Part 2
Bond Markets and Their Infrastructures in Each Economy

Contents

Figures and Table

People's Republic of China
(PRC)

1. Bond Market Infrastructure

1.1 Overview of Bond Markets

People's Republic of China's bond market is comprised of the Inter-bank Bond Market and the exchange bond market. More than 99% of trades (by value) take place in the Inter-bank Bond Market.[1] This market is also called the "China over-the-counter (OTC) market." The China Foreign Exchange Trade System (CFETS), also known as the National Interbank Funding Center (NIFC), provides the electronic platform for the Inter-bank Bond Market.

Inter-bank Bond Market-traded bonds are settled through the China Central Depository and Clearing (CCDC) or the Shanghai Clearing House (SHCH), while exchange-traded bonds are settled through the China Securities Depository and Clearing Corporation (CSDCC). Currently, government bonds, policy bank bonds, central bank bills, and other instruments are settled by CCDC, while super and short-term commercial papers (SCP), commercial papers (CP), private placement notes (PPN), etc. are settled by SHCH. Cash are transferred through the high-value payment system (HVPS) of the China National Automatic Payment System (CNAPS), a type of real-time gross settlement (RTGS), which is operated by the People's Bank of China (PBOC). Shanghai Clearing House (SHCH) is designated to provide centralized clearing service in the Inter-bank Bond Market and slated for production operation near the end of year 2011. The PBOC is opening the Inter-bank Bond Market for cross-border trade.

Nonresidents need to access to the exchange markets—the Shanghai Stock Exchange (SSE) and Shenzhen Stock Exchange (SZSE)—as a qualified foreign institutional investor (QFII). Data traded on the exchange markets are transmitted to the CSDCC and settled using commercial bank money (Part 3, Figure A.1).

---

[1] There is a retail bond (OTC) market called the commercial bank counter market. Since the size of the market is negligibly small compared with the interbank bond market, it is not included in this survey.

1.2. Description of Related Organizations

China Foreign Exchange Trade System and National Interbank Funding Center (CFETS/NIFC)

CFETS, founded on 18 April 1994, is a sub-institution of the PBOC. Its main functions include: organizing and providing systems for foreign exchange (FX) trading, renminbi lending, bond trading, and exchange-rate and interest-rate derivatives trading; providing clearing, information, risk management, and surveillance services on interbank markets; and engaging in other businesses authorized by the PBOC. CFETS is also called ChinaMoney.

The Shanghai Stock Exchange (SSE)

SSE was founded on 26 November 1990 and began operations on 19 December 1990. It is a membership institution directly governed by the China Securities Regulatory Commission (CSRC). Membership of the SSE includes domestic brokers and a small number of foreign brokers. SSE deals with A-Shares, B-Shares, government, corporate and convertible bonds, and securities investment funds.

The Shenzhen Stock Exchange (SZSE)

SZSE, established on 1 December 1990, is a self-regulated legal entity under the supervision of CSRC. Its main functions include providing venue and facility for securities trading, formulating operational rules, arranging securities listing, organizing and supervising securities trading, offering membership supervision and oversight of listed companies, managing and publicizing market information and other capacities permitted by CSRC.

China Central Depository and Clearing Company, Limited (CCDC)

CCDC is a state-owned financial institution operating the China Bond Integrated Business System (CCDC system). CCDC mainly serves the Inter-bank Bond Market and also acts as general custodian for cross-market eligible issues. CCDC-eligible securities are dematerialized, including: Treasury bonds, local government bonds, policy bank bonds, agency bonds, commercial bank bonds, other financial bonds, enterprise bonds, commercial papers (CPs), medium-term notes (MTNs), mortgage-backed securities (MBS) and asset-backed securities (ABS), foreign bonds, domestic dollar bonds, among others. There are over 10,000 system members, including almost all financial institutions and various non-financial entities, as well as institutional investors. CCDC also provides nearly 9 million retail bond investors in the OTC market with inquiry service. CCDC business line covers issuance, registration, custody, settlement, principal and interest (PI) payment, and, collateral management, as well as services on information, research, consultancy, training, and magazine production. CCDC establishes a proprietary network based on multi-telecommunications operator lines, with integrated services digital network (ISDN) and dial-up combined. CCDC has several links with central securities depositories (CSDs) and international CSDs (ICSDs), including the link with CSDCC, outbound links with Hong Kong Monetary Authority's Central Moneymarket Unit (CMU), and Clearstream. CCDC is also called ChinaBond.

China Securities Depository and Clearing Corporation (CSDCC)

CSDCC is owned by SSE and SZSE, and operates the CSDCC system for the exchange

market. CSDCC-eligible securities are dematerialized, which include: stocks, bonds,[2] warrants, exchange trade funds (ETFs), ABSs, and repo. CSDCC business line covers central registry and depository, wherein security companies and custodian banks act as sub-custodians. CSDCC is also known as ChinaClear.

Shanghai Clearing House (SHCH)
SHCH was authorized by the PBOC and the Ministry of Finance of China, and incorporated by the CFETS, CCDC, China Banknote Printing and Minting Company Limited (CBPMC), and China Gold Coin Corporation. SHCH aims to provide central counterparty (CCP) net clearing-based and CSD services for the interbank renminbi and FX market. SHCH currently provides CSD service for innovative instruments and money market tools of the inter-bank market, covering super and short-term commercial papers (SCP), commercial papers (CP), Credit Risk Mitigation (CRM) instrument, and private placement notes (PPN), etc. SHCH has established its proprietary business network through the Synchronous Digital Hierarchy (SDH). SHCH was established in November 2009 by a decree from the PBOC and the Ministry of Finance of China. It provides a CCP function to mitigate counterparty risk and settlement risks, following the Group of Twenty (G-20) recommendation. SHCH is currently focused on the interbank bond and both spot and derivatives FX markets.

1.3 Trading

1.3.1 Inter-bank Bond Market
The Inter-bank Bond Market is a wholesale OTC market also known as the China OTC market. The China OTC market started in 1997 and occupies a dominant position, accounting for more than 97% of trading in the entire market share in 2010. The market does not have a single owners, while the market is operated by CFETS. Participants in the Inter-bank Bond Market are institutional investors. It is a quote (price)-driven market trading government bonds, central bank bills, enterprise bonds, policy bonds,[3] other financial bonds, subordinate bonds, short-term financial bill (STFB), US dollar-denominated bonds, international development institution bonds (IDIB), ABS, and MTN. The People's Bank of China (PBOC) supervises and regulates the Inter-bank Bond Market. In recent years, with market-oriented guidelines, the PBOC, together with relevant departments and the industry, implemented a series of measures to promote the development of the Inter-bank Bond Market. To this end, the PBOC also supervises and guides the National Association of Financial Market Institutional Investors (NAFMII).

Bonds are traded through the CFETS/NIFC and brokers or dealers. The Automated Interbank Trading System (AITS) of the CFETS has a trade-matching function. The AITS is linked with the Centralized Bond Book-Entry System of the CCDC and the Clearing Business Integrated Processing System of the SHCH to support a straight-through processing (STP) of the trading and settlement layers of the Inter-bank Bond Market. The market is regulated by the PBOC.

---

[2] Bonds include Treasury bonds, local government bonds, enterprise bonds, listed corporate bonds, and convertible bonds.
[3] Policy bonds are issued by Chinese policy banks such as the State Development Bank, China Import and Export Bank, and China Agriculture Development Bank, and often represent subordinated debts.

1.3.2 Exchange Market

The exchange market is a retail market open to individuals and non-bank financial institutions. The market is owned and operated by the SSE and SZSE. In 1992, the stock exchanges started government bond trades, and by 1995, all government bonds are traded in the stock exchanges. To support STP, the exchanges are linked with the CSDCC. The market is regulated by the CSRC. Although the exchange market provides platforms for bond transactions, institutional investors prefer to transact bonds in the Inter-bank Bond Market.

1.4 Central Counterparty Clearing

1.4.1 Central Counterparty for Bonds Traded in the China Over-the-Counter Market

SHCH started to provide CCP service for bond transactions in the Inter-bank Bond Market since 19 December 2011. Currently, it is used for bonds deposited by the SHCH.

1.4.2 Central Counterparty for Bonds Traded in the Exchange Market

Bonds traded through the exchanges are netted through CCP, before they are settled at the CSDCC.

1.5 Bond Settlement

1.5.1 Bond Settlement in the China Over-the-Counter Market

Most bonds (or normal bonds), including government bonds traded in the China OTC market, are settled at the CCDC. However, new instruments such as super short term CP (SCP) are settled at SHCH. Normal bond transactions are matched by the Central Bond Integrated Services System and settled through the safekeeping account in the centralized bond book-entry system of the CCDC. The centralized bond book-entry system is linked with the AITS of CFETS to support STP of the trading and settlement layers of the Inter-bank Bond Market.

CCDC's network is a proprietary network. The types of lines are a combination of ISDN and dial up. The protocols used are Transmission Control Protocol/Internet Protocol (TCP/IP), Hyper Text Transfer Protocol (HTTP), and Single Object Access Protocol (SOAP). The interface is used Message Queue (MQ), and message formats use Extensible Markup Language (XML) and text.

For bonds deposited by the SHCH, trades are matched by the Clearing Business Integrated Processing System and settled by the Securities Settlement System of the SHCH after receiving transactions from CFETS.

SHCH has established its proprietary business network via a Synchronous Digital Hierarchy (SDH).

1.5.2 Bond Settlement in the Exchange Market

Bonds are traded through the exchanges and settled at the CSDCC after they have been netted also through the CSDCC, which also serves as the CCP.

Local participants use fiber optic lines and satellite network to access CSDCC's system. Overseas customers, on the other hand, use dial-up connections. The protocol is based on TCP/IP, and message formats are dBase's underlying file format (DBF) and text.

1.6 Cash Settlement

1.6.1 Cash Settlement Using Central Bank Money

Settlement of the bond transactions at the CCDC/SCH is simultaneously processed with cash settlement through the current accounts of HVPS of CNAPS in delivery-versus-payment (DVP) Model 1 of the Bank for International Settlements (BIS) definition. In 2004, the CCDC system linked to the HVPS, which achieved DVP for interbank bond trades. Institutions could also achieve DVP through commercial bank agents that have an account in HVPS. However, this route has not been utilized yet. So far, the overall DVP technical mechanism has been in place, with characteristics of RTGS, central bank money, and strongest finality as a true DVP. For bond transactions settled at the SHCH using DVP mode, cash settlement can be processed in three ways. Institutions who have accounts in HVPS could achieve DVP directly through HVPS. Institutions who do not have accounts in HVPS could achieve DVP either through commercial bank agents, or through their cash settlement accounts at the SHCH. The intraday liquidity facility includes intraday overdraft and collateralized lending is available. Collateralized lending will be used prior to the intraday overdraft. Overnight overdraft is not allowed.

A real-time monitoring system for securities is available for the Inter-bank Bond Market. The monitoring system provides a real-time platform to detect operating conditions, speeds up emergency responses, and significantly improves regulation effectiveness.

The Inter-bank Bond Market is based on a proprietary network using leased lines and dial-up lines provided by multi-vendors. The communication protocol is based on TCP/IP.

1.6.2 Cash Settlement using Commercial Bank Money

Cash settlement is done by CSDCC using Participant Remote Operating Platform (PROP) for SSE market's business and Integrated Settlement Terminal (IST) for SZSE market's business. DVP is settled by Model 2 of the BIS definition.

2. Typical Business Flows

2.1 Delivery-Versus-Payment Flowchart for the China Over-the-Counter Market

The DVP flowchart for the China OTC Market is shown in Part 3, Figure A.2.

2.2 Delivery-Versus-Payment Flowchart for the Exchange Market

The DVP flowchart for the exchange market is illustrated in Part 3, Figure A.3.

2.3 Delivery-Versus-Payment Flowchart for Cross-Border Transactions in the Over-the-Counter Bond Market

China is opening its OTC market (Inter-bank Bond Market) for cross border trades. The PBOC published a notice in August 2010 on renminbi investments by three kinds of institutions in the Inter-bank Bond Market in China on a pilot basis. Please refer to Appendix 1.

For the bond transaction flow for foreign investors in the OTC market, please refer to Part 3, Figure A.4.

2.4 DVP Flowchart for Cross-Border Transactions (Exchange Markets)

For bond transaction flows for foreign investors in the exchange market, please refer to Part 3, Figure A.5.

3. Matching

3.1 Inter-bank Bond Market

On the trading aspect, two matching mechanisms are introduced in the Inter-bank Bond Market through an electronic trading platform operated by CFETS—the bilateral negotiation method and the click-and-deal method. The bilateral negotiation method refers to negotiation on the quotation's key fields between the quotation's initiator and the counterparty. The deal is closed when the initiator and counterparty reach an agreement on key fields. Under the click-and-deal method, the initiator can place a click-and-deal quote in the market, which can be entered into two types. The first type is market-making quotation, which is entered by the market maker. The second is the non-market-making quotation, a one way buy-or-sell quotation, which is entered by any member including a market maker. A counterparty can select a quote and enter the amount he wants to trade and thus 'deal'. Besides, the CFETS electronic trading system provides limit-order functionality under the click-and-deal trading mode. A price limit order is a one-way buy-or-sell order that is matched with a click-and-deal quote. Since a price limit order cannot match with another price limit order, this trading mode is classified under the click-and-deal quote method.

CCDC/SHCH implements automated matching through DVP and FOP. If trade takes place in CFETS platform, CCDC/SHCH receives the data automatically. The CCDC/SHCH then asks both parties to confirm the trading order, and processes the settlement after the confirmations are matched. If counterparties trade outside CFETS system, one party needs to input settlement instruction into the CCDC/SHCH system. The CCDC/SHCH system automatically asks the other party to confirm. If not, CCDC/SHCH does not process settlement. After matching the order, CCDC/SHCH settles the trade in FOP or DVP, as requested by customers.

3.2 Exchange Market

Matching in the exchange market is integrated in its trading system. The SSE uses both the New Generation Trading System (NGTS) and the Integrated Electronic Platform for Fixed-income Securities (IEPFS) for bond trade. The SZSE system uses

the auction trade system and the Integrated Negotiating Trade System (INTS) for bond trade. The matching system is owned and operated by the exchange market it serves.

4. Settlement Cycle

The settlement cycle allows for any date agreed between the counterparties, although T+1 and T+0 are most common for OTC market. Net settlement for bond trades occurs on T+1 at 4:00 p.m., but funding needs to be arranged on the previous day and to be sent by 3:00 p.m. on T+1 for exchange market. Trading data is transferred from the stock exchanges to CSDCC on the trade date, and book-entry transfers are effectuated at end of day of the trade date. If funds are not provided to the client's account, bonds will be withheld by CSDCC until the settlement is cleared. The failed party pays a penalty. CSDCC also supports securities lending transactions and its system supports STP from and to participants.

The standard settlement cycle of trade in government bonds to the settlement is T+1. The reasons for the differences between settlement cycles of typical business processes are: (1) market infrastructure and principle, (2) differences in settlement complexity, and (3) differences in participants' risk level. At present, there is no initiative to shorten settlement cycles. Also, such an initiative should be led by market participants.

5. Numbering and Coding

Both the CCDC and CSDCC settle government-bonds numbering and coding. The numbering and coding process for each CSD is further elaborated below.

5.1 Numbering and Coding for the China Central Depository and Clearing Company, Limited (CCDC)

5.1.1 Securities Numbering
All securities registered on the Inter-bank Bond Market are given an International Securities Identification Number (ISIN). The ISIN is not used for bond trades or settlement, but rather proprietary securities numbering is used. The CCDC is planning to create a conversion table within the system to make possible the conversion of proprietary numbering to ISIN.

5.1.2 Financial Institution Identification
A proprietary participant code is used for financial institution identification. By creating the conversion table in the system, the conversion of proprietary code into the business identifier code (BIC, ISO 9362) is possible.

5.1.3 Securities Account
For securities accounts, the proprietary account code is used instead of ISO 20022.

5.1.4 Cash Account
The proprietary account code is also used for cash accounts instead of the International Bank Account Number (IBAN).

5.1.5 Character Code and Language
Unicode (UTF 8) is used for character codes. For the language code, it is not desirable to use English as a common language, thus, the need to make a standard conversion rule.

5.2 Numbering and Coding for the China Securities Depository and Clearing Corporation (CSDCC)

5.2.1 Securities Numbering
For securities numbering, the local code is still used instead of the ISIN. It is possible to convert local numbering to ISIN using a conversion rule.

5.2.2 Financial Institution Identification
Financial institution identification codes use local codes instead of the ISO 9362 (BIC). A software program is used in converting BIC and local codes.

5.2.3 Securities Account
Local securities account code is used for securities account.

5.2.4 Cash Account
For local accounts, local account code is used instead of the IBAN.

5.2.5 Character Code and Language
Unicode (UTF) is not used as the character set.

6. Medium- to Long-Term Strategy

6.1 CFETS Medium- to Long-Term Strategy
As the main trading platform and the price setting center of RMB products, CFETS will continue to strengthen the construction of infrastructure through promoting debt financing instruments innovation, which is to comply with market demand, going a step further to optimize the market transaction mechanism and service mode, and expanding market participants including continuously introducing foreign institutional investors.

6.2 CCDC Medium- to Long-Term Strategy
CCDC has three major targets to achieve by 2014. First, ensure that its core business, management and systems meet international standards and are fully prepared for the opening up of China's bond market to the world, as well as supporting the RMB bond market's move to become the regional core market. Second, diversify on the basis of professionalization: establishing its strengths while developing its core competencies and new business; protecting against risk and increasing our overall operating capacity. Third, improve its internal management in line with modern financial corporate standards in order to reap both economic and social rewards.

CCDC is trying to enhance its comprehensive issuance services, expanding the coverage and depth of registration and depository services, improving its customer service system, improving IT system construction standards, and promoting strategic research and cooperative exchange.

Cross-border bond-related business will be promoted based on the agreements and Memoranda of Understanding (MOUs) with ICSDs and other CSDs. CCDC shall participate in the International Standardization Organization and shall participate in making the standard rules and promoting related business. Also, CCDC shall consider the situation of each country and each region, and shall support local business as much as possible.

6.3 SHCH Medium- to Long-Term Strategy

Continuous improvement of various aspects of registration, custody, clearing and settlement services, and enhancement of STP processing capabilities would be the core of the Mid- to Long-Term Strategy and Technical System Construction Plan of SHCH. As a clearing institution and CSD, the business area of SHCH includes registration, depository, clearing, settlement and other relevant services of RMB and foreign exchange cash and derivatives.

In terms of registration and depository service, SHCH would improve the efficiency of registration and depository service, as well as reduce the operational risk to meet regulatory requirements. In the aspects of registration, custody, settlement, interest payment, information disclosure, evaluation, collateral management and other information services for innovative, fixed-income and moneymarket instruments, SHCH would enhance the quality of services by an automated and standardized procedure according to relative international standard.

In terms of market services, when broadening the business scope of the CCP clearing and enrich the level and range of clearing members, SHCH would implement the recommended standardized approach, such as BIS and other international standardized institutions. Firstly, it would support and coordinate market regulatory requirement, reform OTC market transactions stratification and settlement agent to improve efficiency and enhance incentive mechanism, by providing relative automotive services. Secondly, it would support multi-product and multi-market to meet the centralized clearing and settlement requirements of OTC market, broaden the service network of clearing members, enhance the data downloading/uploading service via member terminals, and improve the quality of multi-product cross-market clearing and settlement service, to prevent systemic risk.

Appendix 1

People's Bank of China Published Notice on Issues Concerning Renminbi Investments in the Inter-bank Bond Market in the People's Republic of China

The People's Bank of China (PBOC) has published a notice on relevant issues in relation to renminbi investments by three kinds of institutions in the Inter-bank Bond Market in the People's Republic of China on a pilot basis. The Notice has been issued in conjunction with the pilot programme of using renminbi to settle cross-border trades, and is intended to further facilitate and widen the channels for the backflow of offshore renminbi.

Amongst other things, the Notice includes the following provisions:

- The three kinds of competent institutions are offshore central banks or currency authorities (referred to as Offshore Central Banks), renminbi clearing banks in Hong Kong, China and Macau, China (referred to as renminbi Clearing Banks), and offshore participating banks for renminbi settlement of cross-border trades (referred to as Offshore Participating Banks). These three are referred to collectively as Offshore Institutions;
- Renminbi funds that are permitted to invest in the Inter-bank Bond Market shall come from currency cooperation between central banks, cross-border trades and investment in renminbi business;
- Offshore Central Banks and renminbi Clearing Banks may entrust Inter-bank Bond Market settlement agents, which have the capability of conducting international settlement business to trade and settle bonds. They may also apply to open a bonds account with the China Central Depository and Clearing Corporation, Limited directly and complete the relevant procedures with the National Interbank Funding Center;
- Offshore Participating Banks shall entrust Inter-bank Bond Market settlement agents, which have the capability of conducting international settlement business to trade and settle bonds;
- Offshore institutions shall open renminbi special accounts for the funds settlement of bond transactions—each institution is permitted to open only one renminbi special account; and
- Offshore institutions can only make investments within their approved quota, and are not permitted to trade bonds with their affiliate enterprises.

The Notice also applies to other offshore financial institutions that participate in cross-border services settled by renminbi on a pilot basis and use renminbi funds to invest in the Inter-bank Bond Market.

Hong Kong, China
(HKG)

1. Bond Market Infrastructure

1.1 Overview of Bond Markets

The Hong Kong bond market is comprises mainly of over-the-counter (OTC) market, while a relatively small portion of bonds are listed and traded on the Hong Kong Stock Exchange.

The Central Moneymarkets Unit (CMU) serves as the central securities depository (CSD) in Hong Kong for debt securities involving Exchange Fund Bills and notes, government bonds, and debt securities issued by both public and private entities. The CMU is owned and operated by the Hong Kong Monetary Authority (HKMA), and also provides trade matching and bond settlement service for market participants. It also conducts end-of-day batch settlement on net basis, but does not act as a Central CounterParty (CCP).

Cash settlement is performed on the Clearing House Automated Transfer System (CHATS), a computer-based system in Hong Kong for electronic processing and settlement of interbank fund transfers. CHATS operates in a Real Time Gross Settlement (RTGS) mode between banks in Hong Kong, and is designed for large-value interbank payments. Banks using CHATS are connected to the clearing house computer operated by the Hong Kong Interbank Clearing Limited (HKICL). The HKMA, Hongkong and Shanghai Banking Corporation Limited (HSBC), Standard Chartered Bank (Hong Kong) Limited, and Bank of China (Hong Kong) Limited, respectively, serve as the Settlement Institution for the HKD, USD, EUR, and RMB RTGS systems under CHATS.

Please refer to Figure HK01 of Part 3: Diagram of Hong Kong, China Bond Markets.

1.2 Description of Related Organizations

The Hong Kong Monetary Authority (HKMA)

The HKMA was established on 1 April 1993 after the Legislative Council passed amendments to the *Exchange Fund Ordinance* in 1992 empowering the Financial Secretary to appoint a Monetary Authority. The powers, functions, and responsibilities

of the Monetary Authority are set out in the *Exchange Fund Ordinance*, the *Banking Ordinance*, the *Deposit Protection Scheme Ordinance*, the *Clearing and Settlement Systems Ordinance* and other relevant Ordinances. The division of functions and responsibilities in monetary and financial affairs between the Financial Secretary and the Monetary Authority is set out in an "Exchange of Letters" between them dated 25 June 2003. This Exchange of Letters also discloses the delegations made by the Financial Secretary to the Monetary Authority under these Ordinances.

The HKMA's main functions are:

- to maintain currency stability within the framework of the Linked Exchange Rate system;
- to promote the stability and integrity of the financial system, including the banking system;
- to help maintain Hong Kong's status as an international financial center, including the maintenance and development of Hong Kong's financial infrastructure; and
- to manage the exchange fund.

The HKMA is an integral part of the Hong Kong government. In its day-to-day work, the HKMA operates with a high degree of autonomy within the relevant statutory powers conferred upon, or delegated to, the Monetary Authority.

Hong Kong Interbank Clearing Limited (HKICL)

HKICL is a private company jointly owned by the HKMA and the Hong Kong Association of Banks (HKAB). HKICL was established in May 1995 to take over in phases the clearing functions provided by the former management bank of the Clearing House. The Hongkong and Shanghai Banking Corporation Limited (HSBC), and the process was completed in April 1997.

HKICL provides interbank clearing and settlement services to all banks in Hong Kong, and operates a central clearing and settlement system for public and private debt securities on behalf of the HKMA.

1.3 Trading

1.3.1 Over-the-Counter Market
Bonds in Hong Kong are primarily unlisted and traded over-the-counter (OTC).

1.4 CCP (Central Counterparty Clearing)
There is no CCP for the bond market in Hong Kong.

1.5 Bond Settlement
In Hong Kong, majority of bond transactions are conducted OTC, and cleared and settled through the CMU. The Settlement of bond transactions through the CMU is final and irrevocable. This finality is protected from insolvency laws and other laws by the Clearing and Settlement Systems Ordinance (CSSO).

The CMU is the debt securities clearing and settlement system in Hong Kong operated by the HKMA. Established in 1990, the CMU provides an efficient clearing,

settlement and custodian service for debt securities denominated in Hong Kong dollars and other major currencies. It also provides an electronic book-entry system, which eliminates the physical delivery of debt securities between CMU members. These debt securities include Exchange Fund papers, Government bonds, and debt securities issued by both public and private sector entities.

In December 1996, a seamless interface between the CMU and HKD RTGS system was established. Such linkage provides real-time and end-of-day delivery versus payment (DVP) services to CMU members. The CMU was further linked to the USD, euro, and RMB RTGS systems in December 2000, April 2003, and March 2006, respectively, to provide real-time DVP capability for debt securities denominated in these currencies, and also intraday and overnight repo facilities for their respective payment systems in Hong Kong.

Through the seamless interface between the CMU and the HKD, USD, EUR, and RMB RTGS systems, securities transactions can be settled on real-time or end-of-day DVP basis in the CMU. For real-time DVP, both seller and buyer input instructions through its CMU Terminal or SWIFT. Once the instruction is matched, the 'matched' transaction will be stored in the system. The system will then look for the specific securities in the seller's account and put the securities on hold, after which an interbank payment message will be generated. After the payment initiated by the buyer is settled across the books of the HKMA or the Settlement Institution (SI), a confirmed message will be returned to the CMU and the securities held will be released to the buyer. If the seller does not have sufficient securities, the system will retry at a 15 minutes' interval until cut-off time by which all unsettled transactions are converted to end-of-day transactions and settled during the end-of-day settlement run. Likewise, if the buyer does not have sufficient funds in its cash accounts, the transactions are pending for settlement until sufficient funds are available in the buyer's accounts. If transactions cannot be settled before the cut-off time, the transactions are converted to end-of-day transactions and settled during the end-of-day settlement run.

For end-of-day transactions, securities and cash are settled on multilateral netting basis. At the settlement time of end-of-day settlement run, the system calculates the net settlement amount of both securities and cash for each member. The system will then check whether sufficient funds and securities are available for each member. If so, final transfers of both securities and cash for all members are effected simultaneously. Otherwise, all or part of transfer instructions of the members who do not have sufficient funds or securities will be cancelled before final end-of-day settlement takes place.

The settlement of government bond is performed on the CMU's book-entry system. CMU supports both real-time gross settlement (BIS Model 1) and end-of-day net settlement (BIS Model 3). Presently, over 90% of trades are settled on DVP basis. In terms of settlement arrangements, if the debt securities are settled using real-time DVP mode, both cash and securities legs are settled on gross basis. If the debt securities are settled using end-of-day DVP mode, both cash and securities are settled on net basis. If the securities are settled using free of payment (FOP) mode, settlement will be done in gross basis for real-time FOP or net basis for end-of-day FOP.

The settlement process for government bond trades (DVP) is illustrated as follows.

Figure 2.1   Settlement Process for Government Bond Trades

Notes: (1) Sending instructions to CMUP for validation and matching. (2) Once securities and cash are held, real-time delivery versus Payment settlement takes place in (3).
           (4) Confirmation send out. (a) By auto-feeding of concluded transactions on electronic trading platform (ETP) at Bloomberg to CMT for further processing (only
           applicable to registered dealers who have registered to ETP services with CMU)
Source: Hong Kong Monetary Authority.

CMU uses SWIFTNet as its network with participants. Types of lines are leased line and internet. Protocol is TCP/IP. Interfaces are SWIFTNet InterAct and InterBrowse. Message format is ISO15022.

Over the years, CMU has developed external links with regional CSDs and ICSDs. One-way inbound links from Euroclear and Clearstream, the two largest ICSDs in the world, to CMU were set up in 1994 to allow international investors to hold and settle Hong Kong dollar debt securities through these international networks. The linkages were further extended to two-way (bilateral) links in November 2002 (Euroclear) and January 2003 (Clearstream) to enable investors in Hong Kong and other parts of Asia to hold and settle Euroclear and Clearstream debt securities directly in a secure DVP environment via their CMU members.

