



CENTEAL SECURITIES
DEPOSITORY OF IRAN
(CSDI)



IRANIAN SECURITIES AND
EXCHANGE ORGANIZATION
(SEO)



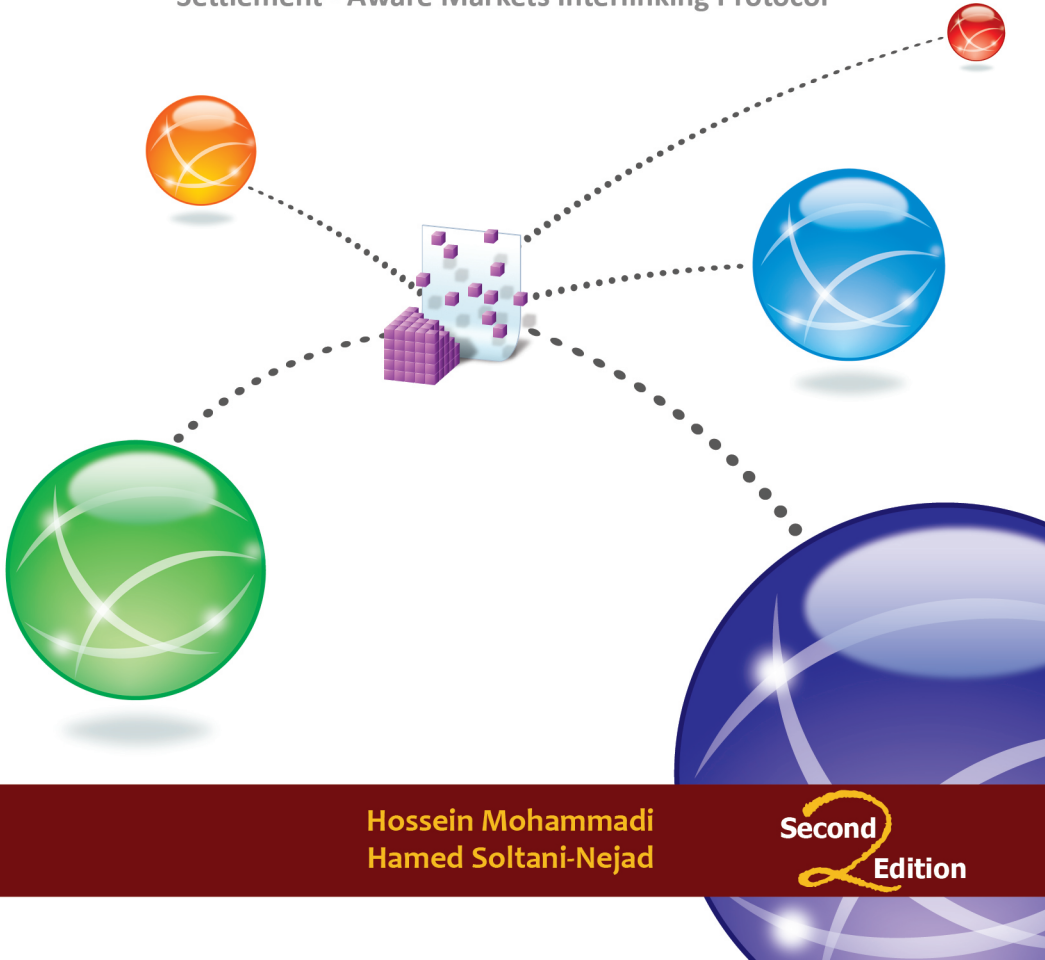
TEHRAN STOCK
EXCHANGE
(TSE)

Capital Markets Interlinking

using

SAMIP

Settlement - Aware Markets Interlinking Protocol



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Second
2 Edition

CENTRAL SECURITIES DEPOSITORY OF IRAN

OIC Capital Markets Interliking *using* SAMIP
IT and Bussiness Aspects

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Preface to the Second Edition

As a result of discussing SAMIP in some conferences with people from both academic and business sectors, we found the necessity of central bank's contribution to the ICF as a bottleneck and design problem for SAMIP. Therefore, building sophisticated simulation scenarios, we came up with the second version of ICF (the International Clearing Fund) which addresses all the challenges of the first version. The new ICF is reported in chapter 8 while the rest of the book mostly remains unchanged.