Hong Kong's multi-currency payment and securities settlement infrastructure is illustrated as follows.

Figure 2.2   Hong Kong Multi-Currency Payment and Securities Settlement Infrastructure

BI-RTGS = Indonesia payment system; CCASS = Central Clearing and Settlement System (DVP for stock); CDFCPS = China's Domestic Foreign Currency Payment System; CLS = Continuous Linked settlement; CMU = Central MoneyMarkets Unit; CNAPS = China National Automatic Payment System; RENTAS = Real-time Electronic Transfer of Funds And Securities System in Malaysia
Source: Hong Kong Monetary Authority.
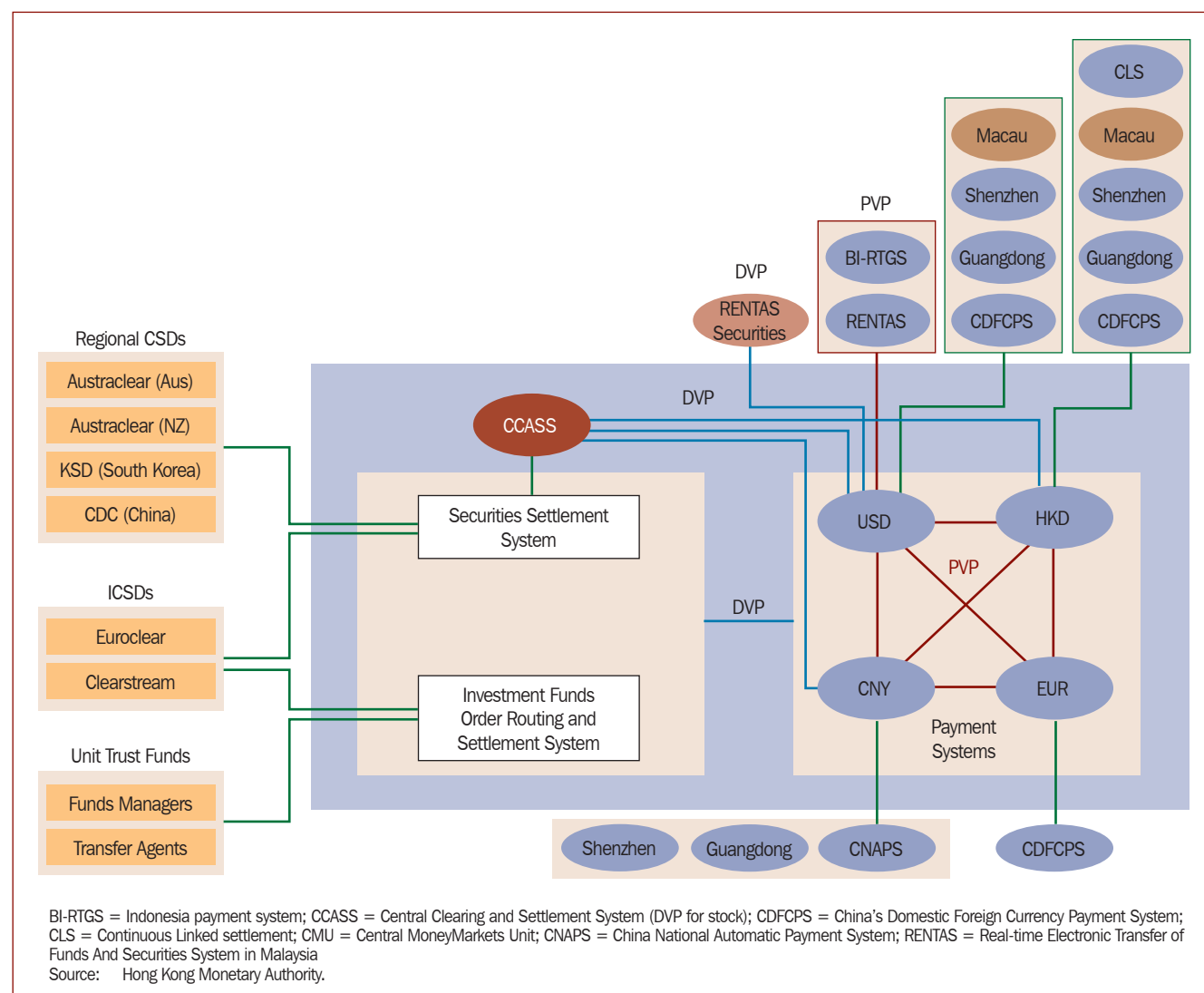
CMU also established links with CDSs in Australia in December 1997, New Zealand in April 1998, and South Korea in September 1999. Apart from facilitating cross-border holding and settlement of debt securities in Hong Kong and overseas, they also enlarged the investor base, broadened the domestic debt markets, and reduced settlement risk by facilitating DVP settlement for cross-border securities transactions. HKMA and the China Central Depository and Clearing Co., Ltd. (CCDC) signed an agreement in April 2004 to establish a link between CMU and the Government Securities Book-entry System (GSBS) operated by the CCDC. This link enables authorised investors in Mainland China to hold and settle Hong Kong and foreign debt securities lodged in CMU. These links for Euroclear, Clearstream, New Zealand, and South Korea are bilateral. The others (for China and Australia) are unilateral. To be concrete, CMU has an account at Austraclear in Australia, and CCDC has an account at CMU.

The cross-border and cross currency trade is processed along the model that the following figures show.

Figure 2.3   Cross-Border Cross-Currency Delivery-versus-Payment Model for Renminbi-Denominated Debt Securities Issued in Hong Kong, China

* The System Link between CNAPS in Mainland and RMB RTGS in Hong Kong, China is established through the Clearing Bank, Bank of China, Hong Kong (BoC, HK).
BoC = Bank of China; CMU = Central Moneymarkets Unit; CNAPS = China National Automatic Payment System (CNAPS); DVP = delivery versus payment; RMB = renminbi; RTGS = real-time gross settlement
Source: Hong Kong Monetary Authority.
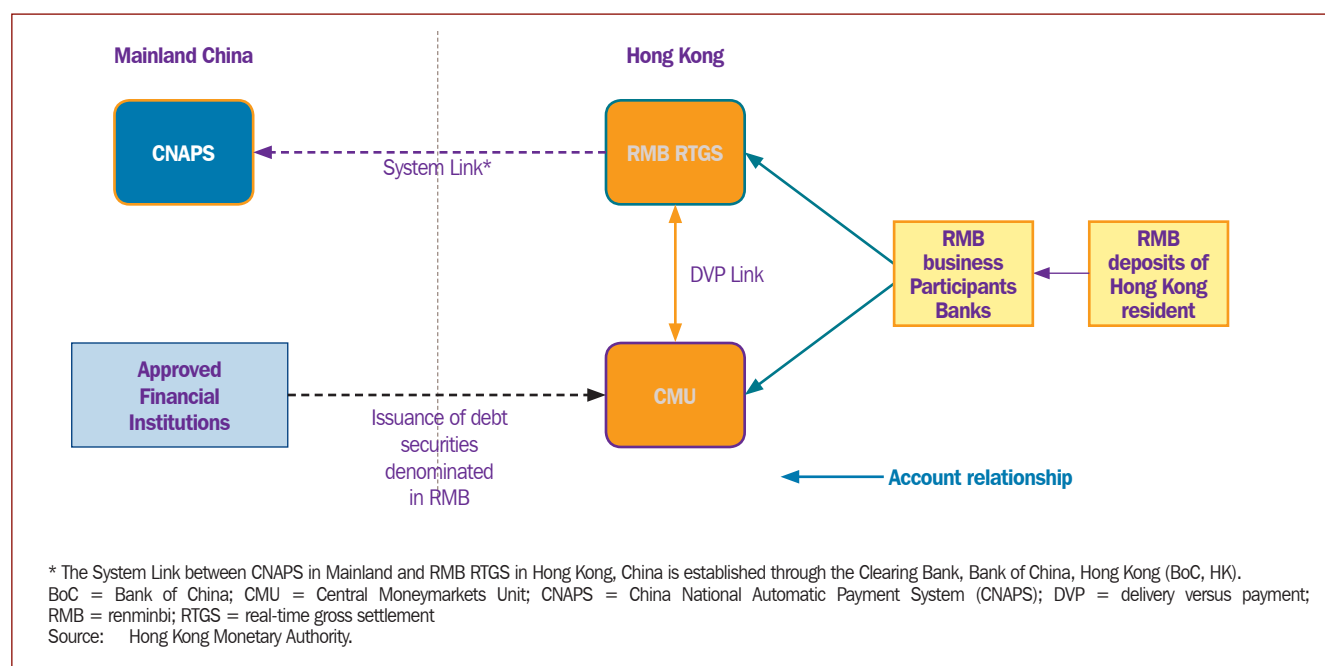
Cross-border cross-currency DVP Model (denominated in USD) is illustrated as follows.

Figure 2.4   Cross-Border Cross-Currency Delivery-versus-Payment Model

* The RENTAS in Malaysia and USD RTGS system in Hong Kong, China are linked enabling real time DVP settlement mode for US dollar denominated securities in Malaysia.
DVP = delivery versus payment; HK = Hong Kong, China; RENTAS = Real-time Electronic Transfer of Funds and Securities; RTGS = real-time gross settlement; USD = US dollar
Source: Hong Kong Monetary Authority.
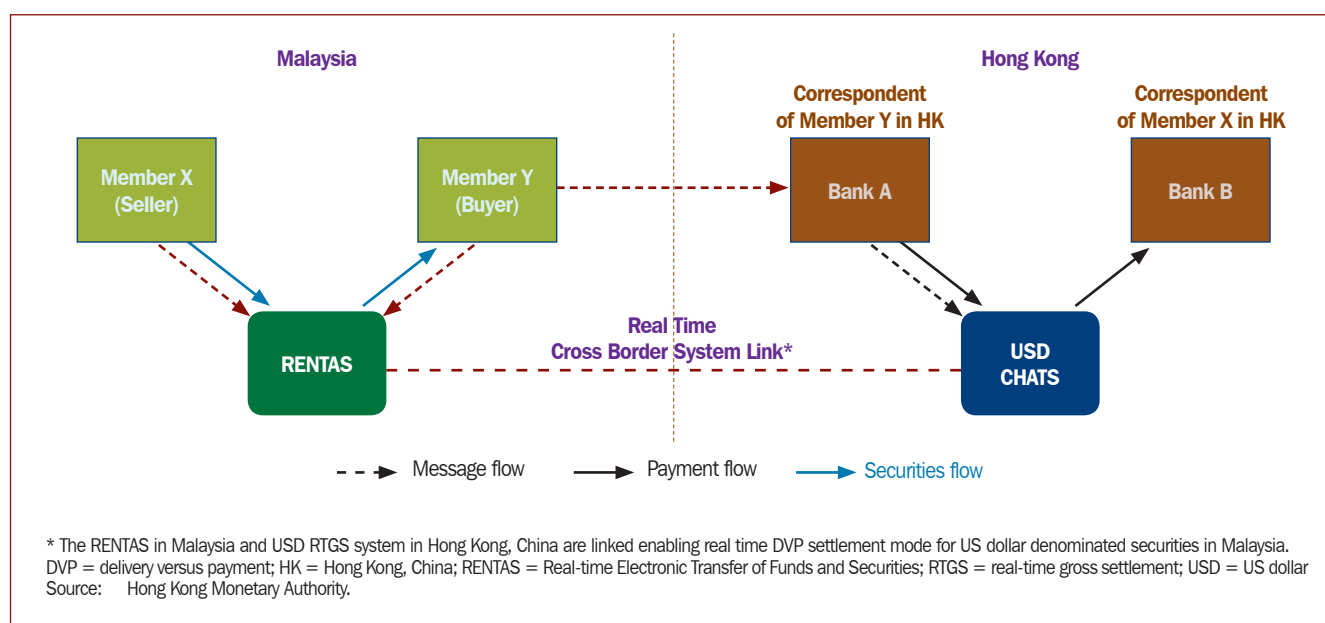
1.6 Cash Settlement

Cash settlement of bond transactions is carried out in CHATS. As mentioned in the section on bond settlement section above, for real-time DVP transactions, after the CMU put the required securities involved in a bond transaction in the seller's account on hold, an interbank payment message will be generated in CHATS. After the payment initiated by the buyer is settled across the books of the HKMA or the relevant Settlement Institution (SI), a confirmed message will be returned to the CMU and the securities held will be released to the buyer. If the buyer does not have sufficient funds in its cash accounts, the transactions will be pending for settlement until sufficient funds are available. In the event that the transaction cannot be settled before the cut-off time, the transaction will be converted to end-of-day transaction and settled during the end-of-day settlement run.

At the settlement time of end-of-day settlement run, the system calculates the net settlement amount of both securities and cash for each member. The system will then check whether sufficient funds and securities are available for each member. If so, final transfers of cash within CHATS and for securities are effected simultaneously. Otherwise, all or part of transfer instructions of the members who do not have sufficient funds or securities will be cancelled before final end-of-day settlement takes place.

To allow better liquidity management for banks via collateral management services, intraday repos and overnight repos are available for HKD, USD, EUR, and RMB RTGS systems while intraday overdraft is available for USD and EUR RTGS systems.[4]

Clearing House Automated Transfer System (CHATS) is a computer-based system established in Hong Kong for the electronic processing and settlement of interbank fund transfers. CHATS operates in a Real Time Gross Settlement (RTGS) mode between banks in Hong Kong and is designed for large-value interbank payments. Banks using CHATS are connected to the clearing house computer operated by the Hong Kong Interbank Clearing Limited (HKICL).

2. Typical Business Flows

2.1 DVP flow for OTC market

Please refer to Figure HK02 of Part 3: Business Process Flowchart of Hong Kong, China OTC market.

2.2 Cross-Border Flow

Please refer to Figure HK03 of Part 3: OTC Bond Transaction Flow for Foreign Investors (including cross-border, funding components).

3. Matching

3.1 OTC market

Pre-matching (including linkage transactions) is not a guarantee of settlement and does not commit either party to settlement. All FOP and DVP instructions,

---

[4] Intraday and overnight repos for RMB RTGS system were introduced on 21 February 2011.

except house transfer between participants own accounts, are required to undergo a matching process. Matching fields are at account level. DVP instructions have a settlement amount tolerance level of HKD10.

Both local matching and central matching are supported in Hong Kong, China. Local matching may save time and workload of input but may take the risk to accept incorrect materials input by the input party; central matching need more time for transaction entry and matching but can help identify trading errors more easily.

4. Settlement Cycle

CMU performs clearing and settlement for a variety of debt securities. The settlement cycle of each type of debt securities generally follows the standard cycle practice of that specific type of securities, and may differ among different types of debt securities. For example, the settlement cycles for Exchange Fund papers traded before and after 11 a.m. Hong Kong, China time are T+0 and T+1 respectively. The settlement cycle for Hong Kong government bonds is usually T+1 or T+2, while for corporate bonds and RMB bonds this is typically on T+2 basis.

5. Numbering and Coding

5.1 Numbering and Coding for OTC Market

5.1.1 Securities Numbering
The International Securities Identification Number (ISIN) is used for all securities numbering of bond transactions. The CMU system also supports the CMU Issue Number (i.e., local code) and Common Code.

5.1.2 Financial Institution Identification
A CMU Member Account Number is assigned by internal coding scheme in the CMU. There is no need to convert between ISO 9362 (BIC) and local codes because the system database can include both BIC and local codes.

5.1.3 Securities Account
ISO 20022 is not used for securities account. It is identified by proprietary coding scheme.

5.1.4 Cash Account
The International Bank Account Number (IBAN) code is not used for cash account. It is identified by the CMU member code (proprietary).

5.1.5 Character Code and Language
A character set supported by SWIFT is used for coding and language.

6.   Medium- to Long-Term Strategies

In terms of official initiatives to promote Straight through processing (STP) of bond trading, the HKMA encourages participants to trade Exchange Fund papers using the electronic platform. In particular, STP is promoted through FOP and DVP settlement for debt securities.

The biggest challenge for market members when it comes to STP involves the processing of cross-border transactions.

A Task Force comprising the HKMA, a group of central banks and central securities depositories (CSDs) in the Asian region, and Euroclear issued a White Paper in June 2010, recommending the development of a Common Platform Model in the long run to improve the cross-border post-trade clearing and settlement infrastructure for debt securities in Asia. One major objective of the Common Platform Model in vision is to introduce common systems and processes as well as common securities and corporate action database across markets in Asia to promote efficiency.

The conceptual framework of the Common Platform Model is illustrated as follows.

Figure 2.5   Conceptual Framework of the Common Platform Model

- New functions provided by the Common Platform.
CSD = central securities depository; ICSD = international central securities depository; RTGS = real-time gross settlement
Source: Hong Kong Monetary Authority.
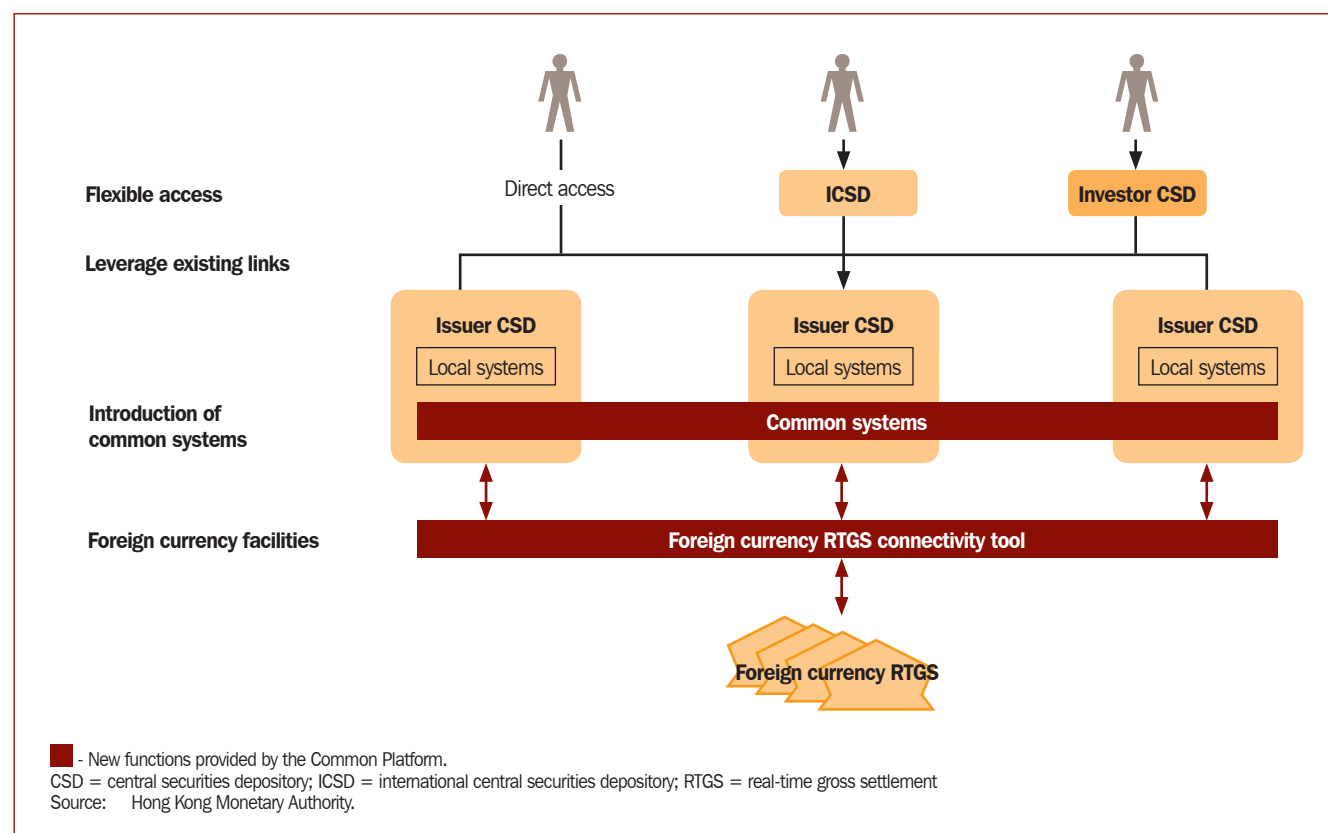
Since it will take time and effort to introduce harmonized processes and common systems in Asia, the Task Force agreed to adopt a gradual approach and introduce the Pilot Platform as a tactical solution to deliver early benefits of the Common Platform

Model before its full implementation. The main objective of the Pilot Platform is to ensure that developments and changes in local practices, regulations and laws are kept at a minimal level, and that the Pilot Platform can bring in come quick wins with limited upfront investments and risks. The HKMA, together with Bank Negara Malaysia and Euroclear, will join the Pilot Platform as early movers. The Pilot Platform is expected to be launched in early 2012; currently, deliberation work is being conducted on possible add-on services (e.g., cross-border collateral management and corporate action servicing) to be provided following the launch of the Pilot Platform.[5]

Concept of the Pilot Platform is illustrated below.

Figure 2.6   Conceptual Framework of the Pilot Platform

- New functions provided by the Pilot Platform.
CSD = central securities depository; ICSD = international central securities depository; RTGS = real-time gross settlement
Source: Hong Kong Monetary Authority.
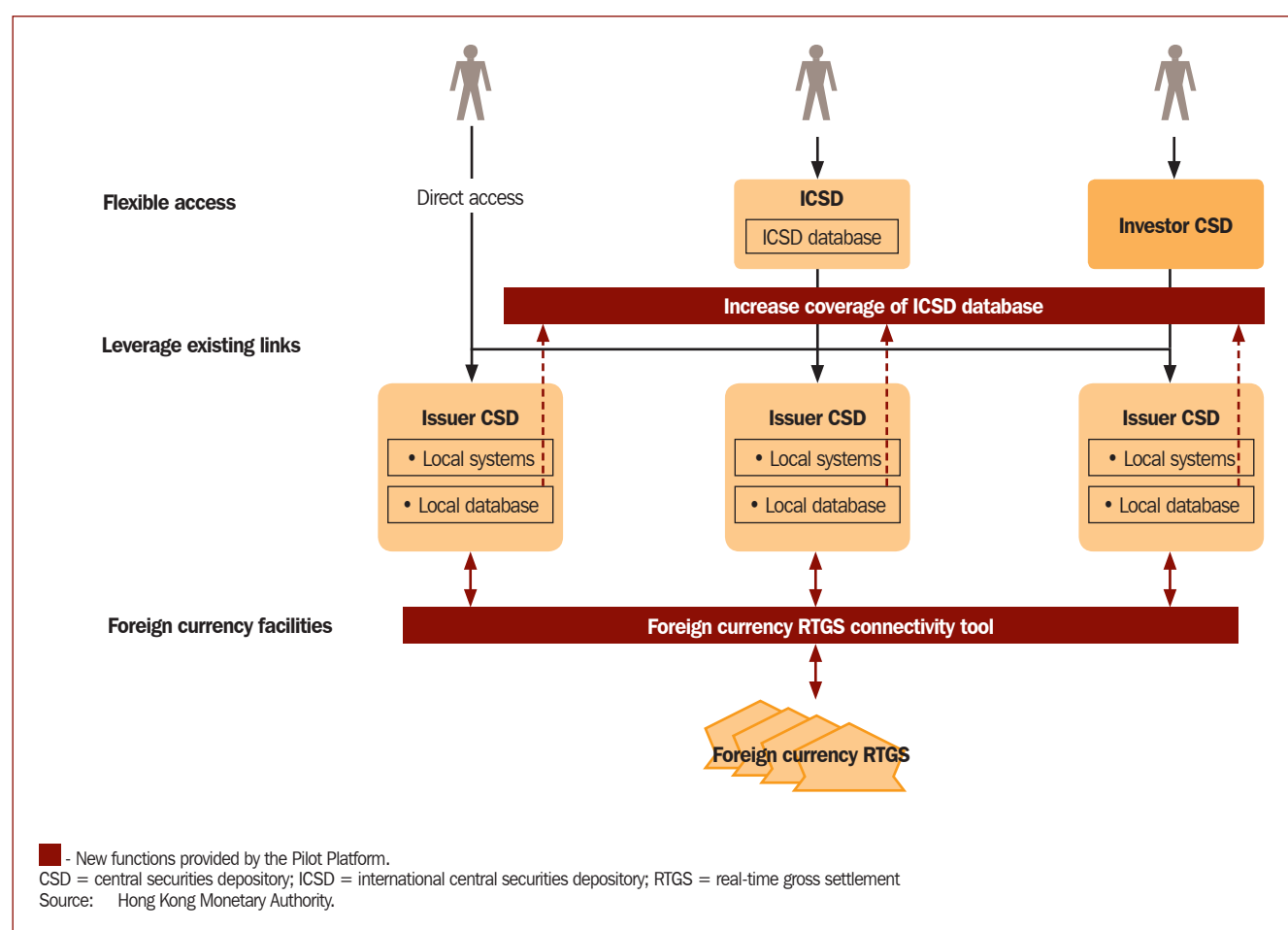
5   Hong Kong Monetary Authority. 2010. *Common Platform Model for Asia: A Collaborative Effort to Improve the Post-Trade Processing Infrastructure for Debt Securities in Asia*. http//:www.info.gov.hk/hkma/eng/public/qb201009/fa2.pdf; *Common Platform Model for Asian Post-trade Processing Infrastructure White Paper.* http://www.info.gov.hk/hkma/eng/infra/pan_asian/white_paper.pdf

Indonesia
(INO)

1. Bond Market Infrastructure

1.1 Overview of Bond Markets

The Indonesian bond market is comprised of the over-the-counter (OTC) and exchange markets. Government bonds are traded OTC, whereas corporate bonds are listed and traded on the Indonesia Stock Exchange (IDX). Corporate bonds can also be traded at the exchange using the Fixed Income Trading System (FITS). However, bond trading at the exchange is not popular, and almost all bonds—either government or corporate bonds—are traded in the OTC market. There are two central depositories handling bonds; Bank Indonesia (BI) handles government bonds, and the Indonesian Central Securities Depository (KSEI) handles corporate bonds, as well as government bonds (as a subregistry to BI). Settlement of the government bonds is performed on Bank Indonesia–Scripless Securities Settlement System (BI-SSSS). Cash settlement of government bonds is conducted on Bank Indonesia Real-time Gross Settlement (BI-RTGS). BI-SSSS and BI-RTGS are electronically linked on Bank Indonesia Real-time Gross Settlement (BI-RTGS). BI-SSSS and BI-RTGS are electronically linked. The settlement of government and corporate bonds in KSEI is performed in the Central Depositary and Book Entry Settlement (C-BEST) system, with cash settlement conducted via the appointed payment banks.. There is no clearing system on the OTC market.

On the other hand, for corporate bonds are traded in IDX using the FITS, the settlement is handled by KSEI with payments through the appointed payment banks. After trade matching, clearing is conducted on the Electronic Bond Clearing System (e-BOCS) and trade settlement is performed on the Central Depositary and Book Entry Settlement (C-BEST). The e-BOCS system is operated by Indonesia Clearing and Guarantee Corporation (KPEI), while the C-BEST system is operated by KSEI. Cash settlement is conducted by five appointed payment banks.

The market infrastructure diagram is shown in Part 3, Figure C.1.

1.2 Description of Related Organizations

The Indonesia Stock Exchange (IDX)

IDX is a private-owned limited company, whose shareholders are local stock-broking firms. IDX is the stock exchange in Indonesia and came into existence as a

mandate of Indonesian Capital Market and Financial Institution Supervisory Agency (BAPEPAM-LK) "Capital Market Master Plan 2005–2009," which stipulated the merger of Jakarta Stock Exchange (JSX) and Surabaya Stock Exchange (SSX).

The Indonesian Clearing and Guarantee Corporation (KPEI)

KPEI, Indonesia's central counterparty (CCP), was established in 1996 as a limited company to provide clearing and settlement, guarantee services for stock exchange transactions (equity, bonds and derivatives), and provide securities and borrowing.

Bank Indonesia (BI)

BI is the central bank of the Republic of Indonesia. BI acts as the central depository for the settlement and safekeeping of government bonds. Its role as the central registry of government bonds includes that of a registrar, settlement agent, and paying agent for coupon, interests and principal.

PT Kustodian Sentral Efek Indonesia (KSEI)

KSEI was granted a permanent operational license as a depository and settlement institution by the BAPEPAM-LK on 11 November 1998. KSEI's shareholders consist of the IDX, KPEI, custodian banks, securities companies, and registrars. KSEI started the settlement operations in scripless form beginning July 2000. Participants in the KSEI are custodian banks, securities companies and other parties approved by Bapepam-LK.

1.3 Trading

1.3.1 Over-the-Counter Markets

There is no formal OTC market in the Indonesian bond market; however, all government bonds can be traded off-exchange and traded directly between counterparties. Although all government bonds and corporate bonds are automatically listed on the IDX, most of trading is done OTC, and they must be reported to the exchange through their system called Centralized Trading platform (CTP) within 30 minutes after a trade is executed. The OTC market occupies a dominant position of bond trading (100%).