Preface

Interlinking capital markets has always been an interesting issue since it not only provides more investment opportunities but also results in reduction of the risk of market volatility due to increase in the size of market. However, global and local barrier like different currencies, legal issues, settlement risks and costs prevents such inter-linkage to take place efficiently. In this book, we propose a model for interlinking capital markets of different countries taking advantage of automatic guideline information provided from the settlement hub to the trading engines. The context data is used in order to take into account and accommodate the above differences and address challenges efficiently. We show that SAMIP can be easily developed, deployed and integrated with current CSD and trading engines with minimal effort and can drastically reduce the cost and risk of international settlement leading to increase in the practical volume of international investment. In order to enrich the book which is itself based on our paper on the issue [1], we have borrowed almost a chapter from [2] describing the basic concepts behind the issue. We strongly recommend the reader to read the concepts chapter before SAMIP.

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Chapter 1

Introduction

1.1 Motivations of Internationalizing Capital Markets

A glance at capital markets especially those offer SHARIAH compliance investments shows that Investments in all Islamic countries are becoming more and more international. Introduction of new financial instruments such as sukuk made these markets more attractive for Muslim investors as well as other portfolio owners who seek for new opportunities to make the benefit of more diversification. A growing proportion of trades are foreign investors, meaning that not only more transactions need to be settled, but more of these transactions require cross-border settlement. Moreover, the complexity of settlement rises with the increasing use of complex derivatives composed of one or more underlying assets from different trading venues. Trading activity, market liquidity, and capital market growth depend on safe

and efficient trading and post-trading systems.[”The Impact of Information technology on European Post-Trading” Torsten Schaper, Michael Chlistalla]

1.2 Global Trend

According to the standard theory, international trade leads to allocation of resources that is consistent with comparative advantage. This results in specialization which enhances productivity and efficiency. Capital flows across countries have played an important role in enhancing the production base. This was very much true in 19th and 20th centuries. Capital mobility enables the total savings of the world to be distributed among countries which have the highest investment potentials. The rapid development of the capital markets has been one of the important features of the current process of globalization. While the growth in capital and foreign exchange markets have facilitated the transfer of resources across borders, the gross turnover in foreign exchange markets has been extremely large. It is estimated that the gross turnover is around \$1.5 trillion per day worldwide (Frankel, 2000). This is of the order of hundred times greater than the volume of trade in goods and services. The expansion in foreign exchange markets and capital markets is a necessary pre-requisite for international transfer of capital. However, the volatility in the foreign exchange market and the ease with which

funds can be withdrawn from countries has created often times panic situations. Especially when international capital flow is considered as one of the main factors encounters economies with financial crisis such as recent one. In the light of this financial crisis, the importance of appropriate post-trading arrangements for capital markets has gained even more weight and the focus of regulators is on ensuring their integrity, efficiency, and robustness.

European Central Securities Depository Association (ECSDA) prepared a report on cross-border settlement in 2002 contained a model for cross-border clearing and settlement based on DvP and allows to settle gross or net [5].

In 2004 The European Commission has adopted a Communication on an action plan to create a genuine single market in securities in the European Union and to make cross border clearing and settlement effective , safe and efficient at European level[6]. The Commission of the European published a report on future of clearing and settlement in Europe Union which outlined the actions it intends to undertake in order to improve Clearing and Settlement arrangements and discussed about The barriers identified by the Giovannini reports [8].

Hamburg Institute of International Economics published a discussion paper on the efficient securities clearing and settlement system in 2004. This paper concludes that in order to minimize the impacts of different national laws, taxation systems, as well as with culture and language

barriers, EU Commission and national governments have to harmonize laws and create a level playing field to foster competition among financial services providers [9].

In 2005 Karlo Kauko published a paper on this issue. He offered the link between CSDs and following DvP standard as a solution for interlink between the markets.[10] Karlo Kauko has a similar study done in 2002. In 2005 Noritaka Akamatsu issued a paper about Bond Market Cross Border Settlement. He addressed basic issues such as channels of cross border settlement, Multi-currency settlement arrangements etc. and finally defined the strategy of encourage competition among national CSDs to become a regional ICSD.