The centralized trading platform (CTP) is an electronic system established to facilitate the reporting of bond transactions. This system was introduced in September 2006 following the appointment of SSX as the Bond Transaction Reporting Center. Users of the CTP are securities companies and banks, which are obliged to report all their corporate and government bond transactions, as well as the transaction of their clients. After the merger, IDX takes over this role from SSX.

1.3.2 Exchange Markets

In June 2005, the stock exchange introduced FITS to facilitate the trading of bonds in the exchange. Bond trades in the exchange are handled through the e-BOCS, including allocations.

IDX provides Exchange Trade and OTC reporting as follows.

- **Bonds Exchange Trading System;**
Investor can order and trade bonds in this system via exchange member (currently only Securities Company) though there was no transaction in Bonds Exchange

Trading System in 2011.

- **Bonds Transaction Reporting System;**
IDX has been appointed by Bapepam-LK and Indonesia SEC, as the Bonds Transaction Reporting Beneficiary, since 2006. Market player reports their OTC transaction to this system via banks and securities company. Market player have obligation to report these transaction to Bapepam-LK through Bonds Transaction Reporting System within 30 minutes.

Both systems can be used for government and corporate bonds.

Figure 3.1   Secondary Market Flow
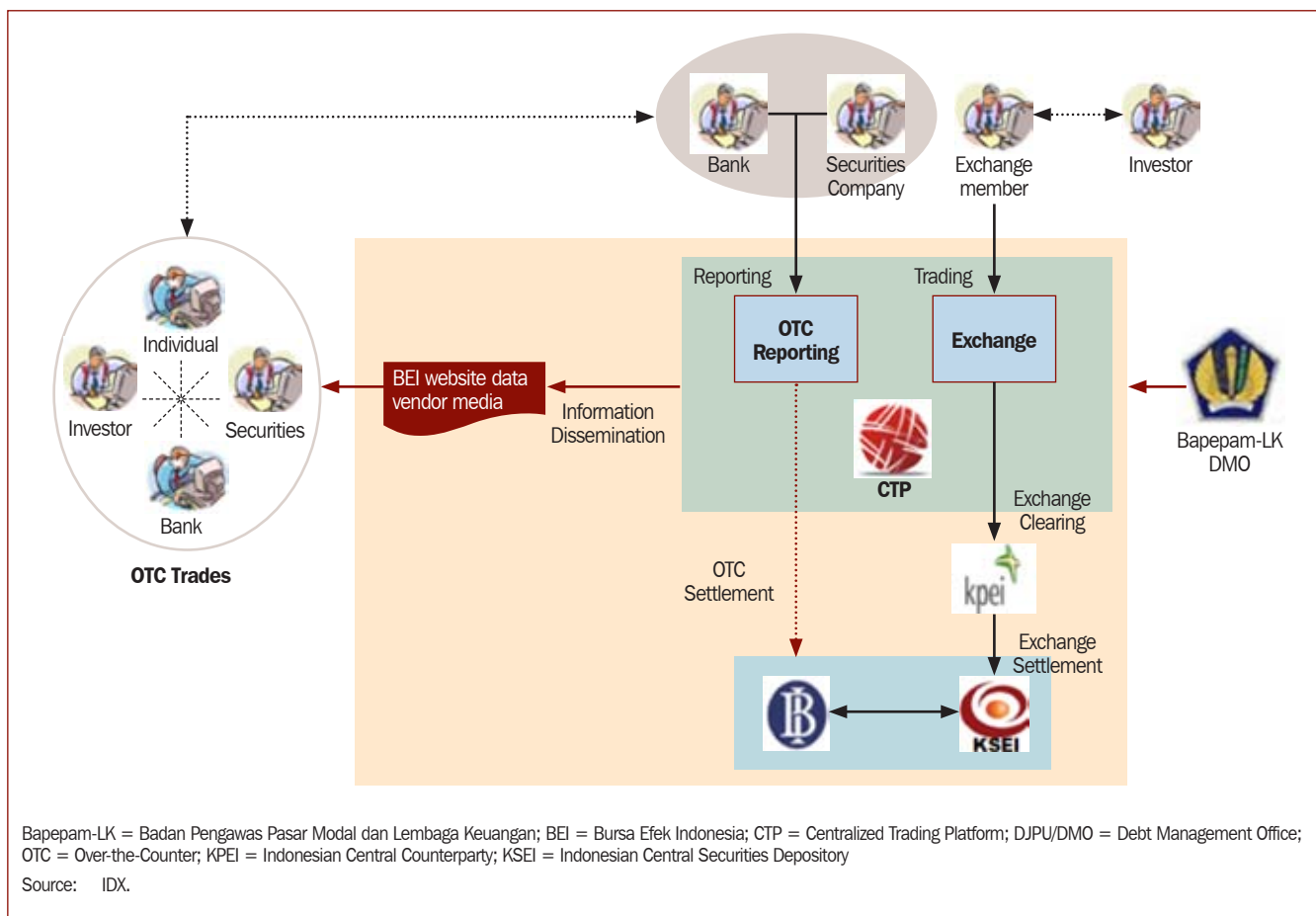
Bapepam-LK = Badan Pengawas Pasar Modal dan Lembaga Keuangan; BEI = Bursa Efek Indonesia; CTP = Centralized Trading Platform; DJPU/DMO = Debt Management Office; OTC = Over-the-Counter; KPEI = Indonesian Central Counterparty; KSEI = Indonesian Central Securities Depository

Source: IDX.

1.4 Central Counterparty Clearing

1.4.1   Central Counterparty Clearing for the Over-the-Counter Market
There is no clearing system on the OTC market.

1.4.2   Central Counterparty Clearing for the Exchange Market
The KPEI has operated e-BOCS since 2006. e-BOCS is the system to settle all bond transactions executive in the IDX. This clearing mechanism shortens the settlement of bonds obligations and also increases efficiency of settlement.

1.5 Bond Settlement

1.5.1 Bond Settlement Traded at Bank Indonesia–Scripless Securities Settlement System

For government bonds, BI is currently appointed as the central registry to handle government bonds, while KSEI and other custodians are sub-registries under BI. Currently, BI maintains only one omnibus account for each sub-registry. Brokers and some custodians, which are not sub-registries of BI, settle and deposit their government bonds to KSEI as the central depository. The registry system of Indonesian government bonds is illustrated as follows.

Figure 3.2 Registry System of Indonesian Government Bonds

KSEI = PT Kustodian Sentral Efek Indonesia
Source: Indonesian Central Securities Depository.
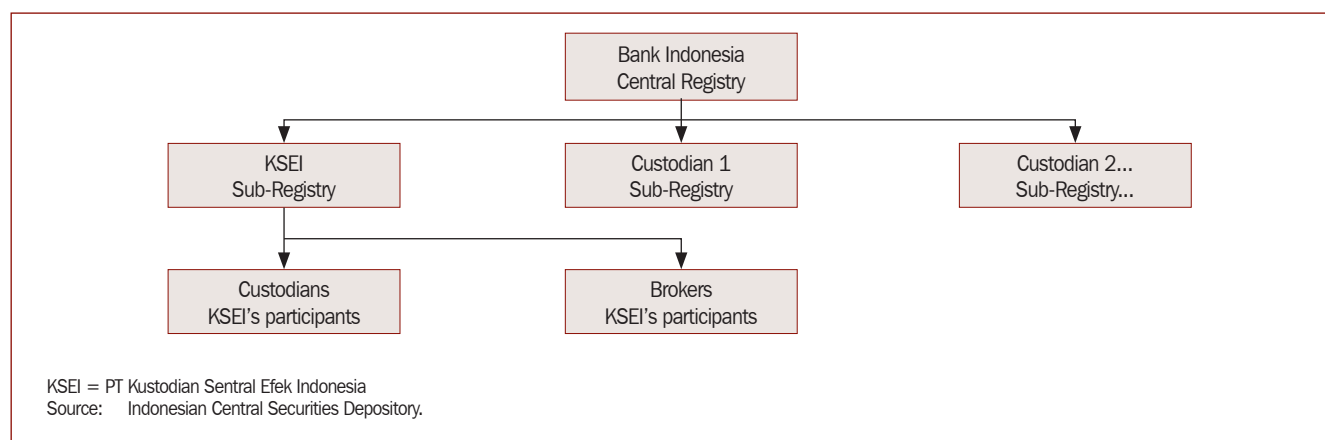
Settlement of government bonds is through BI-SSSS, which has been implemented since 16 February 2004. Under BI-SSSS, settlement of government bonds can only be performed on delivery-versus-payment (DVP) basis. This means that government bonds are not allowed to be settled on a free-of-payment (FOP) basis, unless it is a transfer for the same beneficial owner, grant, settlement of court, and lending and borrowing. BI-SSSS adopts DVP Model 1 of the Bank for International Settlement (BIS) models.

BI-SSSS's network is a proprietary network. The types of lines are leased line and dial-up. Its protocol is Systems Network Architecture (SNA) while its interfaces are proprietary (file transfer protocol [FTP]) and socket. The message format is proprietary.

1.5.2 Bond Settlement Traded at Central Depository and Book-Entry Settlement

The settlement of corporate bonds is performed on KSEI's C-BEST. C-BEST enables the settlement of government bonds for all market players who have a security account in KSEI but are not sub-registries of BI-SSSS. There is no different procedure for trading government bonds on the exchange market and OTC. KSEI participants have access only to C-BEST but C-BEST is directly connected to BI-SSSS, and automatically delivers or receives messages concerning settlement processes in BI-SSSS automatically delivers or receives messages concerning settlement processes in BI-SSSS; therefore, participants of KSEI can monitor transaction status, balance position, and obtain reports with C-BEST. Transaction status in C-BEST is available for viewing and may be downloaded every 15 minutes. C-BEST adopts DVP Model 2 of the BIS settlement models. Government bonds settlement between BI-SSSS and C-BEST is illustrated as follows.

Figure 3.3   Government Bonds Settlement between BI-SSSS and C-BEST

BI-SSSS = Bank Indonesia-Scripless Securities Settlement System; C-BEST = Central Depository and Book-Entry Settlement; KSEI = PT Kustodian Sentral Efek Indonesia;
BI-RTGS = Bank Indonesia Real-time Gross Settlement
Source: Indonesian Central Securities Depository (KSEI).
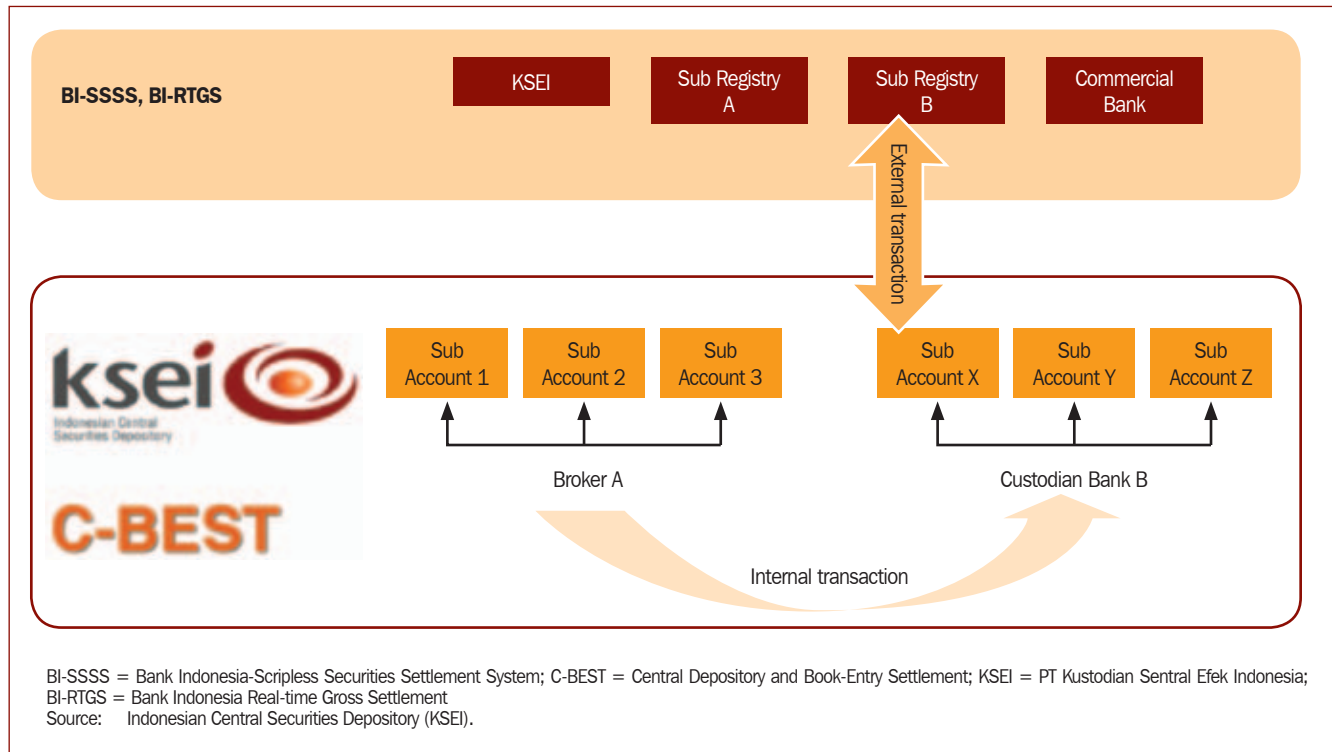
1.6 Cash Settlement

Participants in the BI-SSSS utilize central bank money for bond settlement. BI-SSSS and BI-RTGS owned by BI are directly connected to execute DVP settlement. Overdraft is not permitted for foreigners.

Participants in the KSEI, on the other hand, utilize commercial bank money. KSEI have appointed four cash settlement banks: PT Bank Mandiri Tbk (BMRI), PT Bank CIMB Niaga Tbk (BNGA), PT Bank Central Asia Tbk (BBCA), and PT Bank Permata Tbk (BNLI). Overdraft is not permitted for foreigners, but intraday facility is allowed provided the intraday is supported with a proof of incoming funds or delivery settlement instruction. Custodians provide intraday facility to their selected clients for settlement purposes.

2.   Typical Business Flows

2.1 Delivery-Versus-Payment Flow for the Over-the-Counter Market

Part 3, Figure C.2 illustrates the bond transaction flow for domestic trades (OTC market and DVP).

2.2 Delivery-Versus-Payment Flow for Cross-Border Bond Transactions

Bond transaction flow for foreign investors in the OTC market (DVP) is illustrated in Part 3, Figure C.3.

3. Matching

BI-SSSS provides central matching as settlement matching for bond transactions traded on the OTC market. The seller enters the DVP instruction as bond settlement instruction and the buyer enters the receive-versus-payment (RVP) instruction to BI-SSSS. BI-SSSS then compares the DVP and RVP instructions. When the message items of the instructions are completely the same, the status is regarded as matched. If there is discrepancy between the instructions, the status is regarded as mismatched. If one of the instructions is not yet entered, the status is regarded as unmatched.

4. Settlement Cycle

There is no fixed settlement period for bonds in the OTC market. The settlement date is usually negotiated and agreed at the time of the deal by the trading counterparties, and is generally T+2 or T+3. Market participants may discuss the shortening of the settlement cycle.

5. Numbering and Coding

5.1 Numbering and Coding for the Over-the-Counter Market

5.1.1 Securities Numbering
Local code is commonly used in the local market other than the International Securities Identification Number (ISIN) code.

5.1.2 Financial Institution Identification
A local code is used for foreign institution identification.

5.1.3 Securities Account
Local securities account numbering is used.

5.1.4 Cash Account
Local cash account numbering is used.

5.1.5 Character Code and Language
UTF-8 is used for BI-SSSS, C-BEST and BI-RTGS.

6. Medium- to Long-Term Strategies

BI as the central registry for government bonds maintains an electronic registration. Therefore, the settlement processes of government bonds are STP. One of the current challenges in the Indonesian bond market is how to encourage market participants to use a centralized platform for bond trading.

Regarding new initiatives, firstly, BI plans to implement a second-generation system, which will replace the existing model that includes BI-SSSS and BI-RTGS. It will consist

of two systems—the trading system and settlement system. The second-generation model system will be implemented in 2012. Figure 3.4 illustrates the comparison between the existing system and the proposed second-generation system.

Enhancing interoperability between BI-SSSS and C-BEST is another initiative being undertaken by the BI. Particularly, emphasis is placed issues of interface, standardization (e.g., ISIN), tier system, single investor identity, and synchronization.

Figure 3.4   Comparison between the Existing System and the Second-Generation System

ABS = Automatic Bidding System; BI-Fac = Bank Indonesia-Liquidity Facility; BI-SSSS = Bank of Indonesia-Scripless Securities Settlement System; BI-RTGS = Bank Indonesia Real-time Gross Settlement; CCP = Central Counterparty; C-BEST = Central Depository and Book-Entry Settlement; KSEI = PT Kustodian Sentral Efek Indonesia; LSM = liquidity saving mechanism; SBI = Bank Indonesia Certificates; SBN = Government Securities (Indonesia); SNA = Systems Network Architecture
Source: Bank Indonesia.

The road map to implement the second-generation system is as follows.

Table 3.1   Road Map for the Implementation of Second-Generation System

Year	Activities
2008	• Grand Design • Business Requirements • Market Liquidity and Financial Market Deepening
2009	• Request for Proposal (RFP) • Product Evaluation • Procurement Process
2010	• Procurement Process • Dissemination of Participants and other Stakeholders • Formulation of Regulation
2011	• Formulation of Functional Specifications and Design Specifications • Development (Product Customization) • Dissemination of Participants and other Stakeholders • Formulation of Regulations (BI Regulation and Circular Letter)
2012	• Testing (Unit Test, SIT, UAT, UIT, Simulation/Industrial Test) • Dissemination to Participants and other Stakeholders • Formulation of Regulations (BI Regulation, Circular Letter, SOP, guidance) and By-laws • Training for Participants • Preparation for Implementation • Implementation

SIT = System Integration Test; SOP = Standard Operating Procedure; UAT = User Acceptance Test; UIT = User Integration Test
Source: Bank Indonesia.

Japan
(JPN)

1. Bond Market Infrastructure

1.1 Overview of Bond Markets

There are two major bond markets in Japan, which are the over-the-counter (OTC) market and the securities exchange market. The exchange market is operated by the Tokyo Stock Exchange (TSE). Most bonds are traded on the OTC market. The pre-settlement matching system (PSMS) is provided by the Japan Securities Depository Center, Incorporated (JASDEC) for all types of debt securities traded on the OTC market. However, some transactions go directly to the central securities depositories (CSDs). Regarding clearing systems, the Japan Government Bond Clearing Corporation (JGBCC) is the central counterparty (CCP) for Japanese government bonds (JGB); Japan Securities Clearing Corporation (JSCC), which was established by the TSE and four other securities exchanges, and the Japan Securities Dealers Association, are clearing organizations that conduct the Financial Instruments Obligation Assumption Business under the *Financial Instruments and Exchange Law*. There are two CSDs in the Japan bond market: Bank of Japan (BOJ), which operates the BOJ-NET and is the CSD of JGBs, and JASDEC, which is the CSD for all other securities in Japan. All securities can be settled with central bank money (Japanese yen) using delivery versus payment (DVP). These descriptions are mainly about bond transactions in the OTC market. Part 3, Figure D.1 illustrates the bond market infrastructure diagram.

1.2 Description of Related Organizations

The Japan Securities Depository Center, Incorporated (JASDEC)
JASDEC was founded on 6 December 1984 as a non-profit foundation and began operations on 9 October 1991. It was incorporated on 4 January 2002 and began operations as a stock company, JASDEC Incorporated, on 17 June 2002. The stock company is owned by its depository participants, which include securities companies, banks, insurance companies, securities finance companies, and stock exchanges.

The Tokyo Stock Exchange (TSE)
TSE is a stock corporation that provides an exchange securities market under the authorization of the Prime Minister. TSE is a central institution in the secondary

market and its major functions include provision of a market place, monitoring trading, listing securities, monitoring listed securities, and supervision of trading participants.

The Japan Government Bond Clearing Corporation (JGBCC)
JGBCC was established through a joint capital investment by major market participants, namely securities companies, banks and money-market brokerage companies to enhance the safety, efficiency of, and convenience in the Japanese government bond market.

Japan Securities Clearing Corporation (JSCC)
JSCC was established in 2002 as the first cross-market clearing organization in the Japanese securities market by the TSE, Osaka Securities Exchange, Nagoya Stock Exchange, Sapporo Securities Exchange, Fukuoka Stock Exchange, and the Japan Securities Dealers Association. In January 2003, JSCC was licensed as the first clearing organization in Japan to conduct the securities obligation assumption business now called the financial instruments obligation assumption business under the *Securities and Exchange Law* (now called the *Financial Instruments and Exchange Law*).

Bank of Japan (BOJ)
BOJ is the central bank of Japan. BOJ deals with the entire business of JGBs, namely issuance, interest payment, and redemption. BOJ is also the central depository of JGBs. Settlement of funds and Japanese Government Securities arising from the above operations are facilitated by the BOJ Financial Network System (BOJ-NET).

1.3 Trading

Bonds are mostly dealt in the OTC market. The seller and buyer trade through telephone, fax, the Proprietary Trading System (PTS), or systems operated by information vendors.

JASDEC provides PSMS for all types of debt securities, though some transactions go directly to the CSDs. It also serves a pre-settlement matching function for clearing and DVP settlement, and post-trade matching function.

1.4 Central Counterparty

Approximately 40% of JGB market domestic transactions are cleared by the JGBCC, which is the CCP for JGB.[6] JGBCC replaces a contract between two parties to a JGB trade with two contracts: one between JGBCC and the buyer, and the other between JGBCC and the seller. Cash and securities positions between JGBCC and participants are netted and settled on a DVP basis using BOJ-NET. Netting reduces the value of JGB transfers to roughly a quarter of the value of the original transactions. JSCC is the CCP for exchange market transactions.[7]

---

[6] Cross-border transactions are processed directly by the CSD (BOJ-NET) without using the CCP (JGBCC).

[7] The transactions traded on the TSE are cleared by JSCC. JSCC plays a role in assuming obligation, guarantee settlement, netting funds and securities for transfer, and instructing a settlement facility for transfer. JSCC stipulates the criteria for the qualifications to become clearing participants, to whom JSCC acts as the counterparty of the obligations. In addition, JSCC establishes a scheme to guarantee settlements in place, as well as performs the DvP settlement between clearing participants and the JSCC.

1.5 Bond Settlement

1.5.1 Bond Settlement for Government Bond Market

The BOJ is the CSD of JGBs. It operates the BOJ-NET, an online network system linking BOJ and other financial institutions. The BOJ-NET is used for funds transfer services, as well as JGB-related services, including settlement and other services, namely auction and initial payments for the issuance of JGBs. The business application of the BOJ-NET for JGB-related services is called BOJ-NET JGB Services. BOJ-NET JGB Services started operation in 1990 to enable online processing of JGB-related services.

BOJ-NET's network is also called BOJ-NET. The type of line used is VPN. The protocol used is TCP/IP.

1.5.2 Bond Settlement for Other Types of Bond Market

JASDEC is the central depository for all types of bonds, except JGBs. Under the dematerialized system, it is compulsory for all listed securities to be transferred on JASDEC's Book-Entry Transfer System. Transaction settlement includes securities only, with cash settling separately through the BOJ.

The book-entry transfer system is called the JASDEC network. Types of lines are Integrated Services Digital Network (ISDN) and leased line. The protocol is TCP/IP while the interface used is Common Object Request Broker Architecture (CORBA). Message formats are ISO 15022 and comma separated values (CSV).

1.6 Cash Settlement

Cash settlement of bond transactions uses central bank money. For cash settlement obligations for domestic bond transactions, JGBCC has an account with the BOJ.

Intraday overdraft is allowed, provided that there is a collateral to secure debt incurred as a result of use of the intraday overdraft facility. The liquidity-saving feature of the BOJ-NET real-time gross settlement (RTGS) system enables the smooth settlement of bond transactions.

2. Typical Business Flows

2.1 Delivery-Versus-Payment Transaction Flow for Domestic Japanese Government Bond Trade (OTC Market)

The data are entered to BOJ-NET from both seller and buyer, and settled simultaneously. Delivery-versus-payment (DVP) settlement is effected by locking all related accounts and releasing them simultaneously. The bond transaction flow for domestic trades in the OTC market (DVP) for JGBs is illustrated in Part 3, Figure D.2.

2.2 Delivery-Versus-Payment Transaction Flow for Cross-Border Japanese Government Bonds Trade

Trade order is placed from a foreign institutional investor (FII) to a global broker then to a domestic broker. The trade flow is a typical one as shown in Part 3, Figure D.3.

Japan is an open market where third party foreign exchange is entirely possible and used frequently. Japanese yen is available in international financial markets. Also, a global custodian, or even large FIIs or their investment managers, may have their own treasury function based in Tokyo. Thus, trades are funded into a domestic custodian a/c in Japanese yen on settlement day.

An initiative called "Towards Japan Securities Settlement Systems and Infrastructure Reform" established by the Securities Settlement System Reform Promotion Working Group, which was convened by the Committee for Reform of Securities Clearing and Settlement System, started in year 2000 to develop a more efficient, more accessible, and lower risk securities settlement system in Japan.

The bond transaction flow for foreign investors in the OTC market (DVP) is shown in Part 3, Figure D.3.

2.3 Delivery-Versus-Payment Transaction Flow for Domestic Japanese Government Bonds Trade in the Over-the-Counter Market after the New BOJ-NET

The New BOJ-NET will be made possible to be connected with PSMS and JGBCC. If the New BOJ-NET is connected with PSMS after establishment of the New BOJ-NET, the trade data are directly transmitted from PSMS to BOJ-NET.

An example of the DVP transaction flow which uses PSMS in the case that New BOJ-NET is connected with PSMS is shown in Figure JP04 of Part 3: Bond Transaction Flow for Domestic Trades: OTC Market (JGB)/DVP.

An example of the DVP transaction flow which uses PSMS and JGBCC in the case that New BOJ-NET is connected with PSMS and JGBCC is shown in Figure JP05 of Part 3.

2.4 DVP Transaction Flow for Domestic Corporate Bond Trade (OTC Market)

DVP transaction flow for domestic corporate bond trade is shown in Part 3, Figure D.6.

3. Matching

Pre-Settlement Matching System
The PSMS provides a framework for electronic matching on trades and settlements for institutional investor transactions between investment management companies, securities companies, trust banks, custodian banks, life and non-life insurance companies to achieve the seamless, automated processing of all operations from post trade through to settlement. Moreover, PSMS provides an advanced matching function for DVP book-entry transfer settlements conducted by JASDEC, as well as for clearing by the JGBCC. Please refer to Appendix 2. Some transactions are directly matched in the CSD (BOJ-NET), which provides local matching facility. Both seller and buyer enter trade data and the data are forwarded to the counterparty. If the data are correct, the counterparty will send them back to the BOJ-NET with an affirmative message.

A few variations of trade matching by PSMS are shown in Part 3, Figure D.7.

4.   Settlement Cycle

The standard settlement cycle of domestic transactions is T+3. The settlement cycle of cross-border transactions is T+2~T+4. One reason for the difference is that business processes are different between domestic transactions and cross-border transactions. Cross-border transaction may require additional operations by the global and local custodians. Another reason is the time-zone differences between North America, Europe, and Japan.

The settlement cycle for outright DVP transaction will be shortened to T+2 beginning April 2012 for domestic transactions. An initiative to shorten settlement cycle is discussed later in the "Medium- to Long-Term Strategy."

5.   Numbering and Coding

5.1 Numbering and Coding for Over-the-Counter and Exchange Markets

5.1.1 Securities Numbering

The New BOJ-NET will adopt International Securities Identification Number (ISIN) as securities identification number. JASDEC has already adopted ISIN for bonds and it will be the standard for securities identification in Japan. A relationship between ISIN and local numbering is shown as follows.

Figure 4.1   Local Numbering Scheme and Codes for International Securities Identification Number

ISIN = International Securities Identification Number
Source: NTT DATA Corporation.
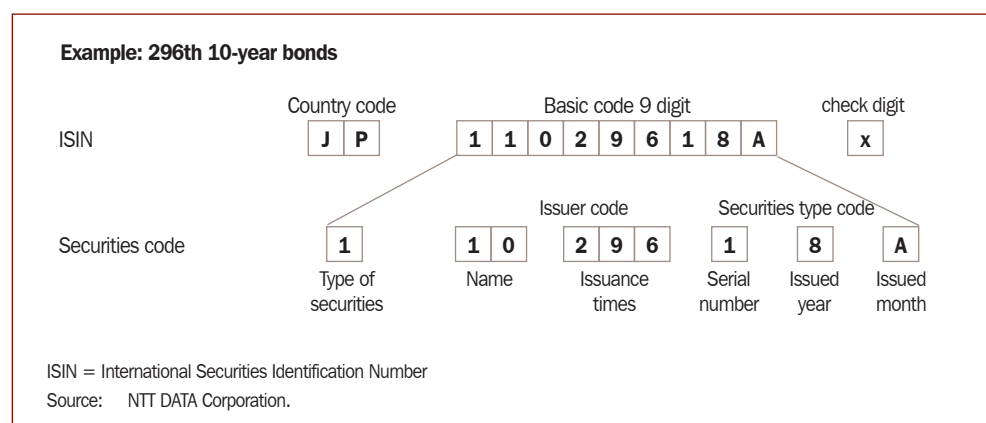
5.1.2 Financial Institution Identification

Currently, only proprietary financial institution identification codes are used in the CSDs for JGBs. New BOJ-NET will adopt the Business Identifier Code (BIC) in addition to the current proprietary codes.