In 2006 Federation of European Securities exchange in corporation with European Central Securities Depository Association declared the European code of conduct for clearing and settlement. In April 2008 Clearstream Banking Frankfurt founded together with the Central Securities Depositories (CSDs) of Austria, Denmark, Greece, Norway, Spain and Switzerland the joint venture Link Up Markets to improve efficiency and reduce costs of post-trade processing of cross-border securities transactions in Europe.[11] In this joint venture Each CSD will have direct access to the services of the other CSDs by connecting to the infrastructure of Link up Markets.

In 2009 European central bank declared the framework of the T2S Guideline including: insuring that CSDs do not

Table 1.1: Change in Market Capitalization (WFE)

Market capitalization (year-on-year)	July 2010 (USD bn)	% change July 2009
Americas	18 967	19,9%
Asia Pacific	14 672	10,0%
Europe Middle East Africa	13 245	16,8%
Total WFE	46 884	15,8%

pose risk to each other, preventing free-riding behavior in T2S and so on.[12]

Chapter 2

Concepts of Securities Exchange Systems

2.1 General Terms

2.1.1 Security Market

Financial markets are important for the efficient allocation of resources in the economy and economic growth. Modern financial markets are characterized by the presence of a variety of financial instruments, including securities (such as debt instruments and equities) and derivatives (such as futures, options and swaps). One important component of the financial market is the securities market. The purpose of a securities market is to bring together two groups of participants: those who have capital to invest (i.e. investors) and those who want to borrow that capital (e.g. firms and public bodies). Thus, as an alternative to borrowing money from an intermediary (e.g. a bank), firms

and public bodies can raise funds directly from investors by issuing securities.

Securities markets are marketplaces where securities are bought and sold. Securities markets are divided into two categories: primary markets and secondary markets. A primary market is a market in which newly issued securities are offered for sale. They may be offered to the public in a procedure called an initial public offering (IPO). Alternatively, they may be offered to select investors in a private placement. The primary market is thus a place where firms and public bodies (i.e. issuers) raise the funds they need for investment purposes. By contrast, the secondary market is where securities are bought and sold once they have been issued in the primary market. Investors are households, firms and other economic actors that invest surplus funds or savings in order to earn a return on their holdings. Investors normally trade in securities markets through an intermediary. Institutional investors are a particular type of investor and mainly comprise banks, mutual funds, pension funds and insurance companies.

For the securities market to work, it needs to be underpinned by arrangements and infrastructures for the handling of securities. As in the case of payment systems, this involves intermediaries, rules, procedures and processes, as well as organizations that provide trading, clearing and settlement services. It relies on institutions that provide securities accounts and related services. There are market ar-

rangements, such as standards, conventions and contracts for the provision and use of various services, as well as arrangements for consultation and cooperation within the industry and with other stakeholders. Again, these operations and systems need to be underpinned by a sound legal basis which includes laws, standards, rules and procedures laid down by legislators, courts, regulators, intermediaries, system operators and central bank overseers.

The infrastructures and arrangements for the handling of securities are, to some extent, more complex than those for the handling of payments. Since securities are, as a rule, delivered in exchange for payment, there are two delivery legs to consider the cash leg and the securities leg. The handling of securities also involves a wider range of functions and participants.

2.1.2 Elements & Institutions

This section aims to provide an overview of the various entities that are active in securities markets and the functions they perform. In this respect, it looks at the issues relevant in the various stages of the life cycle of a security. The first stage in the life cycle of a security is issuance the creation of new securities. The entity issuing the securities is called the issuer. Securities used to be issued as physical certificates, but are nowadays largely issued only in book-entry form i.e. they exist only as electronic accounting records. A notary function will provide for the

registration of securities with a registrar and subsequently ensure that there is no undue creation of securities. This function is often assigned to a central securities depository (CSD), a storehouse providing for the safekeeping of securities. A corresponding service for international securities (i.e. Eurobonds) is provided by international central securities depositories (ICSDs).

CSDs have different types of holding structure. A CSD may hold accounts for all final owners of securities (direct holding). Alternatively, in a tiered structure, intermediaries (custodians) hold accounts (omnibus accounts) with the CSD, while themselves holding accounts on their books for final owners (indirect holding). Mixed structures, combining features of the two types of holding structure, are also common. As part of this safekeeping, CSDs and in particular custodians also provide asset servicing, ranging from the handling of corporate events (coupon or dividend payments, splits, etc.) to more sophisticated and diverse services, such as accounting, risk analysis, collateral management and securities lending. In trading, buyers and sellers agree to exchange securities for funds in accordance with agreed terms. Trading may take place at an exchange or multilateral trading facility (public markets), or in the over-the-counter (OTC) market or at other trading venues (private markets). Investors are those who buy, hold and sell securities. Since access to trading venues is regulated and/or restricted, most investors will not directly partici-

pate in trading themselves, but instead use intermediaries, such as broker-dealers. When the intermediary executes trade

orders on behalf of a customer, it is said to be acting as a broker; when it executes trades for its own account, it is said to be acting as a dealer. Once a securities trade has been agreed, the parties to the trade confirm the terms agreed, and instructions are generated for the execution of the trade (i.e. the delivery of securities and the transfer of funds) and sent for clearing and settlement. Clearing includes the process of transmitting, reconciling and, in some cases, confirming securities transfer orders prior to settlement, possibly including the netting of orders and the establishment of final positions for settlement. In some markets, there may be a central counterparty (CCP), a central provider of clearing services which interposes itself between the two parties and provides multilateral netting and centralized risk management.

The actual delivery of the securities and the corresponding payment is referred to as settlement. Settlement services are offered by CSDs, which operate securities settlement systems. Sometimes an intermediary (e.g. a custodian) can effect settlement internally in its own books. As a rule, securities are delivered against payment in a DvP procedure, unless it has been agreed that securities will be delivered free of payment (FOP). DvP requires interaction between the SSS and a payment system. The cash leg may

be settled at the central bank or in the books of a commercial bank.

It is important to note that issuance, safekeeping (i.e. custody) and asset servicing are primary market activities relevant for any security created. Trading, clearing and settlement services occur only when there is secondary market activity. These services are also referred to as trading and post-trading services. The latter may involve anything from the matching of trades to clearing and settlement.

2.1.3 Central Securities Depository

In modern economies, the volume of securities being issued and traded is so large that, in order to ensure the efficient and safe issuance, safekeeping and transfer of securities, these are issued directly in the books of a public registrar, a special entity serving a whole securities market. The registrar maintains issuer accounts and carries out the notary function, ensuring for each issue that the amount of securities issued equals the amount of securities outstanding at all times, thereby ensuring that there is no undue creation of securities. In most jurisdictions, the notary function is entrusted directly to the CSD the entity responsible for the safekeeping and transfer of securities for the whole market. In a few jurisdictions, however, the notary function is entrusted to a separate registrar. Where this is the case, the CSD interacts with the registrar to notify it of changes in ownership and reconcile the balances of its safekeeping

accounts with those of the registrars issuance accounts.

Thus, a CSD will normally hold two types of securities account: issuer accounts, and safekeeping accounts recording ownership of outstanding securities. Issuer accounts are relevant only for the issuance of securities and the fulfillment of the notary function. Transfers of ownership as a result of secondary market trades do not affect issuer accounts.² Instead, the CSD simply registers any change of ownership by means of a book-entry transfer from one safekeeping account to another. As CSDs were set up to centralize the holdings of national securities markets, they were, at the outset, typically domestic in scope. A security is normally issued in a single CSD.

Between the decision to raise funds through securities markets and the actual issuance of securities, a number of administrative steps need to take place: the issuer usually appoints a bank (which participates in the local CSD) as an issuing and paying agent (IPA). The IPA is usually charged with requesting the securities unique International Securities Identification Number (ISIN) from the securities market coding agency. In the interests of efficiency, this coding agency function is usually assigned directly to the local CSD, but in some jurisdictions it can be performed by a separate entity. The IPA also collects funds from securities underwriters and transfers the funds to the issuer. The IPA may also deal with the exchange on behalf of the issuer if the securities are going to be listed.