Figure 4.2   Financial Institution Identification

BIC address = ISO 9362

✓ 8 digits code shows financial institution (last 3 digits are option for branch code)

✓ Any local identification code used in market practice, should be translated into BIC.

Example:

| B | O | J | P |

4 characters for
financial institution

| J | P |

2 characters
ISO country short name
ISO 3166–1 alpha 2

| J | T |

2 characters
location code

| X | X | X |

3 characters
branch code, option
('XXX' means head office)

BOJP = Bank of Japan; JP = Japan; JT =Tokyo
Source: NTT DATA Corporation.

5.1.3   Securities Account

Securities account uses practically proprietary numbering. The current proprietary account structure will be used for the New BOJ-NET. The following is a brief description of the account structure based on BOJ regulations on the JGB book-entry system.

Divisions of Direct Participant's Account[1]

1. The Direct Participant's Account shall be divided into the following:
    a. The account into which the description or record of the book-entry JGBs to which the relevant Direct Participant holds the rights shall be made (hereinafter referred to as the "Direct Participant's Account [Proprietary ledger]"); and
    b. The account into which the description or record of the book-entry JGBs to which Customers of the relevant Direct Participant, or its Lower-Positioned Institutions, hold the rights shall be made (hereinafter referred to as the "Direct Participant's Account [Customer ledger]").
2. The Direct Participant's Account (Proprietary ledger) and the Direct Participant's Account (Customer ledger) shall have subdivisions for each Classification as separately provided by the BOJ. In such case, the Direct Participant's Account (Proprietary ledger) shall have a subdivision into which the book-entry JGBs, which are subject to a pledge, are described or recorded, and the other subdivision into which other book-entry JGBs are described or recorded.

_____

[1] Bank of Japan. 2009. Regulations concerning the Japanese Government Bonds Book-Entry System. http://www.boj.or.jp/en/paym/jgb_bes/data/fyoryo01.pdf

The securities account structure is illustrated as follows.

Figure 4.3   Securities Account Structure

Account system of JCB book entry

Participant code	+	Participant type	+	Account type
4 digits numeric		2 digits numeric		2 digits numeric
XXXX		XX		XX

+
JGB name code

Account is made up with participant code + type + account type and is managed under each JGBs.

Participant account   (4 digits XXXX)

Participant type 00							Participant type XX		
Customer I	Customer II	Customer III	Proprietary I	Proprietary II	Proprietary III	Proprietary IV	Customer I	..	Proprietary IV
11	12	13	01	02	03	04	11	..	04

Source: ABMF SF2.

Securities account under MT message

A. General information

B. Trade details

C. Financial instrument/account

95a ACOW account owner
97a 4!c Safekeeping account

E. Settlement details

Securities account under ISO message

index	Message item	
8.0	Quantity and account details	M
8.1	Settlement quantity	M
8.2	Quantity	M
8.3	Original and current face	M
8.4	Denomination choice	O
8.5	Account owner	O
8.6	Safekeeping account	M
8.7	Cash account	O
8.8	Safekeeping place	O
8.9	Quantity breakdown	O

Example:

95a:ACOW//BOTKJPJT

95a:SAFE//xyz123

Indicated only as account

ISO example:

```
<QtyAndAcctDtls>
<SfkpgAcct>
   <Id>xyz123</Id>
</SfkpgAcct>
</QtyAndAcctDtls>
```

5.1.4   Cash Accounts

Cash accounts use practically proprietary numbering.

5.1.5   Character Code and Language

UTF-8 contains the Japanese settlement system's character set. The current BOJ-NET adopts Japanese Industrial Standards (JIS). The New BOJ-NET will adopt Unicode using UTF 8 as the encoding scheme. The language for the New BOJ-NET will be Japanese. Image of character code sets and language are illustrated in Figure 4.4.

Figure 4.4   Character Code Sets and Language in the Japanese Settlement System

ISO2002
UTF-8

Japanese Language
JIS-X0208

BOJ-NET (JIS8)

ZENGIN

OK

NTT Data

Outside Japan

Financial institution in Japan

??

エヌ・ティー・ティー　データ

Japanese characterset is UTF-8, but non Japanese does not understand this.

Source: NTT DATA Corporation.
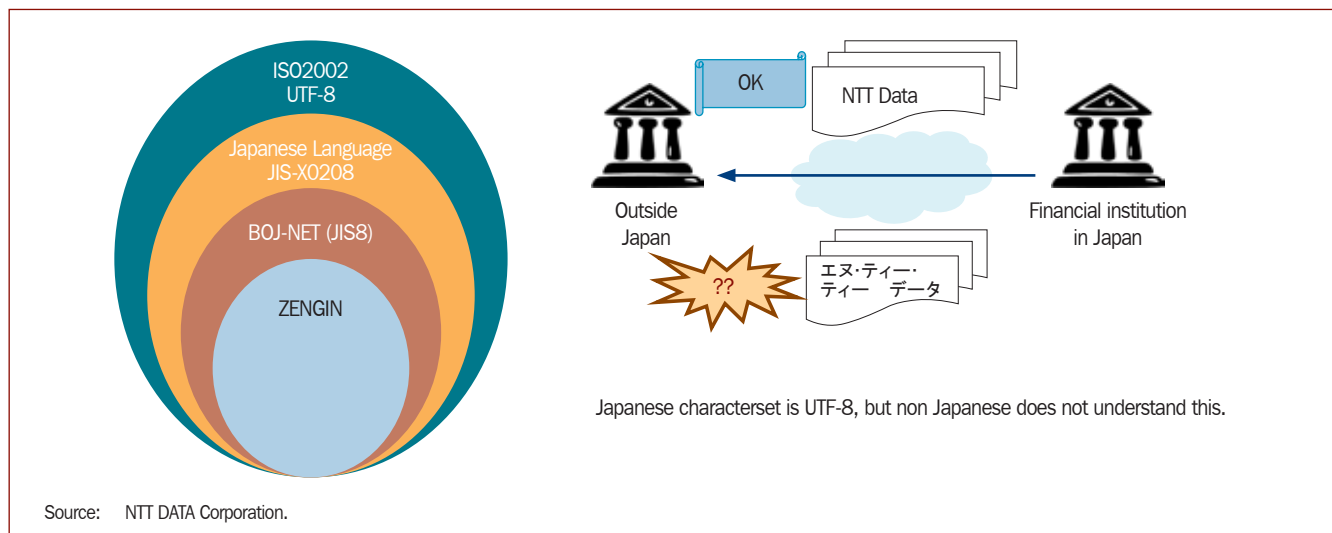
6.   Medium- to Long-Term Strategies

Regarding message standardization compliance with ISO 20022, JASDEC will introduce ISO 20022 message formats in 2014 not only to PSMS but also to Book-Entry Transfer Systems. JASDEC will also introduce SWIFTNet by 2014, and will terminate the customized ISO 15022 message format by 2019.

The BOJ will adopt ISO20022 message formats for some transactions under the new BOJ-NET, which will start operating for some areas around the first quarter of 2014 and the remaining areas between the autumn of 2015 and the beginning of 2016.

On the matter of settlement cycle, a working group tasked to shorten the settlement cycle for Japanese government bonds was established in September 2009 under the Reform Promotion Center for Securities Clearing and Settlement System, with the Japan Securities Dealers Association serving as the secretariat of the working group.

By April 2012, the settlement cycle will be T+2. Discussion on the introduction of T+1 will restart in the second half of FY 2012.

Appendix 2:

Pre-Settlement Matching System

I. Introduction

The Pre-Settlement Matching System (PSMS) provides a framework for electronic matching on trades and settlements for institutional investor transactions between investment management companies, securities companies, trust banks, custodian banks, life and non-life insurance companies, and other actors in the bond market to achieve a seamless, automated processing of all operations from orders to settlement. Moreover, PSMS provides an advance-matching function for delivery-versus-payment (DVP) book-entry transfer settlements conducted by the Japan Securities Depository Center Incorporated (JASDEC), as well as for clearing by the Japan Government Bond Clearing Corporation (JGBCC).

A. Straight Through Processing for Securities Settlement in Japan
As far as institutional transactions are concerned, it is quite common that institutions that perform investments and those that perform settlement are different entities not only in Japan but also in other countries. In Japan, however, it is typical for trust banks to retain the rights and obligations. For this reason, PSMS was developed to realize the straight through processing (STP) suitable to the specifics of the securities settlement environment in Japan.

B. Establishment and Application of Japanese Standards in Conformity with Global Standards
Securities markets have been globalized so quickly. Until recently, securities settlement systems used to be constructed on the vernacular architecture of data syntax and codes, which can be only used in the domestic market; connectivity with overseas counterparts must be incorporated in future settlements system. To achieve this, the PSMS was developed based on the following standard data syntax and codes:
1. **Data Syntax: ISO 15022.** This data syntax was originally developed for the Society for Worldwide Interbank Financial Telecommunication (SWIFT) network as the new securities data syntax to be used beginning in autumn of 2002 and then registered with the International Organization for Standardization (ISO) as ISO 15022. ISO 15022 became the common syntax for financial institution worldwide and replaced ISO 7775, which was widely used by financial institutions all over the world. Using this data syntax makes it possible, for example, to transmit settlement instructions sent from global custodians to Japanese sub-custodians easily to the PSMS. Because of the scalable architecture of ISO 15022, it is also expected to assure the scalability of PSMS to meet future increases in the scope of securities to be handled and the diversification of types of trades.
2. **The International Securities Identification Number.** The International Securities Identification Number (ISIN) is the standard code allocated by the Securities Identification Code Committee in conformity

with the International Securities Identification Code Standard (ISO 6166). All Japanese domestic stocks, as well as all bonds issued by public offering in Japan, are allocated with the ISIN "JP+ basic code+ check digit". ISIN is the only globally common code, since it is allocated by the securities identification code organization of each country in accordance with the International Identification Code Standard. The adoption of ISIN will assure the same effect as the adoption of ISO 15022 mentioned above.

3. **Business Identifier Code.** It is necessary to identify various participating parties, such as counterparties of trading and of settlement, in the PSMS by code numbers. The Business Identifier Code (BIC) is being used in the SWIFT network as the standard bank identifier code, such as the ISO 15022, and is registered with ISO as ISO 9362. To utilize the PSMS, it is necessary for all users such as banks, securities companies, investment trust companies, and investment advisory companies to obtain a BIC. In case it is not possible to obtain a BIC for some reason, other identifiers, such as the Uniform Bank Code or the Standard Code for Securities Company, will be used as a supplementary identification in the PSMS.

C. **Matching on Trade Date (T+0 Matching)**

While PSMS was implemented under the T+3 environment, this aims to complete the matching of trades on the trade date, T+0, to keep pace with the movement of the securities industry to a shorter settlement cycle, T+1. It is believed that completion of trade matching on T+0 will help increase convenience for investment trust management services. To be precise, open-end investment trust is required to calculate and announce the net asset value (NAV) every day, which should be done accurately and promptly. The PSMS provides facilities to match the investment instruction data sent by investment trust companies and trade report data sent by securities companies on a real-time basis, and then sends the matched data to trust banks. This enables trust banks to smoothly and accurately calculate the NAV and match such NAV calculated by investment trust companies more quickly and accurately.

D. **Connecting to the Delivery-Versus-Payment System**

On 17 May 2004, with the implementation of the delivery-versus-payment (DVP) system for trades other than stock exchange transactions, the PSMS linked to the Book-Entry Transfer System. The matched settlement instruction data linked to the Book-Entry Transfer System set in the PSMS is automatically transmitted to the Book-Entry Transfer System, thereby completing the settlement process without any manual interventions. The participation to PSMS is a requisite for putting the DVP settlement into practice.

E. **Digitization and Dematerialization**

Digitization of trade data and dematerialization or immobilization of securities is a prerequisite for bringing STP into operation. As a practical step, an amendment to the *Ordinance of the Cabinet Office* was issued on 1 October 2001, which allows securities companies to send trade reports to their customers in electronic or magnetic form through the PSMS, upon the agreement of customers.

F. The Average Price: The New Pricing Framework in Japan

On 7 July 2003, an amendment to the *Ordinance of the Cabinet Office* on securities companies and the members' notification of the Japan Securities Dealers Association (JSDA No. 15–33) relating to the average price were issued. This allowed securities companies not to send to their customers trade confirmations regulated by the *Securities and Exchange Law* under Art. 41. It also allowed sending trade reports, using an average price with the conditions such as agreement of customers, under the *Ordinance of the Cabinet Office* on securities companies. This amendment made it possible for securities companies to send trade reports using average price to their customers in the electronic or magnetic form through the PSMS.

G. Connecting to Japan Government Bond Clearing Corporation

Since May 2005, the Japan Government Bond Clearing Corporation (JGBCC) started the clearing business of Japan government bonds. At the same time, PSMS linked data to the JGBCC system. The matched trade-report data of Japanese government bonds linked to the JGBCC set in the PSMS is automatically transmitted to the JGBCC system; the PSMS receives data generated by the JGBCC system such as credit approval status, netting result, among others, and sends these data to JGBCC participants.

II. Domestic Transactions

A. Scope of Services

The PSMS is developed to perform the post-trade procedure mainly for institutional investor; thus, it covers both transaction types on the buy-side, consisting of investment managers (investment trust management companies and/or investment advisory companies) and trust banks, which perform matching for specified money trust transactions, and another buy-side consisting of institutional investors, such as life or non-life insurance companies and trust banks, which perform matching for their own transactions, known as the Proper Type. Further, the former buyer type can be categorized into three sub-types based on the difference of data-transmission method between the investment managers and the trust banks: 1) Three-party Center Matching Type (Without Using Investment Instruction Distribution Service), 2) Three-party Center Matching Type (Using Investment Instruction Distribution Service), and 3) Investment Instruction Support Unsubscribed. As far as bonds are concerned, PSMS provides two more transaction types: Through Type and Two-party Center Matching. Under the Through Type, the PSMS is not used for matching investment instruction data and trade report data while the Two-party Center Matching involves two parties confirming the result of a bilateral trade.

1. **Three-party Center Matching Type (Using Investment Instruction Distribution Service).** This type does not receive Investment Instruction Data from investment managers, but PSMS, on their behalf, generates Investment Instruction Data based on Trade Report Data sent from the securities companies, and transmits the data to the investment managers. After checking the contents of the data, investment managers send it back to the PSMS as Investment Instruction Data. Investment managers are able to replace the Notice of Execution by fax from securities companies by electronic data transmission.

2. **Investment Instruction Support Unsubscribed Type.** This type is used when investment managers do not participate in the PSMS and send Investment Instruction Data (or Investment Instruction Statement) to trust banks by some other means. In this case, trust banks receive only Trade Report Data sent by securities companies via PSMS, match Trade Report Data internally with Investment Instruction Data (or Investment Instruction Statement) received by some other systems or methods, and send the Trade Report Affirmation Data to the PSMS.

3. **Through Type.** This type is used when PSMS is not used for matching investment instruction data and trade report data. Investment instruction data from investment managers and trade report data from brokers or dealers are transmitted to trust banks, respectively. In this case, the trust banks match these two data internally and send the Trade Report Affirmation Data to the PSMS.

4. **Proper Type**. This type is used by the buy-side consisting of institutional investors, such as life or non-life insurance companies or trust banks who perform investments and settlement for their own transactions. As the party in the transaction in this case is only one, the matching process becomes simpler than specified money trust transactions, eliminating the transmission or receipt of Investment Instruction Data.

5. **Two-party Center Matching Type.** This type is used when two parties confirm the result of a bilateral trade, and both the seller and buyer send the trade report data to the PSMS, respectively. The PSMS executes matching of trade report data from the seller and the buyer and immediately transmits the Notice Data of Trade Matching Status.
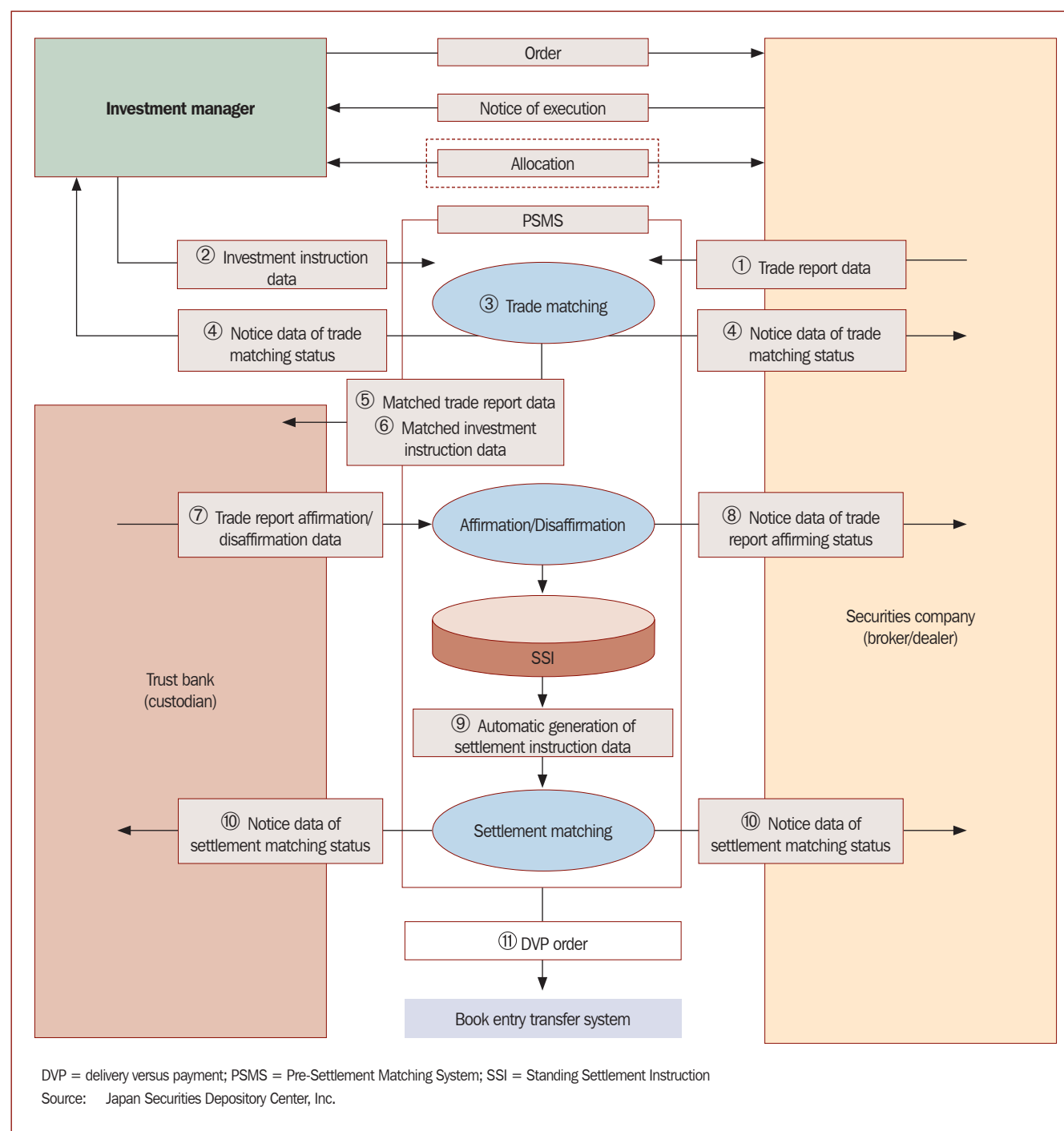
B. Outline of Matching Process

The matching process for the Three-party Center Matching Type (Without Using Investment Instruction Distribution Service) is described below:

1. **Transmission of Trade Report Data and Investment Instruction Data.** As stated above, the Order from investment managers to securities companies, the Notice of Execution from securities companies to investment managers, and the allocation between investment managers and securities companies are beyond the scope of services. Service starts from the transmission of Trade Report Data from securities companies and Investment Instruction Data from investment managers. The data syntax used for Trade Report Data is MT515 of ISO 15022 and that for Investment Instruction Data is MT541/543 (Buy/Sell) (Figure A2.1 ① and ②).

2. **Matching of Trade Report Data and Investment Instruction Data (Trade Matching)** (Figure A2.1 ③). When the Trade Report Data and Investment Instruction Data are received, PSMS searches for the data to be matched in accordance with the matching logic. When the data to be matched are specified, the matching procedure takes place and the Notice Data of Trade Matching Status (MT509) are transmitted to the investment manager and the securities company (originators of matching data) in real-time, together with the status information of "Matched" or "Unmatched" (Figure A2.1 ④). In case the status information is "Unmatched", the reason for discrepancy and details of counterpart for unmatched item will be transmitted.

3. **Transmission of Trade Report Data and Investment Instruction Data to Trust Banks and Trade Report Affirmation /Disaffirmation Data** (Figure A2.1 ⑤, ⑥, ⑦, and⑧). When the data is matched, the Trade Report Data and Investment Instruction Data are immediately transmitted to the trust banks (Figure A2.1 ⑤ and ⑥). The trust banks then confirm the details of data and send out the Trade Report Affirmation or Disaffirmation Data ("Affirmed" or "Disaffirmed", MT517) (Figure A2.1 ⑦). Upon receipt of such data, the PSMS transmits the Notice Data of Trade Report Affirming Status to the securities companies (MT509) (Figure A2.1 ⑧). In case the status indicates "Disaffirmed" by the trust banks, securities companies (or/and investment managers) cancel the previously sent Trade Report Data (or/and Investment Instruction Data) and resend the corrected Trade Report Data (or/and Investment Instruction Data).[8]

4. **Generation of Settlement Instruction Data** (Figure A2.1 ⑨ and ⑩). When a Trade Report Affirmation or Disaffirmation Data sent by trust banks carries the "Affirmed" flag, the process moves to the generation of settlement instruction data.
    To realize the straight-through nature of the process, the PSMS provides the Standing Settlement Instruction (SSI) database to register settlement conditions such as key account information for all trading parties. By using this database, the PSMS automatically generates and transmits Settlement Instruction Data to the settlement matching unit, and eliminates manual efforts of creation and transmission of the settlement instruction data by trust banks and securities companies (Figure A2.1 ⑨). Then, the Notice of Settlement Matching Status Data (MT548) with "Matched" status will be sent to both parties (Figure A2.1 ⑩).

5. **Generation of Delivery-Versus-Payment Order**. When Settlement Instruction Data carrying a "LINK/DVP" is matching, the PSMS immediately prepares a Delivery-Versus-Payment (DVP) Order from the matched settlement instruction data of both deliverer and receiver and transmits the order to the Book-Entry Transfer System (Figure A2.1 ⑪).

---

[8] As ISO 15022 does not have the function to correct data elements, or the re-submission of corrected specific element is not available, the cancellation of all elements of previously sent data and re-entry of the corrected data have to be transmitted.

Figure A2.1 Domestic Transactions–Three-Party Center Matching Type
(Without Using Investment Instruction Distribution Service)

DVP = delivery versus payment; PSMS = Pre-Settlement Matching System; SSI = Standing Settlement Instruction
Source: Japan Securities Depository Center, Inc.

III. Non-Residents' Transactions

A. Scope of Services

In case of non-residents' transactions, trade matching is not performed, but matching of Settlement Instruction Data sent from settlement agents, such as banks and securities companies who perform custody operations for Japanese securities traded by non-residents, is utilized (Figure A2.2).

B. Outline of the Matching Process

1. **Transmission of Settlement Instruction Data or Notice Data of Settlement Matching Status (Figure A2.2 ① and ②).** When Settlement Instruction Data (MT540 to 543) are received from settlement agents, such as banks and securities companies who perform custody operations (Figure A2.2 ①), PSMS searches for the data to be matched in accordance with the matching logic. When the data to be matched are specified, the matching procedure takes place and Notice Data of Settlement Matching Status (MT548) are transmitted to both the deliverer and receiver in real-time with the following corresponding status: "Unmatched" when there is one or more unmatched items; "Matched (settlement not executable)" when all items are matched but with Release Flag, which carries the information whether the settlement is executable or not, on either deliverer or receiver side stays "Release Not Executable"; or "Matched (settlement executable on settlement date)" when all items are matched and Release Flags on both sides stay "Release Executable" (Figure A2.2 ②).

2. **Transmission of Settlement Instruction Modification Data or Notice Data of Settlement Instruction Modification Completion Data** (Figure A2.2 ③ and ④). When the Release Flag in the Settlement Instruction Data states "Release Not Executable," settlement agents resend the correction data (MT599) to change the Release Flag to "Release Executable" after checking the balance of securities or funds, which caused the delivery to be suspended, and making the delivery to be executable (Figure A2.2 ③). When the modified data are received, the PSMS rewrites the Release Flag of Settlement Instruction Data already recorded, and transmits the modification completion data (MT548 or 578) with the corrected status to both deliverer and receiver (Figure A2.2 ④).

   It should be noted that the modification data could be issued not only to change the Release Flag but to correct the settlement amount.

3. **Generation of Delivery-Versus-Payment Order** (Figure A2.2 ⑤). When the Settlement Instruction Data carrying "LINK/DVP" is matching, the PSMS immediately generates a DVP Order from the matched settlement instruction data of both deliverer and receiver and transmits the order to the Book-Entry Transfer System (Figure A2.2 ⑤).

IV. Network and Connection with Users

A. User Connection Format

The formats of connection to the PSMS by users can be in two ways. One is to connect the user's own system directly (Central Processing Unit Direct Connection) to the

Figure A2.2 Non-Residents' Transactions

DVP = delivery versus payment; PSMS = Pre-Settlement Matching System
Source: Japan Securities Depository Center, Inc.
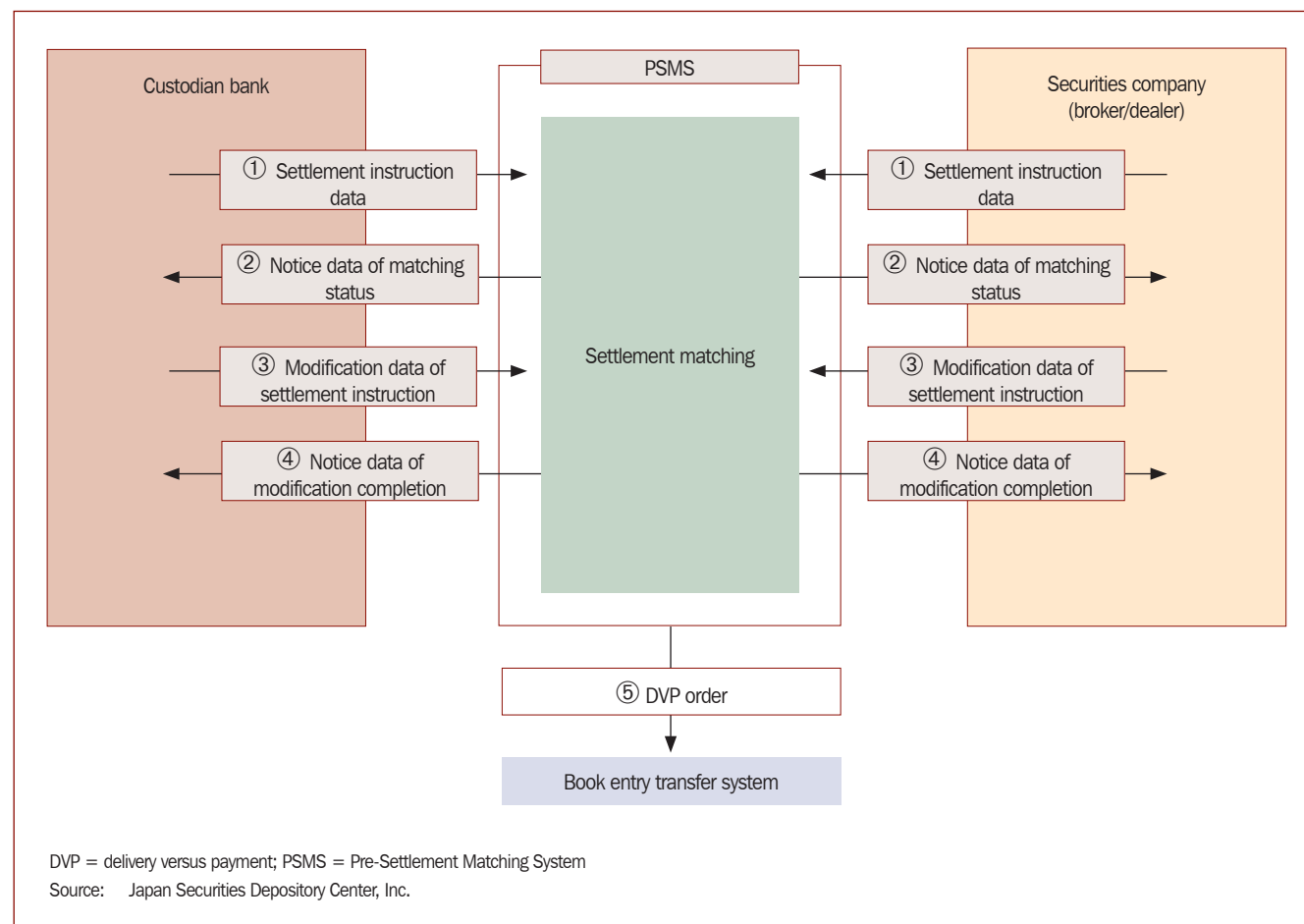
PSMS and the other is to use a personal computer (PC) with a web browser as a terminal of the PSMS (Terminal Connection). The former can utilize either of two types of processing: online real-time processing and batch processing by file transfer. For online real-time processing and batch processing by file transfer, users can choose either to connect their own systems to the PSMS, or to have the systems of their computer service subcontractors connected to the PSMS. In the case of online real-time processing, dedicated lines are commonly used; for file transfer and terminal connection, Integrated Services Digital Network lines are used.