In addition to national CSDs, there are also international central securities depositories. The 1970s saw the growth of an international securities market for debt instruments which were issued outside the issuers country of residence and were not subject to the market regulations, bond market conventions or settlement practices of either the issuers country of residence or the country of issue (with the result that such certificates were sometimes described as homeless). These international securities became known as Eurobonds (with the prefix Euro not relating to the currency, but instead being derived from the fact that such instruments were first issued by US issuers for non-US investors, which were mainly located in Europe). Eurobonds are issued in the form of physical certificates, which are then immobilized.

The growth of this market made it necessary to set up specialist institutions to centralize settlement processing, similar to what CSDs had done for national securities markets. Consequently, two ICSDs now called Euroclear Bank (based in Belgium) and Clearstream Banking Luxembourg were set up. While the ICSDs main focus has been the facilitation of international activities, they also provide some national CSD services. Besides Eurobonds, ICSDs also provide services for securities (i.e. normal debt instruments and equities) that have been transferred to them via link arrangements after originally being issued in a national CSD.

Some special features characterize the issuance procedures for Eurobonds. One important feature is the fact that, by contrast with national CSDs, ICSDs have not traditionally had a direct relationship with the securities issued. This has been due to the fact that, although Eurobonds are issued as physical certificates, the two ICSDs have not themselves had vaults in which to store securities issued in physical form. Instead, Eurobonds have been deposited in depositories, typically private banks, which have held the (physical) securities in safekeeping. The further book-entry recording of the securities has then been allocated to the two ICSDs in shares that depend on where the underwriters, the initial investors or their intermediaries hold their accounts i.e. depending on whether they are members of one ICSD or the other. For this reason, and as an exception to the issuance principle of one CSD for one security, it has been possible for the same Eurobond to be held and settled in two systems. Changes implemented since mid-2006 in the issuance procedures for Eurobonds mean that CSDs and the ICSDs themselves have become directly involved in issuance.

2.1.4 Dematerialization of Securities

Originally, issuance involved a physical certificate, which was delivered to the investor. For security reasons, investors needed to keep certificates in a safe place, and often held them at their bank. This solution became impracti-

cable as securities markets grew, since events such as splits that took place during the life cycle of a security involved the annotation of the certificate, and some rights contained in parts of the certificate required separate processing (e.g. in the case of coupons).

Over time, it became apparent that the general processing of securities could be significantly improved in terms of safety and cost-efficiency by concentrating certificate holdings in a single depository. As a result, central securities depositories were created in the various national markets (sometimes with different CSDs holding different asset classes). Thus, with the introduction of electronic processing technology, the industry moved over to the recording of holdings in book-entry form, with certificates being immobilized at the CSD.

Nowadays, following technological and legal advances, securities are dematerialized i.e. they are issued only in electronic, book-entry form in the issuers account in the books of the CSD. Nevertheless, there are still some markets where the legal framework provides for the issuance and immobilisation of a physical certificate prior to book-entry settlement of transfers.

When securities were issued as physical certificates, it was often the case that the name of the holder needed to be added to both the certificate and the books of the issuer. That meant that, in terms of legal ownership rights, one certificate was not freely interchangeable with another.

However, where immobilisation or dematerialisation are employed, each security held electronically in a safekeeping account represents a fraction of equal value of a particular securities issue. Such fractions are freely interchangeable and the security is said to be fungible. Fungibility is important in the context of repurchase agreement (repo) and securities lending activities, as, for any given securities issue, any fraction returned to the owner will be just as valuable as any other fraction.

2.1.5 Custodies as Holders

Securities holding structures can, in general, be divided into direct and indirect holding systems. The terms direct and indirect refer to the question of whether the investors ownership of securities is recorded at the CSD level (direct) or the next tier down (indirect) in a custody chain. In an indirect holding system, ownership records for end investors will be held not only by the CSD, but also by other entities custodians.