B. Terminal Functions

For users who have large volume of trades, direct online real-time connection of their systems to the PSMS is efficient in view of the possibility to further shorten the settlement cycle in the future. However, for users who do not have large volume of trades and wish to curtail the initial investment for system development, Terminal Connection to the PSMS is convenient. To utilize the services provided, users only need to prepare a PC with certain specifications and a web browser, and log on to the web server of the PSMS. The transmission or receipt of data explained above is possible by means of this terminal function. For data transmission, users may choose either key-input through the form on-browser or comma separated value file transfer.

Republic of Korea
(KOR)

1. Bond Market Infrastructure

1.1 Overview of Bond Markets

The Korean bond market is comprised of the over-the-counter (OTC) market and exchange market operated by the Korea Exchange (KRX). In Korea, four types of bonds are traded on the markets such as Korean government bond (KGB), corporate bond, commercial paper (CP), and Certificate of Deposit (CD). About 70% of bond trades are performed on the OTC market, whereas other bonds are traded on the exchange market. For Trade matching, KRX executes matching for trade on the KRX market while Korean Securities Depository (KSD) execute it for other Trades on the OTC market. KRX is also designated to provide clearing service on the exchange market. For settlement, KSD is in charge of securities settlement for all kinds of bonds while the Bank of Korea (BOK) is in charge of cash settlement as a central bank. The bond market infrastructure in Korea is shown in Part 3, Figure E.1.

1.2 Description of Related Organizations

Financial Supervisory Service (FSS)

The FSS acts as the Financial Services Commission's (FSC) executive arm. The main objectives of the FSS are to provide supervision and conduct examination and investigation of financial institutions to ensure sound and fair trading practice in the financial markets and to protect investors.

Korea Financial Investment Association (KOFIA)

KOFIA was launched on 4 February 2009 through the merger of three associations representing the securities, asset management and futures industry, as set forth by the *Financial Investment Services and Capital Markets Act* (FISCMA), which took effect the same day. To provide transparent and accurate information to participants, KOFIA established FreeBond and manages the OTC market.

Korea Exchange (KRX)

The former three exchanges in Korea, i.e., the Korea Stock Exchange (KSE), Korea Futures Exchange (KOFEX), and the Korean Securities Dealers Automated Quotations (KOSDAQ) Market, have merged into the KRX effective 27 January 2005.

KRX maintains a fair and orderly market for trading securities; it also regulates and supervises its member firms via market operational rules set by the KRX.

Korea Securities Depository (KSD)
KSD was established in 1974 to act as the central depository of the Korea market. KSD is the single central securities depository (CSD) in Korea. In 1994, KSD became a non-profit making organization by increasing its shareholders. The shareholders of the KSD are various market participants, KRX, banks, and other banking corporations.

The name of KSD's network is SAFE+. The types of lines are leased line (front end processor [FEP]) and the Internet.
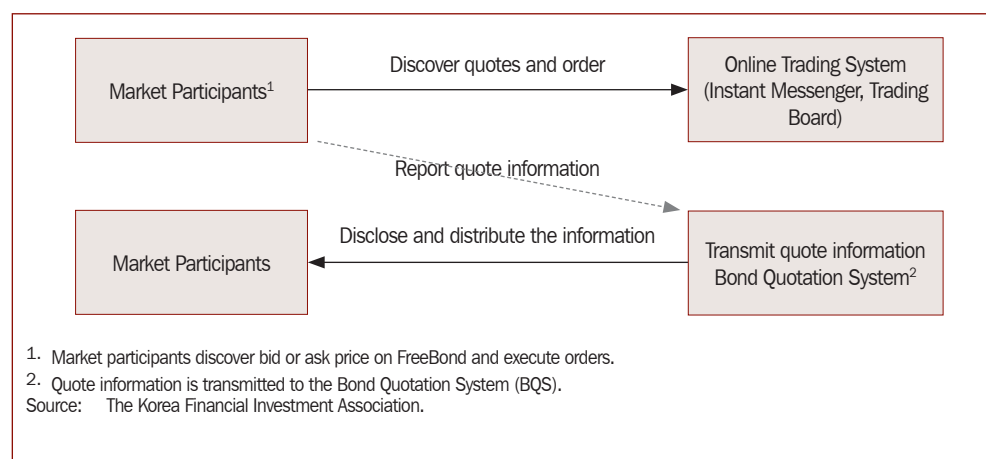
The Bank of Korea (BOK)
BOK was created on 12 June 1950 under the *Bank of Korea Act*. BOK conducts the typical functions of a central bank such as issuance currencies, formulation and the implementation of monetary and credit policy, as bankers' bank, and as the government bank.

1.3 Trading

1.3.1 Over-the-Counter Market

In the Korean OTC market, the seller and buyer trade bonds mostly via a private messenger and partly through the FreeBond. FreeBond, which is run by KOFIA, enables financial investment firms and major market practitioners to search bid or ask prices for trading and intermediation in the OTC bond market. FreeBond also supports trading negotiation with trading counterparties. It consists of two components: Trading-Board (T-Board) and messenger. T-Board has many functions, such as searching bid prices, ordering, negotiation, confirming trade, providing real-time information on bid prices, and analyses. Messenger actualizes one versus N-chatting, storing and using chatting frame layout, and chatting room service. The operation of FreeBond is illustrated as follows.

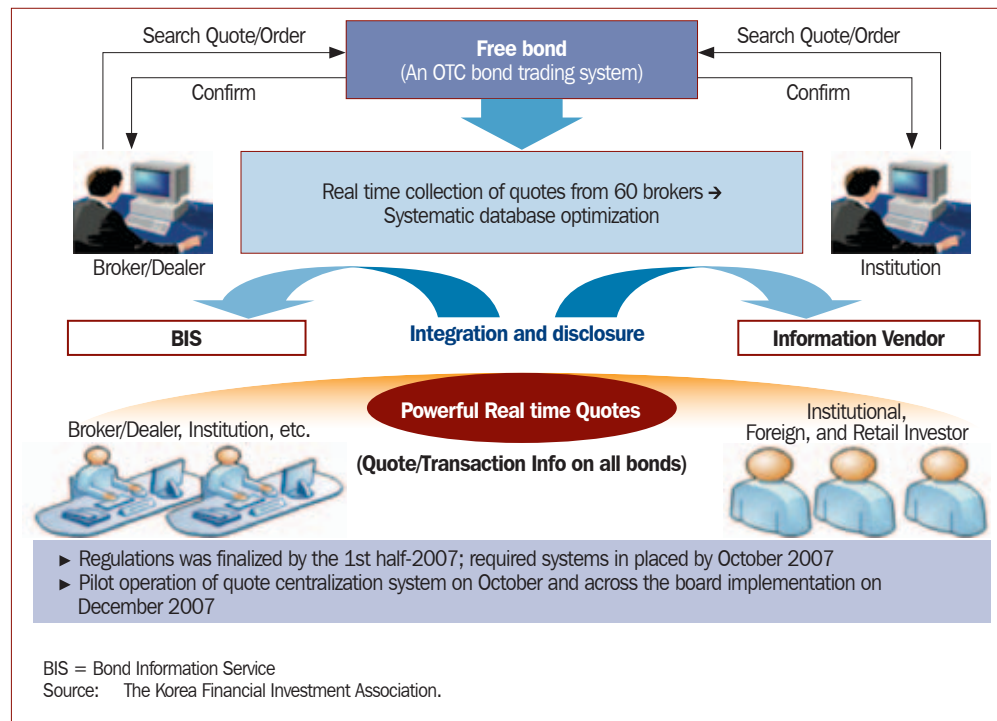**Figure 5.1 Operation of FreeBond**

1. Market participants discover bid or ask price on FreeBond and execute orders.
2. Quote information is transmitted to the Bond Quotation System (BQS).
Source: The Korea Financial Investment Association.

KOFIA is planning and working on adding matching service and link Freebond to the settlement system (or institution) when related laws and regulations in the country changes.

The centralization and disclosure of OTC quotations is illustrated as follows.

Figure 5.2 Centralization and Disclosure of Over-the-Counter Quotations

Search Quote/Order → **Free bond** (An OTC bond trading system) ← Search Quote/Order

Confirm   Confirm

Broker/Dealer

Real time collection of quotes from 60 brokers → Systematic database optimization

Institution

BIS   **Integration and disclosure**   **Information Vendor**

Broker/Dealer, Institution, etc.   **Powerful Real time Quotes**   Institutional, Foreign, and Retail Investor

(Quote/Transaction Info on all bonds)

▶ Regulations was finalized by the 1st half-2007; required systems in placed by October 2007
▶ Pilot operation of quote centralization system on October and across the board implementation on December 2007

BIS = Bond Information Service
Source: The Korea Financial Investment Association.

If the client is a foreign investor, the seller side and/or the buyer side of securities companies transfer order information to the FSS via the Foreign Investment Management System (FIMS). After acceptance of order information, FSS judges acceptance or rejection of the order. FSS determines whether to accept or reject the order. If holding is enough, the FSS transfers order information to the seller side and/or the buyer side of securities companies and the KRX.

A screen image of the Bond-Trade Report and Information Service (B-TRiS) is shown in Figure 5.3.

 A financial investment company engaging in bond trading shall, when trading or brokering bonds with investors in the OTC market, report to KOFIA the details related to such trading within 15 minutes from the point of settlement of the sales agreement, using B-TRiS to enhance transparency on the OTC bond market. After reporting, KOFIA discloses this information on its website.

Figure 5.3 Screen Image of the Bond-Trade Report and Information Service

Source: The Korea Financial Investment Association

1.3.2 Exchange Market

The KRX supplies the KRX Electronic Trading System for Government Bonds (KTS) browser system to market participants. Participants are directly connected with the KTS using the KTS browser without any additional cost, provided that Internet access is available. There are currently 65 market participants. There are currently 65 market participants, 40 of which are regular members and 25 are bond members. By function, primary dealers are 20 and secondary dealers are 45 as of January 2011.

On the KTS, securities such as the Korea Treasury bonds (KTB), Monetary Stabilization Bonds (MSB) issued by the BOK, and Deposit Insurance Fund Bonds (DIFB) issued by the Korea Deposit Insurance Corporation are traded. Trading hours are from 9:00 a.m. to 3:00 p.m. Trading lot is KRW1 billion.

Since the exchange market (KRX) is an order-driven market, bonds are traded through a competitive bidding system. The bid-and-ask orders placed by eligible participants are automatically executed by a centrally matching system. If the client is a foreign investor, the seller side and/or the buyer side of securities companies transfer the order information, as well as trading on the OTC market, to the FSS.

The KTS market structure is illustrated as follows.

Figure 5.4   Market Structure of the KRX Electronic Trading System for Government Bonds
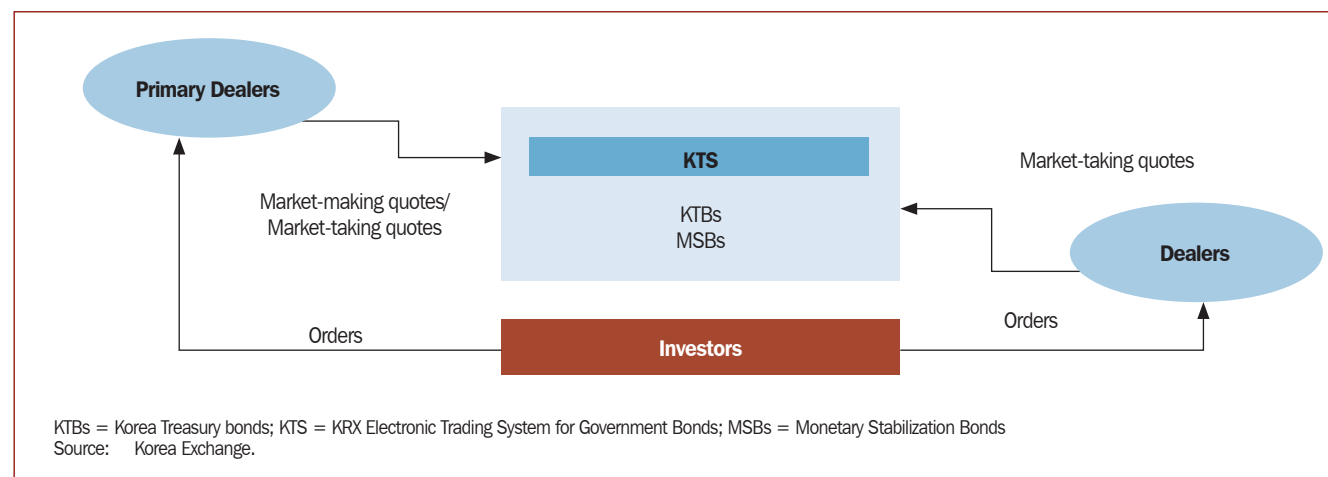
KTBs = Korea Treasury bonds; KTS = KRX Electronic Trading System for Government Bonds; MSBs = Monetary Stabilization Bonds
Source: Korea Exchange.

1.4 Central Counterparty Clearing

1.4.1   Central Counterparty Clearing for the Over-the-Counter Market
There is no central counterparty clearing (CCP) on the OTC market.

1.4.2   Central Counterparty Clearing for the Exchange Market
KRX owns and operates the netting system for the trades on the exchange market as a CCP. Through KRX debt assumption without responsibilities, multilateral trading in Korea's market shifts to a bilateral trading relationship between KRX and its members. This guarantees the legal validity of multilateral netting. Netting is a process that confirms the securities and charges to be delivered by members to the KRX (CCP) on the settlement date. For securities, the quantity of securities to be delivered is calculated from the balance (net) between the selling and buying quantities per issue and members. For charges, the net single position is calculated by finding the net between buying and selling charges per member. In order for settlements to be accomplished according to the calculated settlement positions, the KRX gives settlement orders to member firms and the KSD. Bond trades in the exchange market are cleared by the KRX on the multilateral netting basis. In this process, the KRX acts as the central counterparty.

1.5 Bond Settlement

1.5.1   Bond Settlement Traded at the Over-the-Counter Market
All bonds, including Korean government bonds, are deposited in registered form in the KSD. Participants of the KSD are 257 institutions (63 broker/dealer, 51 banks, 81 asset management, 23 insurance companies, 4 pension funds, and 33 others) as of the end of 2010. KSD conducts simultaneous security and cash settlement on a trade-by-trade base (Delivery-versus-Payment [DVP] Model1).

1.5.2 Bond Settlement Traded at the Exchange Market

KSD also provides DVP settlement for bond trades via the KRX market. KSD has launched a new bond settlement system since November 2011. The new system introduces DVP Model 1 after netting, whereas the previous system adopted DVP Model 3. The new system electrically connects KTS and the New Bank of Korea Financial Wire Network System (BOK-Wire+).

1.6 Cash Settlement

BOK owns and operates BOK-Wire+ for cash settlement system. BOK-Wire, introduced in December 1994, was a large-value payment system owned and operated by the BOK. Through this system, the BOK provided funds-transfer service via participants' current accounts with the BOK. In November 1999, the BOK also began providing a DVP service, and in December 2004 it connected with the Continuous Linked Settlement (CLS) system to enable payment-versus-payment (PVP) service for foreign exchange settlement involving Korean won. In its early days, BOK-Wire processed fund transfers based solely on its real-time gross settlement (RTGS) mechanism. As the BOK-Wire settlement volume surged, however, liquidity burdens on participants increased. In May 2005, the BOK, therefore, launched a 4-year project to develop a new system (BOK-Wire+), which would use not only the pre-existing RTGS mechanism but a hybrid settlement mechanism[9] as well. BOK-Wire+ has operated stably since its launch in April 2009. It replaced BOK-Wire, the pure RTGS system which had been in operation since 1994. The key feature of BOK-Wire+ is the introduction of a hybrid system in addition to the previous pure RTGS system. The BOK-Wire+ hybrid system provides bilateral and multilateral offsetting settlements for liquidity savings. BOK also provides intraday overdraft with KRX for settlement of government bond transactions.

BOK-Wire+ settlement procedures are sub-classified into those using the RTGS system and those using the hybrid system with its bilateral and multilateral offsetting features added to the RTGS system. Participants hold two types of accounts with the BOK—current accounts and deposit accounts for settlement. The former are used for transactions carried out through the RTGS system and the latter for those through the hybrid system.

Funds transfers involving BOK loans, government and public bond transactions, CLS and Retail Payment System (RPS) net settlement are handled through the RTGS system, while those related to general funds transfers, call transaction settlements, and DVP settlements are processed through the hybrid system.

Online operating hours of BOK-Wire+ are from 9:00 a.m. to 5:30 p.m. from Monday to Friday. The BOK may extend these hours temporarily if it deems necessary due to error in BOK-Wire+ system, delays or concentrations of fund settlement, or any other unavoidable reasons.

---

[9] A hybrid settlement system is a payment system which combines characteristics of RTGS system and netting system by adding bilateral and multilateral offsetting features to the RTGS system.

2.   Typical Business Flows

2.1 Delivery-versus-Payment Flow for the Over-the-Counter Market

Please refer to Part 3, Figure E.2 on bond transaction flow for domestic trades on the DVP OTC market.

2.2 Delivery-versus-Payment Flow for the Exchange Market

Please refer to Part 3, Figure E.3 on bond transaction flow for domestic trades on the DVP exchange market.

2.3 Delivery-versus-Payment Flow for Cross-Border Bond Transactions

Please refer to Part 3, Figure E.4 on bond Transaction flow for foreign investors on the DVP OTC market.

2.4 Other Specific Examples of Cross-Border Bond Transactions

Typical examples of cross border transaction flow include inbound transaction by an investor from the United States through a local custodian (KSD) (Figure 5.5) and outbound transaction flow for the Hong Kong market through a global custodian (Figure 5.6), Citibank HK, are illustrated as follows.

Figure 5.5   Sample of Inbound Transactions in the Korea Bond Market

Source: Korea Securities Depository.
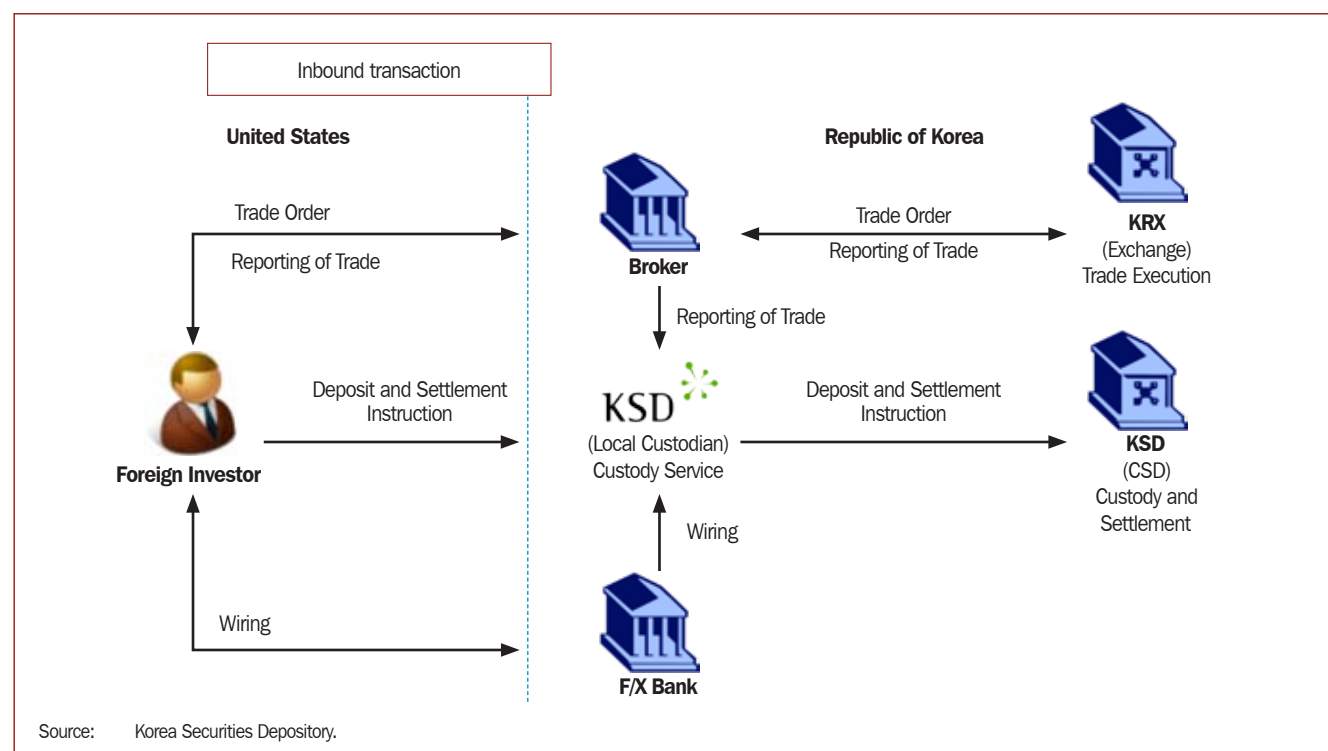
Figure 5.6   Sample of Outbound Transactions in the Korea Bond Market

HK = Hong Kong; HKICL = Hong Kong Interbank Clearing Limited; HKSCC = Hong Kong Securities Clearing Company; HTS = Home Trading System; KRX = Korea Exchange;
KSD = Korea Securities Depository; SEHK = Stock Exchange of Hong Kong
Source: Korea Securities Depository.
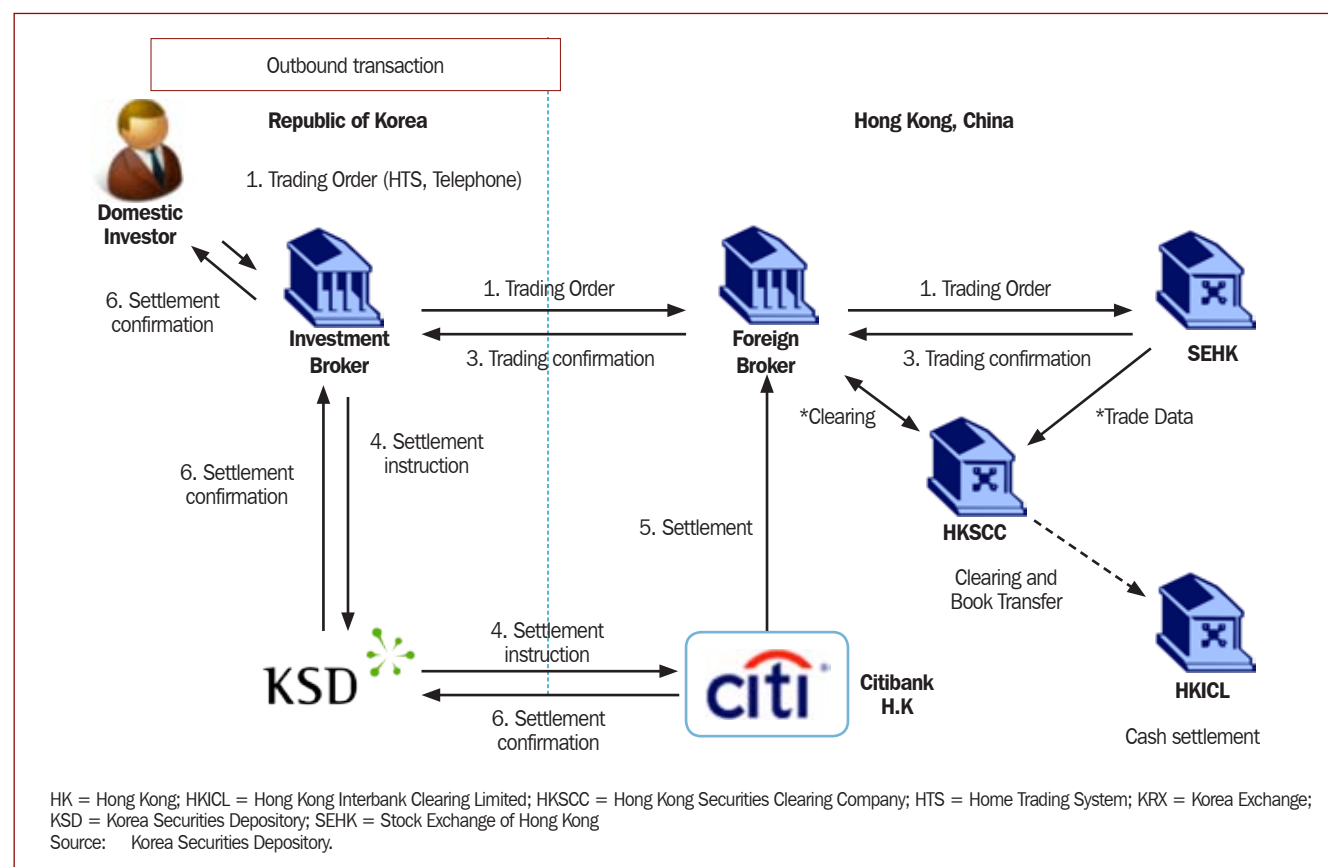
3.   Matching

Both central and local matching facilities are provided to fit each individual case. Central matching is widely used for almost all trades, except for trade funds including members versus its clients who adopt local matching. The seller and buyer send trade data to the KSD and the KSD collates trade data from the seller and buyer. KSD then sends matching status advise to the seller and buyer. Central matching for KRX in the OTC market is illustrated in Figure 5.7 below.