A direct holding system is a custody arrangement which allows end investors to be individually recognised as the ultimate owners of securities at the level of the CSD. The registration and maintenance of changes in the ownership of securities is carried out centrally in the books of the CSD. Direct holding systems exist in several European countries (e.g. Denmark, Finland, Greece, Slovenia and Sweden), as well as outside Europe (e.g. in the Middle East, South-

East Asia and China). Direct holding systems are either (i) mandatory as a result of national law, (ii) voluntary, or (iii) combine features of the two (hybrid systems). In mandatory systems, all end investors are recognised in the CSD. In hybrid systems, it is typically only domestic end investors holdings of securities that have to be recognised at the level of the CSD.

A common feature of the various direct holding systems is the fact that an end investor has to assign an account operator for its account(s) in the CSD. The account operator can be any CSD participant that has the right to operate direct holding accounts, including the CSD itself. The account operator is responsible for the maintenance of the account and the carrying-out of any updates as regards the holdings on the account, although these are technically executed in the CSD. In a direct holding system, corporate events (coupon or dividend payments, share swaps, splits, etc.) need to be booked on accounts maintained in the CSD. The CSD will have to be capable of booking instructions for corporate events

(such as share splits) without delay, which in a direct holding system could be a fairly onerous task. In direct holding systems, the processing of corporate events typically also includes the calculation of any taxes on income. Most direct holding systems were introduced as a result of the majority of the equities in the relevant markets being issued as registered shares. The CSD systems were therefore

established on the assumption that the registered owner should also be the person registered on a given securities account. There would then be no need for any custody intermediation and the CSD would be seen as the issuers agent. In some new markets, the direct holding model has been introduced in the context of large initial public offerings, especially where government-owned businesses have been offered to the public. In that case, the direct holding model is seen as a way of executing such IPOs in a cost-efficient way, having them managed by just one entity (or very few entities).

In an indirect holding system, some (or all) end investors holdings of securities are not recognised at the level of the CSD. Instead, blocks of securities are held in intermediaries accounts with the CSD (called omnibus accounts, as they group together the holdings of several investors in one single account with the CSD), while those intermediaries (i.e. custodians) manage the end investors accounts internally in their own systems. This results in fewer accounts being held at the CSD level. The ICSDs apply the indirect holding model.

Investors may not want to hold or may not be allowed to access accounts with the CSD. They therefore make use of the intermediation services of custodian banks (or, depending on the local jurisdiction, other types of non-bank financial intermediary that are allowed to provide custody services). These investors hold their securities accounts

with a custodian, which is also charged with executing settlement orders on their behalf. The custodian chosen may hold an omnibus account directly with the CSD, or it may hold one with another intermediary, thereby itself acting as a sub-custodian. In this way, a custody chain is established. Each tier holds the ownership records for the tier below. For example, the CSDs records reflect securities ownership by custodians, while the custodians own records reflect ownership by their direct customers. The custodian banks ability to keep records of its customers holdings is critical in order to protect its customers ownership rights. In order to preserve the integrity of the securities holdings, it is essential for each tier in the custody chain (i.e. each custodian bank) to reconcile its account balances with those of the custodian in the next tier, up to the balances of the accounts held in the CSD. (In the event of discrepancies, the balances of the CSD accounts prevail, as the CSD can be considered the ultimate custodian.)

CSDs provide custody services only to those market participants that are allowed to participate in their systems. Consequently, the custody industry is an important part of the securities market infrastructure and is characterized by the presence of different participants meeting the demands of different investors in different ways, providing services that range from very basic safekeeping to targeted, value-added services.