Figure 5.7   Central Matching for Korea Exchange on the Over-the-Counter Market

Source: Korea Securities Depository
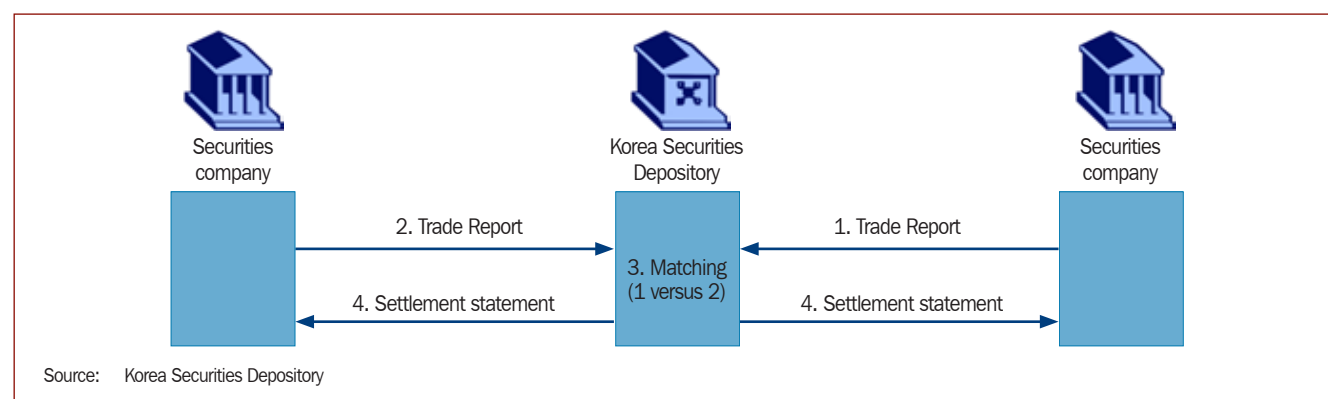
Figure 5.8   Local Matching on Over-the-Counter Market

Source: Korea Securities Depository.
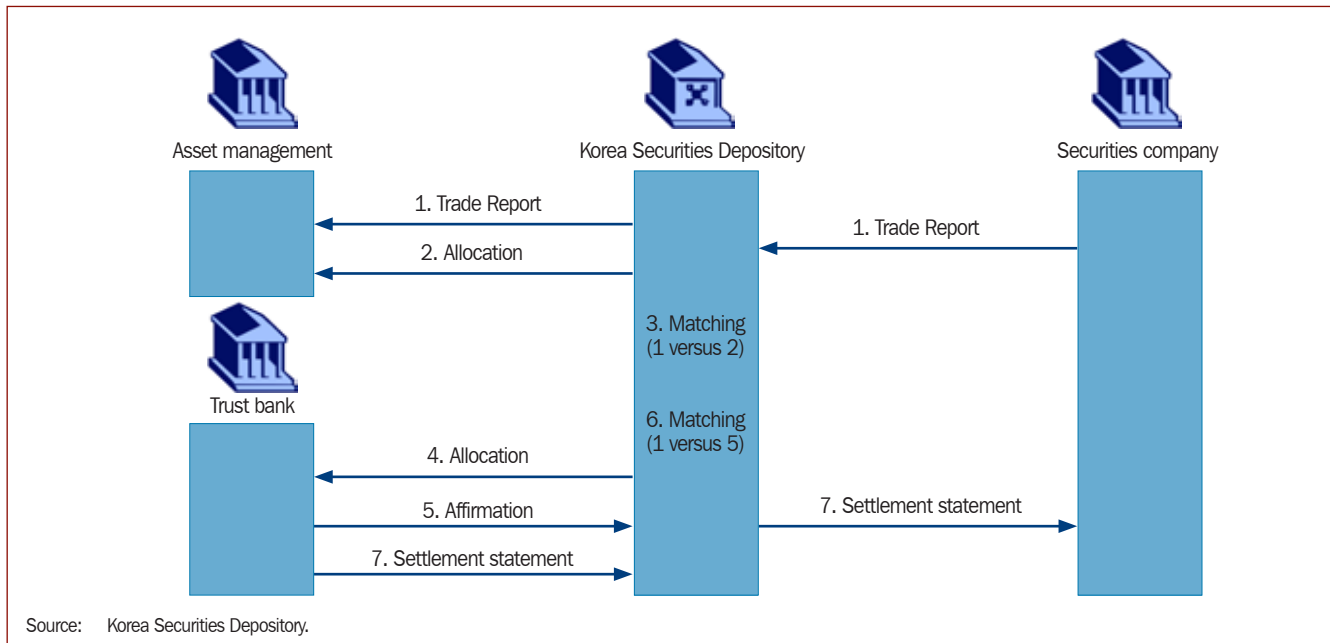
4.   Settlement Cycle

For the OTC market, the settlement cycle is T+1 – T+30. Conventionally, T+1 is adopted to align with exchange trade. The settlement cycle on the OTC market is based on a bilateral contract between counterparties. The settlement cycle of cross-border trades depends on the contract. Usually the settlement cycle of cross-border transaction through Euroclear or Clearstream is T+1 – T+3.

For the exchange market, the settlement cycle is T+1. In case of cross-border trades, the settlement cycle of inbound transaction is T+1. On the other hand, settlement cycle of outbound transaction follows the settlement cycle of the designated country for investment.

5.   Numbering and Coding

5.1 Numbering and Coding for the Over-the-Counter Market and Exchange Market

5.1.1 Securities Numbering
The KRX is authorized by the International Standardization Organization (ISO) for securities numbering in Korea. The International Securities Identification Number (ISIN) is adopted as the numbering standard by the KRX. In the domestic market, short code is also used to identify bond name, which is composed of nine digits. The first digit is alphabetic code, which denotes type of security. An example of the first issued Korean Treasury bond in 2006 is shown as follows.

Figure 5.9 Sample of First Issued Korean Treasury Bond in 2006

Example: 1st issued Korean Treasury Bond in 2006

ISIN — Country code: K R — Basic code 9 digit: 1 0 3 5 0 1 7 0 6 — check digit: 3

Issuer code — Security type code

1 — 0 3 5 — 0 1 — 7 — 0 — 6

Type of securities (1:Government bond) — Name of Securities (035:T-bond) — Issuance times — Type of interest payment (7: Coupon) — Issued year (0: 2010) — issued month

Short code — C — Basic code 9 digit: 0 3 5 0 1 7 0 6

Type of securities (B: Corporate bond, C: Government bond, etc.) — 8 digits from ISIN code (from 3rd to 11th digit of ISIN code)

Source: Korea Securities Depository.

5.1.2 Financial Institution Identification

Each institution such as KSD, the KRX and BOK has proprietary code for each financial entity. KSD uses an account number as an identification number. All of KSD's participants have one or more account number. The account number has 12 digits. The first six digits mean account holder, the next four digits in the middle mean the purpose of the account, and last digit means securities belongings (proprietary or client's). KSD's code structure is illustrated as follows.

Figure 5.10 Korea Securities Depository Code Structure

Account holder: 0 0 0 0 3 0 — Samsung securities company

Sequential number of the account: 0 0 0 0 — First account Samsung Sec. Co. opened with KSD

Purpose of the account: 0 — 0: General deposit . . 3: Foreign securities 4: Separate safekeeping

Securities' belongings: 2 — 1: Proprietary 2: Clients' .

Source: Korea Securities Depository.
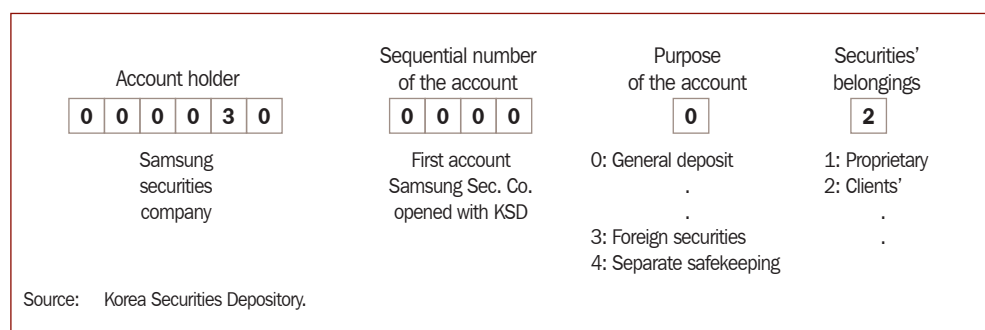
In case of conversion between the Business Identifier Code (BIC) and the local code, mapping the BIC onto local code is executed and vice versa.

5.1.3 Securities Account

A securities account number is used as a financial institution identification code in the KSD.

5.1.4 Cash Account

Proprietary account numbers by the BOK or commercial banks is used for cash accounts. If necessary, mapping the International Bank Account Number (IBAN) into the proprietary code is executed and vice a versa

4.1.5 Character Code and Language

Unicode and UTF-8 are used for character code while Korean is used for bond settlement Infrastructure.

6. Medium- to Long-Term Strategies

KSD was established a new bond settlement system in November 2011 to build a cost-effective Securities Settlement System (SSS) and enhance risk management in the system.

6.1 Background

The domestic bond market has seen a sharp rise in transaction and settlement volumes as a result of heightened market activity since 2006. However, the bond settlement system lacks sufficient improvement to respond to increased transaction and settlement volumes. In particular, chronic settlement delays occur due to lack of compatibility between settlement means of the exchange market and the OTC market (the completion of settlement takes place around 6:00 p.m.). As such, enhancement of the SSS is being pursued to enhance its stability and sharpen its competitive edge.

To resolve the problem of settlement delays in the BOK-Wire+ caused by delays and gridlock in the SSS, the BOK drew up the "Strategy for Upgrading the Securities Settlement System" in November 2009, jointly with the KRX and the KSD. The main elements of this strategy include improvement of the DVP settlement method for greater efficiency in securities settlement, provision by the BOK of intraday liquidity for the settlement of bond transactions, changing of the fund settlement bank for the exchange-traded stock markets, and the introduction of a Continuous Net Settlement (CNS) system. In 2009, KSD, KRX, and BOK formed the Working Group for Securities Settlement System Improvement and concluded the "Agreement on the Securities Settlement System Improvement." The target date for opening business is in November 2011.

6.2 Highlights of Strategy for Upgrading the Securities Settlement System

1. Improvement of DVP Method
   - Settlement of exchange-traded government bonds: Net settlement by issue for both bonds and funds.
   - Settlement of exchange-traded Repurchase Agreements (RPs): Gross settlement per individual transaction for both securities and funds.
   - Settlement of stock transactions by institutional investors: Net settlement per transaction for securities and per member for funds.
   - Starting time for exchange-traded government bond and stock settlement made progressively earlier.
2. Provision of Intraday Liquidity for Settlement of Government and Other Bonds
   - BOK to provide intraday liquidity to financial investment companies and the KRX for settlement of exchange-traded or OTC bond transactions, including government bonds.
3. Introduction of CNS System in Exchange-traded Stock Markets
   - Securities submitted by settlement deadline (4:00 p.m.) delivered immediately to destined members, and those submitted after deadline netted and settled together with securities settled the following business day.

4. Change of Fund Settlement Bank for Exchange-traded Stock Markets
   • BOK to provide fund settlement services for exchange-traded stock markets from the start of the new system.

6.3 Improvement Measures

Improvement measures of government bond settlement are illustrated in Figures 5.11 and 5.12. These include changing the settlement beginning time and the DVP model, as well as the introduction of DVP model 1 after netting.

Figure 5.11   Basic Structure of Exchange Settlement of Korean Government Bonds

Source: Korea Securities Depository.
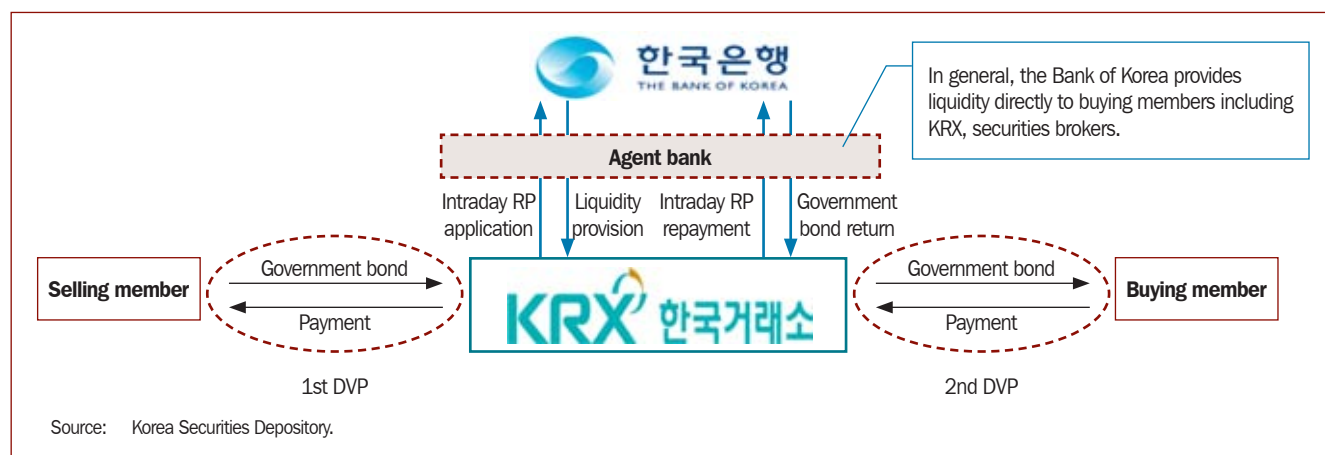
With purchased government bonds under settlement of the BOK as collateral, establishing the intraday RP system to provide liquidity.

Figure 5.12   Basic Structure of Intraday RP System

Source: Korea Securities Depository.
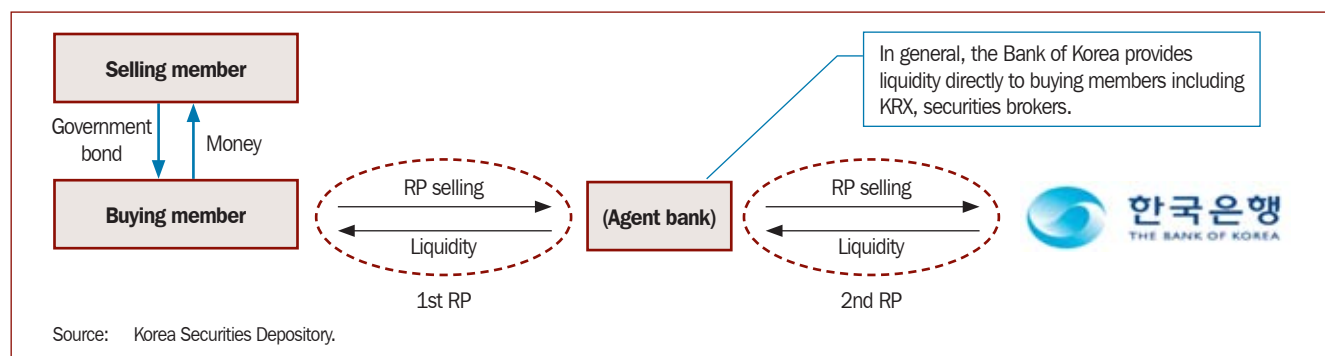
The expected effects of these improvement measures are as follows:

• Enhancement of efficiency in securities settlement
• Enhancement of safety of securities settlement
• Enhancement of convenience of market participants
• Securing global compatibility

Malaysia
(MAL)

1. Bond Market Infrastructure

1.1 Overview of Bond Markets

The Malaysian bond market is comprised of the over-the-counter (OTC) market and the exchange market. Unlisted bonds are largely traded on the OTC market while listed bonds are traded through Bursa Malaysia (exchange market). More than 95% of Malaysian bonds are traded on the OTC market. Trade data are entered into the electronic trading platform (ETP), which was launched by Bursa Malaysia in March 2008.

The Real-time Electronic Transfer of Funds and Securities (RENTAS) is the central securities depository (CSD) and real-time gross settlement (RTGS) system for government bond trades in Malaysia. The RENTAS system is comprised of the Scripless Securities Depository System (SSDS), which allows book-entry settlement and recording of holdings of scripless debt securities; and the interbank funds transfer system (IFTS), which deals with large-value fund transfers. It is a delivery-versus-payment (DVP) Model 1 system. Bank Negara Malaysia (BNM) owns and operates RENTAS.

Please refer to Part 3, Figure F.1 for the bond market infrastructure diagram.

1.2 Description of Related Organizations

Bursa Malaysia

Bursa Malaysia is an exchange holding company approved under Sec. 15 of the *Capital Markets and Services Act 2007*. It operates a fully integrated exchange, offering a complete range of exchange-related services including trading, clearing, settlement and depository services.

Bursa Malaysia Securities Clearing Sdn Bhd (BMSC)

BMSC is a wholly-owned subsidiary of Bursa Malaysia with a paid-up capital of MYR300 million and provides clearing and settlement facilities for contracts done between clearing participants. BMSC was incorporated on 12 November 1983 and commenced clearing house operations in March 1984. The BMSC is governed by the BMSC Rules which came into force on 1 January 1997. On 11 November 2002,

BMSC completed the acquisition of Bursa Malaysia Derivatives Clearing Berhad, thus, making it a wholly-owned subsidiary of BMSC.

MyClear

MyClear is an operator of key market infrastructure for the securities market and provides securities and payment services via RENTAS (CSD and RTGS) and the Fully Automated System for Issuing/Tendering (FAST), the issuing system for unlisted debt securities. MyClear was incorporated in October 2008 and commenced operation on 2 January 2009. It was established as a wholly-owned subsidiary of BNM as a separate overseer and operator of the systematically important payment systems. Facilitating cross-border securities payments and settlement is also part of the role of MyClear.

Bursa Malaysia Depository (BMD)

BMD is a subsidiary of Bursa Malaysia and was established in 1990. It is incorporated under the *Companies Act, 1965* and authorized to perform the role of a central depository by the *Securities Industry (Central Depositories) Act, 1991* (SICDA). SICDA provides the legal framework and safeguards for users and participants in the central depository system (CDS).

Bank Negara Malaysia (BNM)

BNM is the central bank of Malaysia. Today, the BNM focuses on the three pillars of the central banking, such as monetary stability, financial stability, and the payment system. In addition, BNM is responsible for the issuance, registration, and settlement and redemption of the government bonds through the in-house automated trading and settlement system. BNM introduced a payment system called the RENTAS system.

1.3 Trading

1.3.1 Over-the-Counter Trading

The Malaysian bond market consists of listed and unlisted bonds. Unlisted bonds are largely traded as the OTC trade. Most trading takes place on the OTC market, where quotes are typically obtained directly from money brokers and dealers over the phone. Financial institutions would either have to be registered or licensed by the Securities Commission of Malaysia (SC) to trade in bonds for their own or their clients' accounts. An agreement concluded over the telephone is then followed up with a confirmation order in writing. An investor can place an order with a dealer at his desired price and amount. However, trade will only be concluded when the dealer can find a corresponding seller in the OTC market.

Financial institutions maintaining their own bond inventories usually provide their market bid or offer prices to their clients. In addition, principal dealers (PDs) are obliged to provide 2-way quotes for benchmark government securities. Information on Government securities and bond indices are also available on the tickers on Bloomberg and Reuters. All trading on the OTC market are reported on the ETP, where the seller of the securities keys in the deal and buyers confirm within the stipulated 10 minutes' cut-off time from trade execution. Normal business hours for a securities trade are as per standard settlement or value spot, i.e., two business days (T+2) from 9:00 a.m. to 4:30 p.m. from Monday to Friday, excluding holidays. Some custodian prefer T+3.

Bursa Malaysia introduced the ETP on 10 March 2008 for the Malaysian bond market in line with the National Bond Market Committee's mandate to develop a single electronic trade reporting and trading platform for the domestic bond market. The ETP is operated by Bursa Malaysia Sdn Bhd, a wholly-owned subsidiary of Bursa Malaysia. ETP was introduced to boost transparency and liquidity, as well as increase efficiency in bond trading. The launch of the ETP is in line with the ongoing commitment to further improve market accessibility and increase trading efficiencies via infrastructure enhancement initiatives. The decision to develop the ETP was made in February 2004 by the National Bond Market Committee, which includes the Ministry of Finance (MoF), SC and BNM.

ETP allows dealers to match bids with offers, negotiate deals, and access historical data through a common computerized network. ETP offers investors real-time price quotation and facilitates the trading and reporting of all secondary market activities.

The key business components that contribute to the business of ETP are:

- Central order book for matching, trade reporting and negotiation
- A comprehensive dissemination system for price per yield and trade information dissemination
- Data storage for market history data referential maintenance for exchange administrator
- A real-time market surveillance system.

The ETP system interfaces with other systems such as the FAST and other information provider (i.e., Bloomberg and Reuters). 100% of volume is done OTC via voice brokers and electronic message. But, for the time being, there is almost no transaction process by ETP.

1.3.2 Exchange Trade

Bonds listed on Bursa Malaysia may be purchased through a dealer who is a member of the exchange, such as investment banks or through remisiers. To trade in listed bonds, investors are required to open a depository account operated by BMD. These accounts are maintained by banks that are members of the exchange, acting as authorized depository agents. The depository account works on the principle of a book-entry system or electronic clearing and settlement, and represents ownership and movement of the listed bonds. Institutional investors may open depository accounts directly with the BMD. Investors need to provide their depository account numbers when buying or selling listed bonds on the exchange. Listed bonds are normally traded in board lots of 1,000 units. Information on prices of listed bonds is readily available on the ETP.

1.4 Central Counterparty Clearing

1.4.1 Central Counterparty Clearing for the Over-the-Counter Market
There are no CCPs in the Malaysian OTC market.

1.4.2 Central Counterparty Clearing for the Exchange Market
BMSC is the clearing house for bond securities traded on the Bursa Malaysia stock exchange. BMSC provides the Bursa Clearing and Settlement System for participants

on the exchange market. The Bursa Clearing and Settlement System electronically connects with the Bursa Trade System and Central Depository System.

1.5 Bond Settlement

1.5.1 Bond Settlement Traded on the Malaysian Over-the-Counter Market

To subscribe to or trade in debt securities, an investor must open an account with an authorized depository institution (ADI). ADIs are licensed financial institutions that are members of RENTAS and are allowed by BNM to hold SSDS securities on behalf of customers that are not members of the SSDS. For members of the SSDS, BNM is the authorized depository, crediting bondholders with scripless bonds for trading and transfers according to the *Code of Conduct and Market Practices for Scripless Trading*, and recording the holdings and transactions of each SSDS member institution. ADIs offer protection to investors with regard to payment of interest and redemption proceeds. They ensure secrecy of accounts, issue statutory acknowledgement receipts and monthly statements detailing account holdings and transfers, and carry out the various responsibilities of depository institutions to their customers. Dealers that act as ADIs maintain two accounts with the SSDS: one for their own holdings, and another for all the securities they hold in custody, through which non-SSDS members' transactions are cleared and settled. ADIs are required to maintain a separate account for each customer.

All securities trades are generally settled based on a delivery-versus-payment (DVP) basis. For all government securities and scripless corporate debt securities, ownership and transfers are reflected as book entries in the ADIs' custody accounts with BNM in RENTAS. For non-RENTAS members, such as institutional investors and other financial institutions, scripless securities can be transacted via their ADIs. Cash payments of coupons, as well as redemption proceeds, will be forwarded to investors via their respective ADIs.

The settlement of the primary and secondary market transactions in government securities and unlisted corporate debt securities take place through the SSDS, which is part of RENTAS. RENTAS, established by BNM in 1999, comprises the IFTS, which deals with large-value fund transfers, and the SSDS, which allows the book-entry settlement and recording of holdings of scripless debt securities. A sale or purchase of securities between two parties involves a book-entry and intraday settlement of funds in the cash settlement account maintained with BNM. RENTAS, which has straight-through-processing (STP) capability, will process, transfer and settle interbank funds and scripless transactions simultaneously in real time. It is a DVP Model 1 system, i.e., securities and funds settled gross throughout the day.

RENTAS contributes to the reduction of settlement risk in scripless securities transactions by providing a mechanism for DVP. This mechanism would enable transfer instructions for both scripless securities and funds to be effected on a trade-by-trade basis, with final (unconditional) transfer of the securities from the seller to the buyer (delivery) occurring at the same time as the final transfer of the funds from the buyer to the seller (payment). RENTAS utilizes the Corporate Information Superhighway (COINS), which is a nationwide, broadband network which supports multiprotocol and multimedia applications provided by Syarikat

Telekom Malaysia Berhad as the communication network to link up participating financial institutions.

1.5.2 Bond Settlement Traded on the Exchange Market

BMD operates the Central Depository Sytem (CDS) which has created a scripless trading platform for trading bonds. CDS facilitates electronic securities transfer and trade settlement, and uses the book-entry form of recording ownership and movement of securities. BMD has been offering omnibus accounts since 2005.

1.6 Cash Settlement

The RENTAS IFTS is an RTGS system for the transfer and settlement of high-value ringgit-denominated interbank funds and scripless securities transactions. RENTAS IFTS enables payment instructions between participants of the system to be processed and settled individually and continuously throughout the working day. All settled transactions are considered as final and irrevocable. Thus, the receiver can use the funds immediately without being exposed to the risk of the funds not being settled. This is in contrast to the former system, Sistem Pemindahan Elektronik Dana dan Sekuriti (SPEEDS), which was a deferred net settlement system, where payments were processed throughout the working day, but actual entries across the books of BNM were only effected at the end of the day. RENTAS IFTS, being an RTGS system, can substantially reduce or eliminate settlement exposures for participants of the system. Besides reducing the settlement risk for interbank funds transfers, RENTAS IFTS can help reduce the risks in exchange for value settlement systems such as those for securities settlements. The system has the capacity to handle higher volume of transactions compared to the SPEEDS System, and incorporates better security features through the use of smart cards for authentication and transmission. Provision had also been made for international linkages to facilitate real-time DVP and real-time payment versus payment (PVP) should this need arise in the future.

Intraday credit is permitted in the market, and may depend on intermediaries' assessment of client standing. Overdraft is also available, for technical reasons (e.g., time-zone differences) for up to 2 business days; and requires advised credit line (or prefunding arrangement).

2. Typical Business Flows

2.1 Delivery-versus-Payment Flow in the Malaysian Over-the-Counter Market

Please refer to Part 3, Figure F.2 on the bond transaction flow for domestic trades in the OTC market (DVP).

2.2 DVP flow for Cross-Border Bond Transactions

Please refer to Part 3, Figure F.3 on the bond transaction flow for foreign investors in the OTC market (DVP).

Scripless securities, including Malaysian government securities and selected debt securities, can also be settled internationally via major global custodian banks and international central securities depositories (ICSDs), such as Euroclear and Clearstream. Both these ICSDs currently appoint selected ADIs, which are clearing

members of RENTAS, as their clearing agents in Malaysia. Non-residents or offshore investors may also individually appoint ADIs that are RENTAS members as custodians of their investments. Most financial institutions are also members of the Society for Worldwide Interbank Financial Telecommunication (SWIFT), which facilitates the efficient transmission and confirmation of cross-border payment and settlement instructions in foreign currencies.

3. Matching

3.1 Over-the-Counter Market

RENTAS provides local matching. The seller (or buyer) initiates unconfirmed settlement advice in RENTAS. The buyer (or seller) then confirms an unconfirmed settlement advice using the confirmation menu of RENTAS, concluding the local matching process. After confirmation, the seller and buyer can access the confirmation report in RENTAS.

3.2 Exchange Market

A central matching facility will be implemented in the fourth quarter of 2011 and expected to cover only bonds traded on the exchange, and settlement at BMD through the Institutional Settlement Service (ISS)[10] mode.

4. Settlement Cycle

From an infrastructure viewpoint, same-day settlement is available in the Malaysia bond market. Standard settlement cycle is T+1/T+2 from a market practice point of view for domestic transactions. For cross-border transactions, settlement cycle is generally T+2. But, some players adopt T+3.

5. Numbering and Coding

5.1 Numbering and Coding for Over-the-Counter Market and Exchange Market

5.1.1 Securities Numbering

International Securities Identification Number (ISIN) is used for securities numbering, but local securities codes prevail.

5.1.2 Financial Institution Identification

The Business Identifier Code (BIC) is used as part of a unique identifier code (UIC) for the participants.

5.1.3 Securities Account

The Securities Account Structure in RENTAS-SSDS is illustrated in Figure 6.1. Each participant has a primary securities account, a collateral account, as well as an unlimited number of optional customer sub-accounts.

---

[10] ISS is a service compliant with the Bank of International Settlement (BIS) DvP Model 2. BMSC acts as a CCP and guarantees payment and settlement.

Figure 6.1 Securities Account Structure in RENTAS

Source: Malaysian Electronic Clearing Corporation Sdn. Bhd.
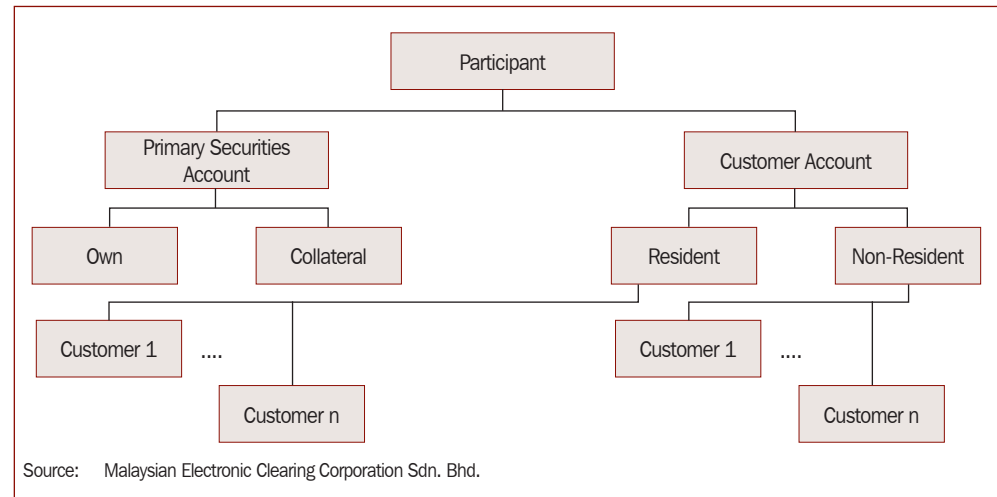
5.1.4 Cash Account

The Cash Account Structure in RENTAS-IFTS is illustrated in Figure 6.2. Every participant has a primary settlement account, a statutory reserves account, as well as an unlimited number of optional sub-accounts.

Figure 6.2 Cash Account Structure in RENTAS

Source: Malaysian Electronic Clearing Corporation Sdn. Bhd.
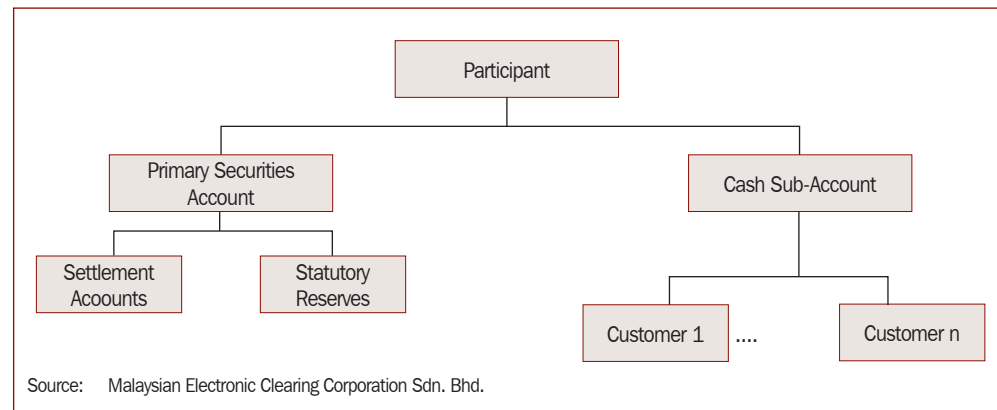
5.1.5 Character Code and Language

Unicode UTF-8 is adopted. The language used for payment and settlement system is English.

6. Medium- to Long-Term Strategy

BM itself will soon access RENTAS directly. An initiative called the Common Platform Model for Asian Post-Trade Processing Infrastructure is underway, which is a cooperation between BM and the Hong Kong Monetary Authority.

Philippines
(PHI)

1. Bond Market Infrastructure

1.1 Overview of Bond Markets

The Philippine bond market is comprised of the over-the-counter (OTC) market and the exchange market. According to OTC rules in Philippines, secondary trading of government and corporate bonds must be conducted through self-regulatory organizations (SROs). Therefore, trading participants of the markets should be members of an SRO. To date, the Philippines Dealing and Exchange Corporation (PDEx) is the only SRO in Philippines, and almost all transactions of bonds take place in with PDEx. It operates the Fixed Income (FI) Trading System, which includes two types of trading platform for debt securities: the Negotiated Dealing Platform and the Auto Match Platform. The Negotiated Dealing Platform is primarily for professional markets with relatively large trading transactions while the Auto Match Platform caters to the public market (through broker participants) with smaller volume.

The Bureau of Treasury (BTr) is the central securities depository (CSD) for government bonds (Treasury bills and Treasury bonds). BTr owns and operates the Registry of Scripless Securities (BTr-RoSS), which is the official registry of absolute ownership, legal or beneficial titles or interest in government bonds. Hence, all government bond transactions are finally settled in BTr-RoSS. The Philippines Depository and Trust Corporation (PDTC) is the CSD for corporate bonds. It also acts as a sub-registry for government bonds in some cases.

After the trade is executed in the FI Trading System, the trade data is sent to BTr-RoSS via PDEx-RoSS straight-through processing (STP) facility or the electronic delivery–versus-payment (eDvP) System. The FI Trading System automatically chooses the system used for the settlement process—either through the PDEx-RoSS STP Facility or the eDvP System—according to the parties involved in a trade.

The PDEx-RoSS STP Facility is for government securities eligible dealers (GSEDs) and transmits trade data directly to BTr-RoSS. The eDvP System is for non-GSEDs and transmits trade data to PDTC.

The cash settlement is performed on Philippine Payment and Settlement System (PhilPaSS), which is owned and operated by the Bangko Sentral ng Pilipinas (BSP). When trading participants do not have an account with BSP, other settlement banks will be involved.

Please refer to Part 3, Figure G.1 for the bond market infrastructure diagram.

1.2 Description of Related Organizations

Philippine Dealing and Exchange Corporation (PDEx)

PDEx is licensed by the Securities and Exchange Commission (SEC) as an exchange under the provisions of the *Securities Regulation Code* (SRC). PDEx is an operating subsidiary of the Philippine Dealing System Holdings Corporation (PDS Group).

Bureau of Treasury (BTr)

BTr is the CSD for government securities (Treasury bills and government bonds), and owns and operates the BTr-RoSS.

Philippine Depository and Trust Corporation (PDTC)

PDTC was founded as the CSD in the Philippines bond market in 1995. It is owned by the PDS Group. PDTC provides depository and settlement services for equities, such as common shares that may be classified as A and B, preferred shares, warrants, and depository receipts, commercial papers, private bonds, and government securities.

Bangko Sentral ng Pilipinas (BSP)

BSP is the central bank of the Republic of the Philippines. It was established on 3 July 1993. It provides the PhilPaSS and acts as a cash settlement entity in the bond market.

1.3 Trading

1.3.1 Over-the-Counter Market

In March 2005, the Fixed Income Exchange (FIE) was established in the Philippines. FIE is operated by PDEx, which is tasked to operate and maintain the trading system for fixed-income securities and its derivatives. It runs the FI Trading System (Negotiated Dealing Platform). Its member brokers and dealers are only allowed to engage in OTC transactions. When a seller and a buyer arrange or negotiate a trade outside the FIE, they have to execute the trade on the FI Trading System within 1 minute from conclusion of negotiation.

Traders can communicate, negotiate and deal transactions from their respective offices,and the system ensures that all information sent to each transacting party is kept confidential and cannot be viewed by the public.

1.3.2 Exchange Market

In February 2008, PDEx launched the Auto Match Dealing Platform where broking participants can post orders received from retail investors. With this platform, retail investors are given equal access to the various fixed income securities listed on the trading board. The transactions on this platform are captured automatically and broadcast on real-time basis.

1.4 Central Counterparty Clearing

1.4.1 Central Counterparty Clearing for the Over-the-Counter Market
There is no CCP for the OTC market.

1.4.2 Central Counterparty Clearing for the Exchange Market
There is no CCP for the exchange market.

1.5 Bond Settlement

1.5.1 Bond Settlement at the Bureau of Treasury-Registry of Scripless Securities
The Bureau of Treasury (BTr) is the CSD for government securities. BTr established the BTr-RoSS for depository and settlement of government securities in November 1996. BTr-RoSS settles transactions in delivery-versus-payment (DVP) Model 1 under the Bank of International Settlement (BIS) definition. BTr-RoSS checks the securities in the seller's securities account and earmarks these for transfer. After the cash settlement is processed, BTr-RoSS will transfer the earmarked securities from the seller's securities account to the buyer's.

The settlement process in Philippine bond market is varied according to the kinds of trade participants as the following figures show. The settlement process for government bond trades where both parties are GSEDs is shown as follows.

Figure 7.1   Settlement through RoSS-PhilPaSS DVP

- Parties execute trades using the PDEx FI Trading Systems.

- GS trades where both parties are members of the RoSS-*PhilPaSS* DVP are automatically downloaded to PDEx-RoSS STP facility.

- RoSS DVP settlement instructions are generated automatically from PDEx GS trades. No more manual encoding.

- Operations officers of both buyer and seller review and authorize trade/settlement instructions.

- On settlement day, authorized settlement instructions are sent to RoSS for settlement.

- RoSS settles the trade through the existing RoSS-*PhilPaSS* DVP System.

BSP = Bangko Sentral ng Pilipinas; BTr = Bureau of Treasury; DVP = delivery versus payment; FI = fixed income; GS = government securities; PDEx = Philippines Dealing and Exchange Corporation; PhilPaSS = Philippine Payment and Settlement System; RoSS = Registry of Scripless Securities; STP = straight through processing
Source: Philippine Dealing and Exchange Corporation.

The settlement process for all corporate bond trades and government bond trades where one or both parties are non-GSED is shown as follows.

Figure 7.2 Settlement Process for Corporate Bond Trades and Government Bond Trades

| Trading | Clearing | Settlement |

FI Trading Systems

Buyer

FI Trading Systems

Seller

- Parties execute trades using the PDEx FI Trading Systems.

- GS trades where at least one party is not a member of the RoSS-*PhilPaSS* DVP are automatically downloaded to eDvP System.

- eDvP settlement instructions are generated automatically from PDEx GS trades. No more manual encoding.

Trade Date

eDvP Systems

Settlement Date

Seller and Buyer authorizers

- Operations officers of both buyer and seller review and authorize trade/ settlement instructions.

- On settlement day, eDvP system executes settlement process:
  - securities = depository
  - funds = BSP-*PhliPaSS* or with Cash Settlement Banks

Securities Settlement

PDTC Depository

Cash Settlement Bank

PhilPaSS

Cash Settlement

BSP = Bangko Sentral ng Pilipinas; eDVP = electronic delivery versus payment; FI = fixed income; GS = government securities; PDEx = Philippines Dealing and Exchange Corporation; PDTC = Philippine Depository and Trust Corporation; PhilPaSS = Philippine Payment and Settlement System; RoSS = Registry of Scripless Securities; STP = straight through processing

Source: Philippine Dealing and Exchange Corporation.

1.5.2   Bond Settlement on the Philippine Depository and Trust Corporation

For corporate bonds and non-dealer government securities trades, the PDTC provides depository and settlement services as a CSD. PDTC adopts the DVP Model 1 under BIS definition. The proprietary network without specific name is used and the types of lines are Internet and point-to-point leased line. The protocol used is Hypertext Transfer Protocol Secure (HTTPS). The interface is browser-based, e.g., Internet Explorer, and the message format is proprietary.

1.6 Cash Settlement

1.6.1   Cash Settlement Using Central Bank

Trade between GSEDs is settled by a central bank account. BSP provides the Philippines's real-time gross settlement (RTGS) system, which is called PhilPaSS. All GSEDs have their accounts of BTr-RoSS for bond settlement and accounts of BSP PhillPass for cash settlement. In this case, the RoSS-PhilPass DVP system sends settlement data to BSP-PhilPass. Cash settlement is made through the debit or credit of the GSEDs accounts. BSP also provides an intraday overdraft facility.

1.6.2 Cash Settlement using Cash Settlement Bank

When one or both parties of trade are non-GSEDs, and both do not have a BSP account, the trade is settled with a cash settlement bank.

2. Typical Business Flows

2.1 Delivery-Versus-Payment Flow for the Over-the-Counter Market (Government Securities Eligible Dealers)

Please refer to Part 3, Figure G.2 on the bond transaction flow for domestic trades in the GSEDs market (DVP).

2.2 Delivery-Versus-Payment Flow for the Over-the-Counter Market (Including Non-Government Securities Eligible Dealers)

Please refer to Part 3, Figure G.3 on the bond transaction flow for domestic trades in the non-GSEDs market (DVP).

2.3 Delivery-Versus-Payment Flow for Cross-Border Trade

The domestic leg settlement is handled like any other domestic trade, with the foreign investor represented locally by a custodian or a dealer trading participant. The process of delivery to or collection from the foreign investor is bilaterally arranged but all modes entail foreign exchange registration with the central bank.

Transaction cost for cross-border clients can range from $15 to $30, which covers both cash and securities transactions and the Bangko Sentral Registration Document (BSRD) processing, reporting and monitoring. Redemption is treated as a free-of-payment (FOP) transaction. The transaction and account maintenance fees should generally cover all services. There would also be an account maintenance fee which ranges from 1.5 basis points (bps) to 3 bps per annum based on future value (FV) and inclusive of depository fees and taxes.

Please refer to Part 3, Figure G.6 on bond transaction flow for foreign investors in the OTC market (DVP).

3. Matching

The seller and buyer send instructions to PDEx and PDEx, through the FI Trading System, matches order from the seller and the buyer. PDEx, through the PDEx-RoSS STP Facility sends settlement data to BTr-RoSS. PDEx FI trades are already matched when sent to the clearing system for DVP settlement. PDEx operates a post-trade clearing facility, with STP from the trading systems, for counterparties to confirm their settlement obligations prior to settlement. Therefore, CSD matching is used only for non-exchange trades. The depository provides both local and central matching capabilities either for inputting or uploading of transactions. Local matching is applicable only to FOP transactions while DVP instructions are used in central matching.

4. Settlement Cycle

All PDEx trades settle on a DVP basis typically on a T+1 settlement cycle for domestic transactions. For cross-border transactions, the settlement cycle depends on the custodians involved. The most prevailing settlement cycle may be T+3 for cross-border transactions. FOP transactions are settled in real-time mode upon execution and confirmation of transfer instructions either at the registry or at the depository.

5. Numbering and Coding

5.1 Numbering and Coding for the Over-the-Counter and Exchange Markets

5.1.1 Securities Numbering
The International Securities Identification Number (ISIN) is used for government securities, except for special purpose Treasury bonds and multi-currency retail Treasury Bonds. Local numbering is also used for most of bond transactions.

5.1.2 Financial Institution Identification
Both Business Identifier Code (BIC) and local code are used. PDS-assigned firm codes are used to identify the financial institution in its trading, depository and settlement systems. However, mapping tables are used to convert these codes to their BIC equivalents when PDS systems interact with central bank or cash settlement bank systems.

5.1.3 Securities Account
The securities account is in text format and using ISO 20022.

5.1.4 Cash Account
The BIC code of the bank and the regular bank account number are used to identify cash accounts.

5.1.5 Character Code and Language
UTF 8 is used for all the trading, depository and settlement systems. The language for payment and settlement is English.

6. Medium- to Long-Term Strategies

The PDS Group and regulators (BSP and SEC) are very conscious about promoting STP whenever possible. While there is no official initiative tasked to implement STP, each financial institution plans to mitigate risks and reduce operational costs. They are promoting STP in the following areas:

- Between trading system and the back-office systems of trading participants
- From trading systems to the clearing and settlement systems
- Between depository system and the back-office systems of depository participants
- Between the depository and the registry systems both for government and corporate bonds

- Between the depository or registry systems and the settlement bank systems for linkages with other depositories

Each institution implements STP using proprietary conventions. For example, interfaces to settlement banks' deposit systems are governed by each bank's proprietary solution. This results in the feeder institution (such as the depository) having to customize the interface for each settlement bank which it connects to. The development of specific interface program for each connectivity point translates to multiple development and maintenance cost and increased operational risk. It is applicable that an industry-wide initiative streamlines STP connectivity requirements and promotes to use a centralized infrastructure (such as an STP "hub"). Regulators could set deadlines for companies to be ISO 20022 compliant.

Singapore
(SIN)

1. Bond Market Infrastructure

1.1 Overview of Bond Markets

Singapore's bond market is comprised of the over-the-counter (OTC) market and the exchange market. Singapore government securities (SGS) are traded on the OTC market, whereas corporate bonds are mainly traded on the Singapore Exchange (SGX), too. Settlement of SGS is performed via the Monetary Authority of Singapore (MAS) Electronic Payment System plus (MEPS+) SGS, and settlement of corporate bond is performed via the Debt Securities Clearing and Settlement System (DCSS). MEPS+ real-time gross settlement (RTGS) has a cash settlement function of full range of bonds.

Please refer to Part 3, Figure H.1 for the bond market infrastructure diagram.

1.2 Description of Related Organizations

The Monetary Authority of Singapore (MAS)
MAS is the central bank of Singapore, which acts as the agent for the Government of Singapore in issuing SGS that comprise of Treasury bills (T-bills) and government bonds. It provides overall supervision of the financial industry, including the securities industry, and operates a bond settlement and registry system (MEPS+ SGS) to facilitate the trading of Singaporean government debt. The book-entry system (MEPS+ SGS) is linked to the MEPS+ RTGS.

The Singapore Exchange (SGX)
SGX is a self-regulating organization governed by its own rules and by-laws, but ultimately supervised by the MAS. SGX was formed on 1 December 1999 as a holding company of some former exchange companies such as the Stock Exchange of Singapore (SES), Singapore International Monetary Exchange (Simex), and the Securities Clearing and Computer Services Pte. Ltd. (SCCS). The Tokyo Stock Exchange Group, Inc. holds about 4% of the stock while SGX holds a 20% stake in the Philippine Dealing System Holdings Corporation (PDS Group), which has become an associated company of SGX.

The Central Depository (Pte.) Limited (CDP)
CDP, which was established in 1980 and commenced operations in 1987, is wholly owned by the SGX. Settlement through the CDP is compulsory for all transactions of listed securities. The CDP, through its DCSS, is the depository for eligible private sector debt. DCSS-eligible securities are restricted to new, Singapore dollar-denominated private sector debt issues. The CDP provides clearing functions for corporate bonds, derivatives, and equities.

1.3 Trading

1.3.1 Over-the-Counter Markets
SGS are mainly traded in the OTC market. All trade confirmations for SGS are performed through the MEPS+ SGS. The seller keys in all the trade detail into MEPS+ SGS, which is then affirmed by the buyer. The buyer and seller have an option to choose either delivery-versus-payment (DVP) or free-of-payment (FOP) based settlement (most of them settled by DVP) in the MEPS+ SGS. As SGS are in the scripless form, ownership and transfer of SGS are reflected as book entries in the bank's custody account with MAS.

Corporate and statutory bonds are also traded in the OTC market. Transactions are cleared and settled through the online DCSS.

1.3.2 Exchange Markets
Bonds which are listed are traded on the SGX. The corporate bond market in Singapore is regulated by the SGX. Corporate bonds are traded on the Bond Quotation System of the SGX. The trading system of SGX links directly with DCSS, which is operated by the CDP. Taking effect beginning 8 July 2011, investors can trade SGS bonds in the secondary market on the SGX.

1.4 Central Counterparty Clearing
There is no central counterparty clearing (CCP) function for the OTC and exchange bond markets.

1.5 Bond Settlement

1.5.1 Bond Settlement on the Over-the-Counter Market
SGS are settled via book-entry movements within participant accounts at the MAS. Trade instructions are submitted by the delivering party and receiving counterparty to MEPS+ SGS by 5:30 p.m. on settlement day (SD). Upon matching, securities and cash are transferred between participants on a simultaneous, trade-by-trade basis. Settlement is completed on T+3 against MEPS+ payment.

The MEPS+ SGS system holds government bonds and facilitates the instantaneous and irrevocable transfer of SGS. It is linked to the MEPS+ RTGS system to provide DVP for SGS transactions. Under the scripless settlement system, crediting or debiting the securities owner's account through the book-entry system effects any transfer of securities. Most of SGS transactions are settled through DVP over MEPS+ SGS and MEPS+ RTGS.

If the seller of SGS has insufficient SGS for delivery, the transaction is queued in MEPS+ SGS until sufficient SGS is made available in the seller's SGS account. When the seller's SGS account has sufficient SGS, the SGS is earmarked for transfer to the buying bank, and a payment instruction is sent to MEPS+ RTGS for funds settlement.
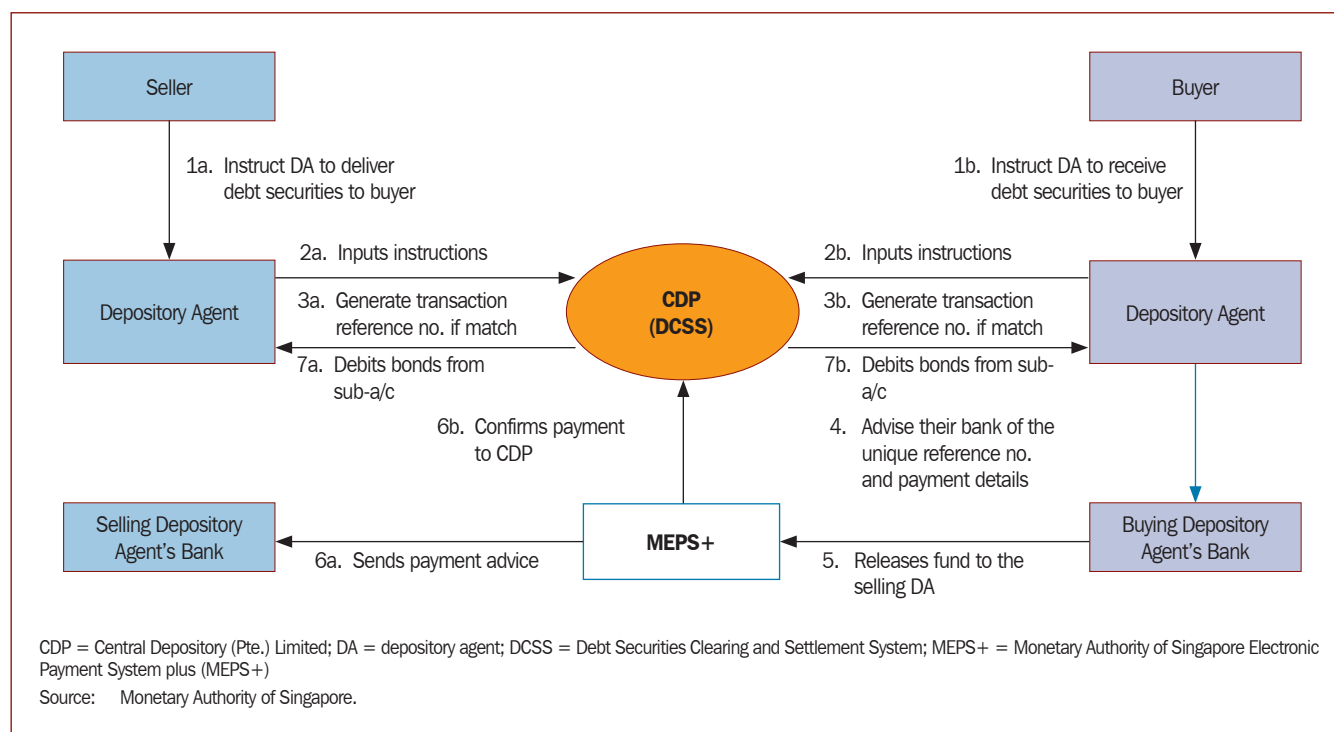
1.5.2 Bond Settlement on the Exchange Market

The DCSS is an electronic book-entry system and a facility for clearing and settlement of transactions in the OTC market in Singapore dollar-denominated private debt securities. It is operated by the CDP, which is a depository and a designated clearing house. Transactions can be settled on a DVP or FOP basis. Exchange-listed corporate debt securities are mostly settled on a DVP basis. CDP does not act as the central counterparty for such trades, and no netting is carried out. Both the buyer and seller input the settlement instruction, containing key details of the trade into the DCSS. Upon matching of the settlement instructions, the seller's debt securities are earmarked and the transaction proceeds to settlement. Matched instruction can only be revoked by the buyer.

For DVP settlement, transactions are settled on a real-time basis. Funds are transferred via MEPS+, and securities are simultaneously transferred via the DCSS book-entry system on a gross trade-for-trade basis. The real-time DVP arrangement is achieved through a live leased-line link between DCSS and MEPS+. For FOP settlement, transacting parties use CDP only for securities transfer and arrange for funds transfer separately.

The transaction flow of DCSS is illustrated below.

Figure 8.1 Transaction Flow of Debt Securities Clearing and Settlement System

CDP = Central Depository (Pte.) Limited; DA = depository agent; DCSS = Debt Securities Clearing and Settlement System; MEPS+ = Monetary Authority of Singapore Electronic Payment System plus (MEPS+).

Source: Monetary Authority of Singapore.

1.6 Cash Settlement

All types of bonds utilize MEPS+ RTGS for cash settlement. MEPS+ RTGS and MEPS+ SGS are directly linked for cash settlement of SGS. If the buying bank has insufficient funds to pay for the SGS purchase, the payment is queued in the MEPS+ RTGS. When the funds become available, the amount is debited from the buyer's RTGS account and credited to the seller's RTGS account. The MEPS+ RTGS simultaneously notifies the MEPS+ SGS to transfer the securities to the buyer.

Cash settlements for corporate bond trades also occur in MEPS+ RTGS. Funds are transferred via MEPS+ RTGS while securities are simultaneously transferred via the DCSS book-entry system on a gross trade-by-trade basis. A real-time DVP arrangement is achieved through a live leased-line linkage between DCSS and MEPS+ RTGS.

2. Typical Business Flows

2.1 Delivery-versus-Payment Flow for the Singapore Over-the-Counter Market

Please refer to Part 3, Figure H.2 for the bond transaction flow for domestic trades on the OTC market (DVP).

2.2 Delivery-versus-Payment Flow for Cross-Border Bond Transactions

Please refer to Part 3, Figure H.3 the bond transaction flow for foreign investors on the OTC market (DVP).

3. Matching

For SGS transactions from the OTC market, MEPS+ SGS provides local matching. The seller or buyer enters trade data to the MEPS+ SGS system. The system then transmits the data to the counterparty. If the data are correct, the counter party sends them back to the MEPS+ SGS for affirmation. Then, the SGS transactions are regarded as matched.

4. Settlement Cycle

The settlement cycle of SGS and corporate bonds is can be T+1, but is commonly contracted at T+3.

5. Numbering and Coding

5.1 Numbering and Coding for the Over-the-Counter Market and Exchange Market

5.1.1 Securities Numbering

The International Securities Identification Number (ISIN) is used in the Singapore bond market.

5.1.2 Financial Institution Identification

MEPS+ SGS and MEPS+ RTGS adopt the Society for Worldwide Interbank Financial Telecommunication (SWIFT) Business Identifier Code (BIC) to identify financial institutions. MEPS+ SGS and MEPS+ RTGS non-participant member code can either use its SWIFT BIC or an eight-character code assigned by MAS.

5.1.3 Securities Account

Securities account uses proprietary numbering. There are three types of SGS accounts in MEPS+ SGS—SGS Reserve account, SGS Trade account, and SGS Customer account.

SGS-Reserve Account

Banks would deposit SGS for compliance with the Minimum Liquid Assets (MLA) requirement to hold at least 10% of the qualifying liabilities (QL) in SGS at all times in this account prior to the start of the 2-week maintenance period. Banks may not sell SGS in the SGS-MLA account directly. To give banks the flexibility to manage their holdings of SGS issues, transfers of SGS holdings between the SGS-Reserve account and the SGS-Trade account can be made at any time when the MEPS+ SGS is in operation, subject to the 7:00-p.m. deadline for same-day transfers. Transfers of SGS holdings out of the SGS-Reserve account to the SGS-Trade account are permitted only if the remaining value of SGS holdings in the SGS-Reserve account after the transfer is at least 10% of QL. Transfers to or from the SGS-Reserve account will not be queued for settlement, i.e., if there is insufficient securities in the account (either SGS-Trade or SGS-Reserve accounts) to be transferred out, and the transaction will be rejected.

SGS-Trade Account

SGS holdings in excess of the minimum 10% MLA requirement may be deposited in the SGS-Trade account. SGS holdings in this account can be used for trading.

SGS Customer Account

Primary and approved SGS dealers maintain an additional SGS Customer account for the SGS holdings of their customers. Holdings in a Customer account can be transferred FOP to the bank's SGS holdings, or to another bank's or its customer's SGS holdings. Purchases or sales on delivery against payment of SGS holdings in a bank customer's account from and/or to another bank or its customer's SGS holdings can also be transacted.

5.1.4 Cash Account

Cash account uses proprietary numbering.

Participants are required to maintain current account with MAS. Banks' intraday Minimum Cash Balance (MCB) requirement, if any, is maintained in the Current Account.

Funds in the Current Account exceeding the intraday MCB requirement are transferred at the start of the day to the participant's RTGS account in MEPS+ RTGS, where they may be used for the settlement of interbank payments.

5.1.5   Character Code and Language

UTF-8 (Unicode) is adopted and English is chosen as a standard language for payment systems in Singapore.

Thailand
(THA)

1. Bond Market Infrastructure

1.1 Overview of Bond Markets

The Thai bond market is composed of the over-the-counter (OTC) market and the exchange market. Unlisted bonds are largely traded under the OTC market while listed bonds are traded through the Stock Exchange of Thailand (SET). More than 95% of bonds are traded in the OTC market. Traded data are entered into Post-Trade Integration (PTI) and settled using the PTI, which is the book-entry system of bonds in Thailand. PTI is owned and operated by SET and shared by the Thailand Clearing House (TCH) and the Thailand Securities Depository (TSD), which are subsidiaries of the SET. Cash settlement is effected through the Bank of Thailand Automated High-Value Transfer Network (BAHTNET) which is the RTGS system owned, operated and regulated by the Bank of Thailand (BOT).

Please refer to Part 3, Figure I.1 for the bond market infrastructure diagram.

1.2 Description of Related Organizations

The Stock Exchange of Thailand (SET)
SET is the stock exchange of Thailand and was established with the enactment of a legislation passed in May 1974. On 30 April 1975, the SET officially started trading. On 1 January 1991, its name was formally changed to "The Stock Exchange of Thailand" (SET).

The Bond Electronic Exchange (BEX)
BEX is a subsidiary of SET and was launched on 26 November 2003. BEX's main role is to support the secondary market for bond trading. As majority of bond trading are in the OTC market, therefore, BEX's objective is to expand bond activities to individual investors.

The Thai Bond Market Association (BMA)
BMA is a securities business related association under the *Securities and Exchange Commission Act B.E. 2535*. Its main purposes are to be a self-regulatory organization (SRO) for a fair and efficient operation of the bond market and to be an information center for the Thai bond market. As a pricing agency, BMA provides Thai bond prices

to Bloomberg and Reuters; in return, it receives trade details via Bloomberg's FIRST online capture. The BOT stipulates that every bond dealer has to be BMA member.

The Thailand Clearing House Co. Ltd. (TCH)

TCH, a subsidiary of SET, was established on 9 August 2004, with a registered capital of THB100 million. During 2004–2009, TCH acted as a clearinghouse or a center for clearing derivatives traded in the Thailand Futures Exchange (TFEX). Through the clearing house integration plan and intention to segregate risk associated with clearinghouse role from depository function, the TSD, which had acted as clearinghouse for equity and bond since 1 January 1995, has transferred clearing and settlement functions for equity and bond to TCH from 2010 onwards. Thus, TCH will become the integrated clearing house for all financial products. The TCH is governed by the *Securities and Exchange Act B.E. 2535 (1992)* for equity and bond, and the *Derivatives Act B.E. 2546 (2003)* for derivatives. It is under the supervision of the Securities and Exchange Commission (SEC).