Some custodian banks have specialized in providing ac-

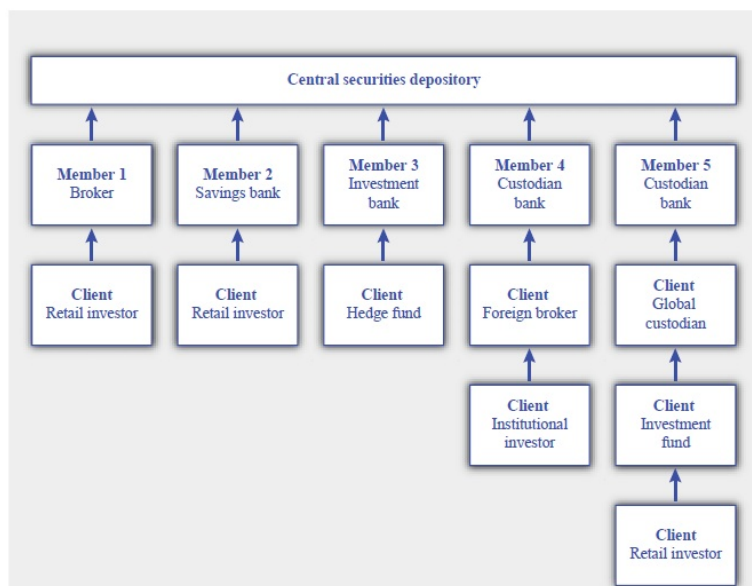


Figure 2.1: Examples of multi-tiered intermediation in securities custody

cess to a variety of markets and offer a one-stop shop for international investors. These custodians ensure a presence in numerous national markets by establishing local subsidiaries or branches, or by means of a network of agreements with local sub-custodians, which access the local infrastructures on their behalf (a less frequent solution being remote participation in foreign infrastructures). For this reason, such entities are called global custodians.

Custodians receive instructions from their customers and take care of settlement. In theory, they can either forward the instructions to the CSD or, if both parties (and their brokers) are customers of the same custodian bank, internalise settlement (i.e. execute the transaction by means of book entries in their own accounts). Where settlement is internalised, the balance of the custodian banks account with the CSD will not change. Although statistics on the extent of internalised settlement are not publicly available, custodian banks indicate that it is usually incidental and marginal, even for the largest custodians, because the conditions that must be met in order for internalised settlement to occur are very specific. For example, the client chooses its own trading counterparty, but a custodian cannot settle the transaction in its books unless the counterparty also happens to be a client. At the same time, the securities positions of the two customers that are transacting must be in the same (omnibus) account held with the CSD with internalised trades resulting in internalised

settlement only if the broker of both counterparties is also the custodian.

Direct vs. Indirect Holding of Securities

In an indirect holding system, the broker/custodian will split exchange trades into various client transactions in its internal accounting system, and the legal transfer of securities will take place at that stage. This is not possible in a direct holding system, as a brokers internal system may not have legal validity for settlement purposes. Consequently, direct holding requires that the securities settlement system operate at the highest level of ownership i.e. at the level of the CSD. Exchange trades will therefore need to be split into numerous settlement entries at the booking stage.

An obvious advantage of direct holding systems is that the notary and registry functions as well as most corporate event and settlement functionalities can all be performed by the same entity, the CSD. The settlement procedures result in the final and irrevocable transfer of ownership at the end investor level. The accounts held with the CSD represent the legal register for a given security, which makes it easy for the CSD to perform functions related, for example, to corporate events and distribute holder lists for issuers (e.g. where coupon or dividend payments have to be made). One disadvantage is the increased amount of information that needs to be submitted to the CSD for

each transaction, since there is a need for information on the end investor in addition to purely trade-related information. Furthermore, a direct holding system requires far more accounts with the CSD than indirect holding systems, in which, for cost-efficiency reasons, a broker often carries out a bulk sale or purchase for a number of underlying end investors rather than effecting separate transactions for each individual client.

2.2 Trading of Securities

2.2.1 Actors and Role Players

Once a security has been issued in the primary market, it can be sold in the secondary market.

Securities are often listed on a stock exchange an organised and recognised market on which securities can be bought and sold. Issuers may seek to have their securities listed in order to attract investors, ensuring that the market is liquid and regulated and investors are thereby able to buy and sell securities. Securities are also bought and sold over the counter. OTC markets are used for unlisted securities.

Prices are determined by auction bidding at an exchange, and by negotiation between buying and selling parties (through telephone communication, computerised networks of quotation terminals, etc.) in the case of OTC markets.