The Thailand Securities Depository Co., Ltd. (TSD)

TSD is a subsidiary of SET and was established on 16 November 1994. TSD is the sole central securities depository (CSD) in Thailand using a scripless system.

The Bank of Thailand (BOT)

The BOT was first set up as the Thai National Banking Bureau. The *Bank of Thailand Act* was promulgated on 28 April 1942 vesting upon the BOT the responsibility for all central banking functions. The BOT started operations on 10 December 1942. It developed an electronic large-value funds transfer, known as BAHTNET. It is designed to mitigate risk in payment systems to facilitate settlement in effective, secured and timely manner on real-time gross settlement (RTGS) basis since 24 May 1995.

1.3 Trading

1.3.1 Over-the-Counter Markets

Most trading takes place on the OTC market, where quotes are typically obtained directly from money brokers and dealers over the phone. An agreement concluded over the telephone is then followed up with a confirmation order in writing. An investor can place an order with a dealer at his desired price and amount. However, the trade is concluded when the dealer can find a corresponding seller in the OTC market.

Dealers have to report trade details to the BMA, as the pricing authority, within 30 minutes. BMA publishes trade reports for government securities upon receipt and twice daily for corporate bond trades.

1.3.2 Exchange Markets
Trading Fixed Income Instruments on the Exchange

BEX was established to provide investors with additional investment instruments. In addition to a better access to information for investors, BEX will also provide investors with an ease to conduct trading transactions. BEX enhances the bond's secondary market. Prior to BEX, bonds were traded on the OTC market, which was mainly the institutional investor's arena. Small investors were unable to get into that particular market due to its size and its ambiguity, or simply the lack of information.

BEX is currently working under the trade-by-price method. However, the committed price will be converted into indicative yield to assist in decision making. The commission fee associated with bond trading required by brokerage companies is not fixed and subject to negotiation between the investors and their respective brokers. Dealers have to report trades to the BMA within 30 minutes in similar ways on the OTC market.

1.4 Central Counterparty Clearing

1.4.1 Central Counterparty Clearing for the Over-the-Counter Market
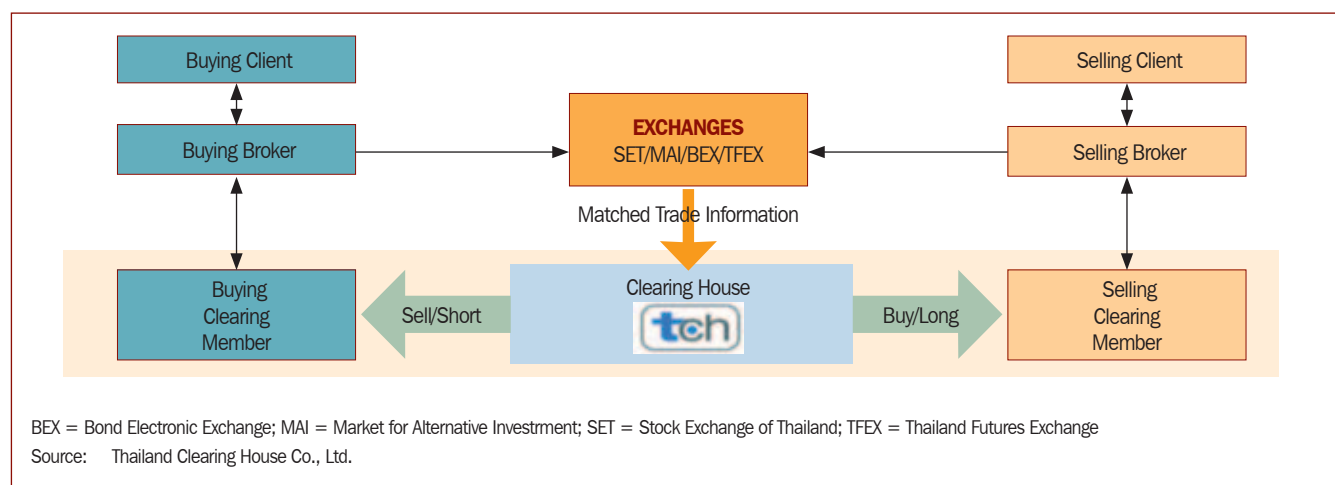There is no clearing function for the OTC bond market.

1.4.2 Central Counterparty Clearing for the Exchange Market
TSD administers clearing and settlement process. Currently, it takes 2 working days to complete the clearing and settlement transaction once the order has been executed. To simplify the procedure, investors are encouraged to make scrip deposit to TSD prior to any deal taking place. Right after a trading transaction is matched and those exchanges have confirmed the matching transactions with their members, the TCH, as the direct central counterparty (CCP), will become a buyer to every selling member and a seller to every buying member. Therefore, a member who has bought or sold the securities has an obligation not to the party on the other side of the transaction, but to the clearinghouse, just as the clearinghouse has an obligation to the member. This is called a novation process.

As a CCP, TCH guarantees the performance of payment and securities delivery of any trading transactions on SET (BEX). This reduces the risks stemming from clearing members who fail to meet their contractual obligations or 'credit risks', thereby strengthening the confidence in and by the involved parties, as well as preserving the financial integrity of the clearinghouse and the market as a whole. However, the TCH does not guarantee the payment and securities delivery for gross settlement transaction.

The role of the TCH is illustrated as follows.

Figure 9.1 Role of the Thailand Clearing House

BEX = Bond Electronic Exchange; MAI = Market for Alternative Investment; SET = Stock Exchange of Thailand; TFEX = Thailand Futures Exchange

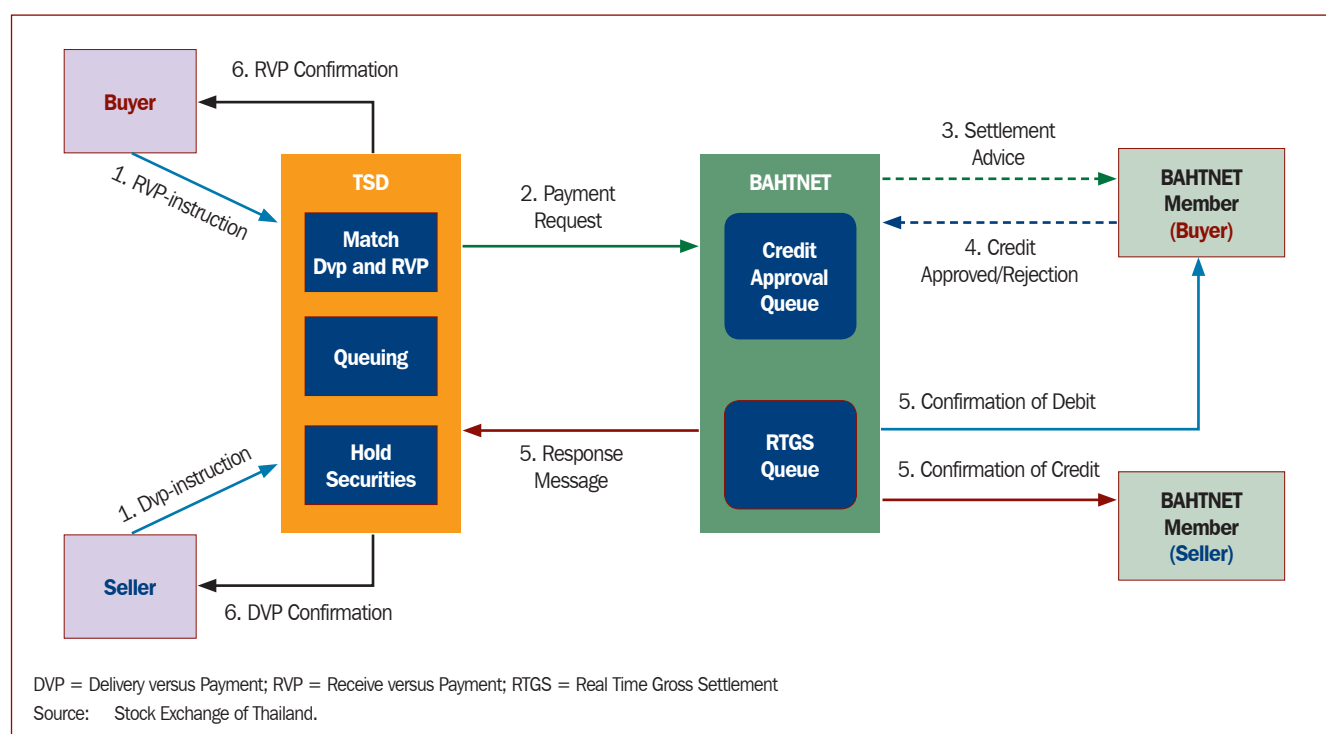Source: Thailand Clearing House Co., Ltd.

1.5 Bond Settlement

Bonds are settled via the PTI system on the RTGS basis. The buyer and seller send the settlement instructions to PTI. Once they are matched, TCH sends the instruction to TSD to withhold the bonds in the seller's account. TSD also sends the instruction to the BOT to settle the money. After the money settlement is completed, TSD transfers the bond from the seller's account to buyer's account.

PTI as core system combines settlement-depository-registration functions and features. PTI allows for STP, integrates with BAHTNET, and includes FOP transactions. PTI's messaging is based on Society for Worldwide Interbank Financial Telecommunication (SWIFT) messages. PTI uses the International Securities Identification Number (ISIN) and Business Identifier Code (BIC), but a converter exists to local codes. Participants can utilize web-based capture, and uploading is possible. Each market participant must have PTI terminals. A PTI system is a standalone system, with no interface with market participants' systems.

Figure 9.2 Process for Gross Settlement for DVP

DVP = Delivery versus Payment; RVP = Receive versus Payment; RTGS = Real Time Gross Settlement
Source: Stock Exchange of Thailand.

1.6 Cash Settlement

Cash settlement uses BAHTNET. BAHTNET is an irrevocable funds transfer system, which operates on RTGS basis. BAHTNET is linked with TSD's system to facilitate delivery versus payment (DVP) for government securities. Intraday Liquidity Facility (ILF), which provides intraday overdraft, is available for the BAHTNET members under BOT supervision. BAHTNET also provides a quieting mechanism and gridlock resolution system to provide adequate liquidity for cash settlement. As a high-value payment system, BAHTNET has implemented sufficient level of security measures such as digital signature based on private keys and smart cards to secure integrity, confidentiality, authentication, and non-repudiation including

audit trail. Regarding foreign exchange control, currently, non-residents can open two types of Baht accounts with commercial banks: Non-resident Baht Account for Securities (NRBS) and Non-resident Baht Account (NRBA). NRBS must be used for investment in securities and other financial instruments in Thailand (such as equity instruments, debt instruments, unit trusts, and exchange traded derivatives), as well as any payments relating to such investment (e.g., tax payment relating to securities investment, brokerage fee, and custodian fee). NRBA is for general purposes other than those of NRBS. Outstanding balances of each type of account at the end of each day shall not exceed the limit of THB300 million per non-resident, which includes balances of all accounts opened by each non-resident with all financial institutions in Thailand.

2. Typical Business Flows

2.1 Delivery-versus-Payment Transaction Flow for Domestic Trade in the Over-the-Counter Market
Please refer to Part 3, Figure I.2 for the bond transaction flow for domestic trades in the OTC market (DVP).

2.2 DVP Transaction Flow for Cross-border Trade
Please refer to Part 3, Figure I.3 for the bond transaction flow for foreign investors in the OTC market (DVP).

3. Matching

The automatic matching system for settlement transaction is used. The system checks if the DVP instruction can be matched with other receive-versus-payment (RVP) instructions according to the pre-specified matching fields. The PTI system already uses central (two-side trade input) matching. This method is preferable as market participants can input the instructions to the system in advance and the system matches automatically with the specified date. In addition, most of participants in bond settlement are banks which already use SWIFT messages so they can forward the instructions to the system without having to re-key in.

4. Settlement Cycle

Although the bond settlement system can be on real-time basis, most of market participants settle bond on T+2. In addition, bond trading in BEX is also settled on T+2. In the case of an investor from the United States, the settlement cycle is T+3.

5. Numbering and Coding

5.1 Numbering and Coding for the Over-the-Counter Market

5.1.1 Securities Numbering
ISIN is used for bond trade but, local numbering is also used.

5.1.2 Financial Institution Identification

BIC code is used for financial institution identification. However, proprietary code is also used.

5.1.3 Securities Account

ISO 20022 is not adopted in Thai bond market. The settlement system uses proprietary account numbers to transfer the bond.

5.1.4 Cash Account

The International Bank Account Number (IBAN) is not used. Since market participants are banks and the fund is settled via the BOT system, participants then use the BOT account number as reference to transfer funds.

5.1.5 Character Code and Language

SWIFT format is used as the character code for bond and cash instructions. English is adopted as the standard language for payment systems.[11]

6. Medium- to Long-Term Strategy

Currently, STP is already implemented for bond transactions. Most of the bonds are traded on the OTC market. After entering to the PTI of TCH, traded data are processed automatically without significant manual intervention, except necessary affirmation. As such, domestic bond settlement process is sufficiently automated. Regarding cross-border trade, messages are compliant with ISO 15022 and have high potentiality to be processed with less manual intervention of custodians. Adoption of ISIN and BIC may have some advantage to be directly connected with other CSDs in the near future.

In the very near future, both government and corporate bonds will be listed on the BEX. While, currently, only publicly listed companies' bonds are allowed to trade on BEX, non-listed companies will soon be able to have their bonds traded on the exchange as well. However, there is no electronic trading platform for the Thailand bond market. In 2010, BMA signed a multilateral memorandum of understanding with four key authorities namely, the BOT, the Public Debt Management Office, and the SET and Securities and Exchange Commission to establish the Thailand Financial Instruments Information Center (TFIIC), an infrastructure project under the Capital Market Development Master Plan 2009–2014. The TFIIC will centralize storage of financial instruments date and information for public access and cross-agency sharing within domestic financial markets.

---

[11] SWIFT format is based on UTF-8.

Viet Nam
(VIE)

1. Bond Market Infrastructure

1.1 Overview of Bond Markets

In Viet Nam there are two bond markets which are the over-the-counter (OTC) market and the stock exchange market. Most of the bonds are firstly traded on the OTC market bilaterally by phone or some other measures similar to other countries in ASEAN+3. All traded data are entered into the stock exchanges. There are two stock exchanges in Viet Nam: the Hanoi Stock Exchange (HNX) and the Hochiminh Stock Exchange (HOSE). HNX was established in 2005 and started handling government bonds in 2009. All traded government bonds are entered into HNX since then. Unlisted bonds are also traded on the OTC market though the trading volume and value are very small compared to those of listed bonds. As such almost all bonds are entered to the stock exchanges. Government bonds (government bond, government-guaranteed bond, and municipal bond) and foreign currency-denominated bonds traded in the Specialized Government Bond Market are processed and operated at the HNX. Corporate bonds listed on HNX and HOSE are dealt on the two exchanges.

The definition of trade date in Viet Nam is different from other ASEAN+3 markets. In Viet Nam, the date traded data are entered to the HNX is regarded as the trade date instead of the date when the bond is actually traded and agreed upon by phone or some other measures. As such, the standard settlement cycle in the Viet Nam bond market is T+1 according to proprietary practices. This means settlement cycle T+2 or T+3 is in accordance with standard market practice.

The Vietnam Securities Depository (VSD) is the central securities depository (CSD) for all bonds listed in the HNX and HOSE. Bond transactions are cleared by VSD and VSD is in charge of bond delivery and the Bank for Investment Development of Vietnam (BIDV) is in charge of fund transfer (cash settlement) using delivery versus payment (DVP) subject to the clearing result sent by VSD.

Please refer to Part 3, Figure J.1 for the bond market infrastructure diagram.

1.2 Description of Related Organizations

Hanoi Stock Exchange (HNX)

HNX is a government-owned and -operated exchange under the oversight of the State Securities Commission (SSC). HNX serves as the secondary market for fixed income in Viet Nam (focusing on government bonds, government-guaranteed bonds and municipal bonds. In September 2009 HNX launched a specialized market to trade in government bonds. Innovations in the new market include a system of Internet-based database that will be updated frequently, as well as quoting of both prices and yields of bond trades.

Hochiminh Stock Exchange (HOSE)

HOSE is a government-owned and -operated exchange under the oversight of the SSC. HOSE serves as the secondary market for fixed income in Viet Nam (focusing on municipal bonds and corporate bonds). In June 2008, all government bonds with maturity dates of at least 6 months in the future were moved from HOSE to HNX.

Vietnam Securities Depository (VSD)

VSD provides depository services and depository memberships to local market participants. According to the *Securities Law*, VSD was established on 27 July 2005 as the sole agent providing support services to complete transactions on the Viet Nam securities market. It commenced operations in May 2006. It is headquartered in Ha Noi, with a branch in Ho Chi Minh City. Both branches serve as depositories for securities traded on the respective exchanges in the two cities. Securities are immobilized at the VSD and participant positions are updated via book entry. On 18 December 2008, VSD was re-organized from a state income-generating service delivery agency into a wholly state-owned company. Under the new structure, the VSD is a limited liabilities company which is 100% owned by the MOF and continues to be responsible for monitoring securities registration, deposit, and settlement. The accounts at the VSD are omnibus accounts under the names of depository members.

### Bank for Investment and development of Vietnam (BIDV)

BIDV is the oldest commercial bank in Vietnam. BIDV has been designated as a settlement bank for cash settlement for the cash market. All market members are required to maintain a cash account with the designated clearing bank for cash settlement of trades.

1.3 Trading

The seller and the buyer execute bond trades via direct negotiation methods in the stock exchange market. After trading, participants input manually the trading data into the system of the HNX or HOSE. After trade matching, the system of stock exchanges sends the transaction result to the system of the VSD.

1.4 Central Counterparty Clearing

There is no central counterparty clearing (CCP) on the Vietnam OTC bond market.

Figure 10.1 Bond Settlement Process in the Viet Nam Bond Market

Source: Bank for Investment and Development of Viet Nam.
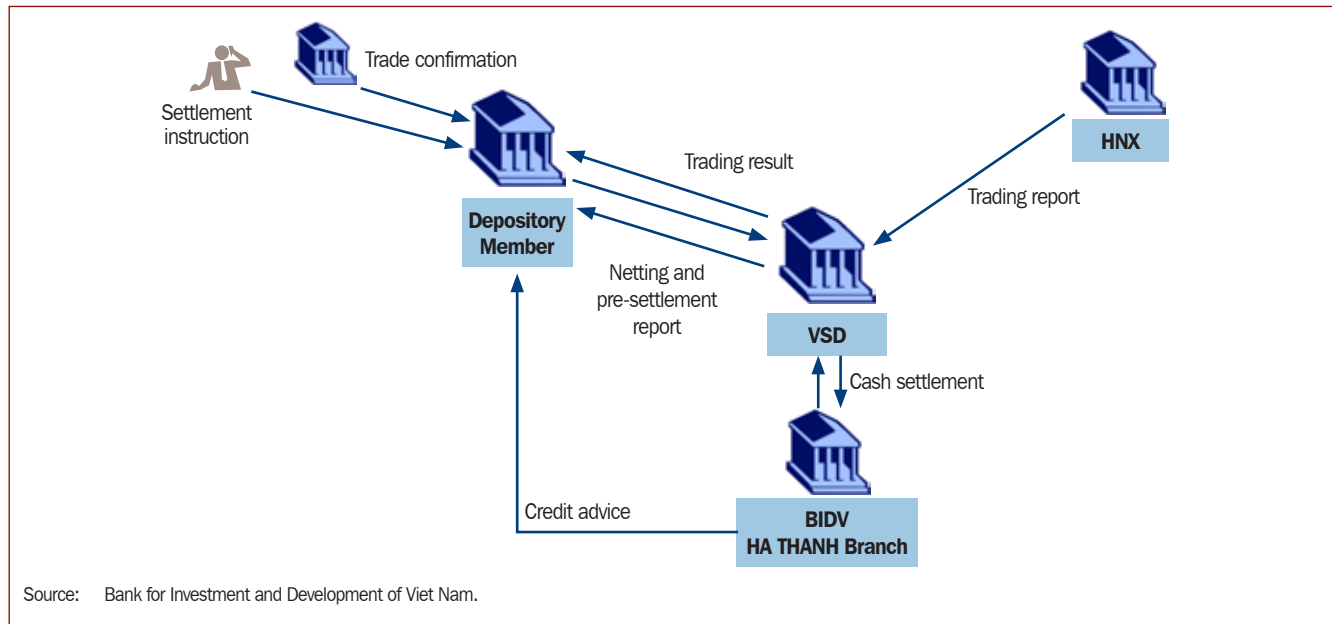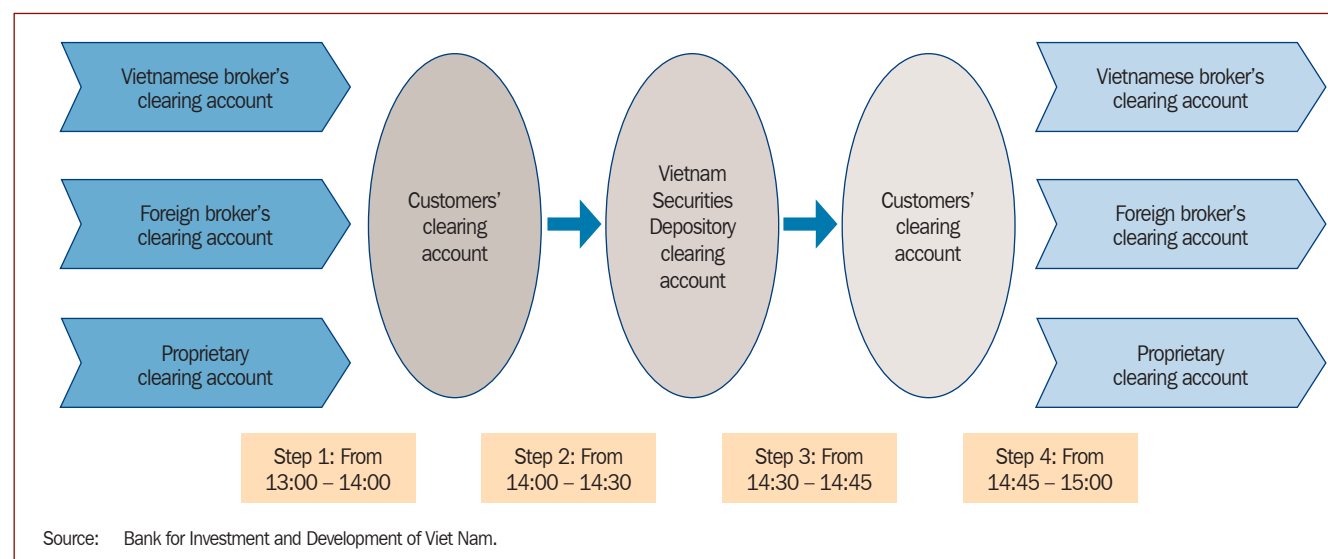
1.5 Bond Settlement

After receiving transaction results from the exchange markets, VSD performs confirmation between trading parties, netting and conduct settlement processes. Settlement is considered irrevocable after the market deadline, and it becomes obligatory to settle the trades. If the seller or buyer neither affirms nor disputes the trades, it is deemed to have been affirmed by default and such trades are included in its settlement obligations. In fact, VSD sends transaction settlement data to BIDV in the form of files. The software system of VSD and BIDV are independent and do not have a link to each other.

The Bank of International Settlement (BIS) Model 3[12] and Model 1 (for US dollar bonds) are applied in the Viet Nam bond market. Proprietary network without a specific name is used. The types of lines are leased line, Internet Protocol-Virtual Private Network (IP-VPN), and Multi-Protocol Label Switching (MPLS). The protocol is Transmission Control Protocol/Internet Protocol (TCP/IP). The interface to access to the system is terminal while the message format is Extensible Markup Language (XML).

1.6 Cash Settlement

On settlement day, participants must transfer the net cash obligations listed trades to their appropriate cash settlement accounts at BIDV after netting trades for proprietary, domestic clients, and foreign clients. Depository members have to transfer cash to their relevant accounts at BIDV (usually through the interbank system). BIDV will then process this through BIDV's system.

---

[12] Systems that settle transfer instructions for both securities and funds on a net basis, with final transfers of both securities and funds occurring at the end of the processing cycle.

Figure 10.2 Cash Settlement Process in the Viet Nam Bond Market

Vietnamese broker's clearing account			Vietnamese broker's clearing account
Foreign broker's clearing account	Customers' clearing account → Vietnam Securities Depository clearing account → Customers' clearing account		Foreign broker's clearing account
Proprietary clearing account			Proprietary clearing account
Step 1: From 13:00 – 14:00	Step 2: From 14:00 – 14:30	Step 3: From 14:30 – 14:45	Step 4: From 14:45 – 15:00

Source: Bank for Investment and Development of Viet Nam.

2.   Typical Business Flows

2.1 Delivery-versus-Payment Transaction Flow for Domestic Trade on the Over-the-Counter Market

Please refer to Part 3, Figures J.2 and J.3 for the bond transaction flow for domestic trades in the OTC market (DVP).

Traded data are entered to HNX and matched before it is transmitted to VSD.[13] The trades are netted and settled through the accounts in the VSD for bonds and in the BIDV for cash. Therefore, it is not a real-time gross settlement. There are no messages transmitted neither from HNX nor VSD to participants (seller or buyer). Participants need to access from a web terminal or physically to the sites, and obtain information. Therefore, bond settlement infrastructures need to be reconstructed completely to meet ISO 20022. However, considering the current situation of the Viet Nam bond market and trades, it is an appropriate business flow with sufficient functions and robustness. The data are processed in a manner of straight through processing from VSD to BIDV.

2.2 Delivery-versus-Payment Transaction Flow for Cross-border Trade

Please refer to Part 3, Figure J.4 for the bond transaction flow for foreign investors in the OTC Market (DVP).

Cross-border trade transaction flow is in principle not very much different from the generally accepted flow in ASEAN+3 region. Foreign exchange funding to the domestic custodian of buyer needs to be completed before sending trade order. Pre-funding is also required.

---

[13] Government and corporate bonds are nowadays traded only on HNX; however, some residual bonds (both municipal and corporate) remain on HOSE until maturity.

3. Matching

Matching at HNX is a proprietary matching. The seller and buyer enter traded data into HNX and forward the data to VSD after having been matched. Seller and buyer access the VSD system and check the stored data to be correct. Seller and buyer check the data and change the status of the data in VSD. If both seller and buyer confirm that the traded data are correct, it means bond settlement instructions are matched.

For government bonds traded on the OTC market, since seller or buyer does not send the bond settlement instruction to the VSD, confirmation of traded data stored in VSD to be correct by both seller and buyer is regarded as settlement instructions are matched.

4. Settlement Cycle

The settlement cycle for government bonds is based on the market practice generally accepted in ASEAN+3, which is T+2 or T+3, though it is regarded as T+1 based on local proprietary practice. In other words, the definition of trade date in Viet Nam is different from other ASEAN+3 markets. In Viet Nam, the date of traded data are entered to the HNX is the trade date instead of the date when the bond is actually traded and agreed upon by phone or some other measures. As such the standard settlement cycle in Viet Nam is T+2 or T+3.

5. Numbering and Coding

5.1 Numbering and Coding

5.1.1 Securities Numbering
VSD issues International Securities Identification Number (ISIN) for all bonds registered with VSD and listed in the stock exchanges since VSD is a full member of Association of National Numbering Agencies (ANNA). Local code is used domestically and needs to be converted to ISIN. The market allows investors the option of using ISIN codes and local codes. Local codes are used while ISIN codes are used alternatively subject to specific purposes.

5.1.2 Financial Institution Identification
Local code is used domestically. Conversion between local and Business Identifier Code (BIC) is necessary when foreign institutional investors use the BIC.

5.1.3 Securities Account
Local securities account is used.

5.1.4 Cash Account
Local cash account numbering is used.

5.1.5 Character Code and Language

Unicode (UTF-8) is used. Regarding language, Vietnamese is used as the official language for bond trade and settlement infrastructures.

6. Medium- to Long-Term Strategies

After entering traded data into HNX, the data are processed and transmitted to BIDV for cash settlement through VSD. As such it can be said that straight through processing (STP) is realized fitting the current situation in Viet Nam. However, there are still many paper-based processes between participants (seller and buyer) and infrastructure operators (HNX, VSD, and BIDV), which need to be improved. Therefore, it may be recommended that bond trade- and settlement-related infrastructure will be reconstructed based on international standards in the future.

New information technology-related initiatives to introduce STP (from trade to settlement, including depository) are currently being planned by the stock exchanges and the VSD. New investments to meet technical criteria set up by the stock exchanges and VSD need to be considered.