The securities trading landscape is changing, with the emergence of new markets and infrastructure. In addition to traditional exchanges, new recognised marketplaces (such as multilateral trading facilities) and other new trading venues (such as electronic communication networks) have been introduced. ECNs are order-driven, screen-based electronic markets for securities trading which bypass traditional market-makers. In addition, some investment firms are offering their customers sub-trading platforms for securities traded on several exchanges. A securities firm may become a member of several exchanges and allow its customers access to these exchanges via the firms in-house trading platform. Thus, trading between two members of the same firm is not channelled to the original exchange, instead taking place on the books of that firm.

Investors may be able to trade directly in these markets, but they tend to resort to the intermediation of brokers and dealers. Brokers act as agents for investors, communicating bid and ask levels to potential principals and arranging transactions. They do not become principals, but take a commission for their services. Dealers are persons or firms acting as principals, buying (or selling) from their own accounts for position and risk. Dealers make a profit by correctly guessing future price movements and selling at a higher price. In the securities industry, investment firms often act as both brokers and dealers, depending on the transaction, and the term broker-dealer is commonly used.

2.2.2 Matching & Confirmation

Once a securities trade has been agreed, the execution of the trade begins with its confirmation, a process whereby the two parties confirm to each other the terms of the deal (e.g. the type and amount of securities, the price and the value date of the transaction). Instructions for the execution of the trade are then created and transmitted to the clearing and settlement systems. Instructions may also undergo matching in order to reduce the likelihood of errors e.g. owing to initial input mistakes or a misunderstanding between the parties. (Trade matching can be carried out (i) at the level of the trading platform, (ii) by specialist providers of matching facilities prior to submission for clearing and settlement, or (iii) by the relevant clearing and settlement system itself.)

2.3 Clearing: the First Post Trade Activity

2.3.1 General Concepts

Securities clearing is the process of transmitting, reconciling and, in some cases, confirming security transfer instructions prior to settlement, potentially including the netting of instructions and the establishment of final positions for settlement. (For more information on netting.

The clearing agent may capture, match and confirm trades, as well as calculating obligations relating to secu-

rities transfer instructions prior to settlement. Position netting (or settlement netting) refers to situations where the clearing entity calculates net settlement positions without taking any risk itself. These functions are normally performed by CSDs in their role as operators of securities clearing and settlement systems. Alternatively, the clearing function may be performed by the exchange where the trading takes place.

2.3.2 Central Counterparty Clearing

In some markets, the clearing agent acts as a central counterparty. A central counterparty interposes itself between the two parties in a securities trade, becoming the buyer to every seller and the seller to every buyer. Two new contracts are created between the buyer and the central counterparty, and between the central counterparty and the seller to replace the original single contract between the two parties to the trade. CCPs were originally set up to serve derivatives markets, particularly for the clearing of futures and options contracts. However, in some markets the list of financial products covered by CCPs has been extended to include cash securities.

The legal process of replacing the original counterparties and becoming the single counterparty for all participants is generally called novation. Another legal concept enabling a CCP to become the sole counterparty is called open offer. In an open offer system, if predetermined con-

ditions are met, the CCP is automatically and immediately interposed between the buyer and the seller at the moment they agree on the terms of the transaction, and there is never a contractual relationship between the buyer and the seller.

Many of the benefits of CCP clearing can be attributed to multilateral netting. Multilateral netting allows a substantial reduction in the number of settlements, thereby considerably reducing operational costs, including settlement fees. In addition, netting by novation, a service offered by CCPs, allows a reduction in individual contractual obligations, thus affecting market participants books and balance sheets. To the extent that national legislation limits the trading volume of a given participant to a certain percentage of its balance sheet, netting by novation could create more trading opportunities for that participant. Netting by novation may help to reduce the margin requirements that collateralise current and potential future credit exposures. CCP clearing may also help to reduce the capital required in order to support participants trading activity. In addition, CCP clearing helps to maintain anonymity where the trade execution process is itself anonymous, which can prove valuable where market participants fear that their trading activities will have an impact on the market.

In addition to multilateral netting, a CCP offers benefits mainly by providing risk management services. When

trading in securities, market participants are exposed to the risk that their trading counterparties will not settle their obligations when these become due (liquidity risk) or will not settle their obligations at all (counterparty credit risk). In order to protect themselves against such risks, market participants can take preventive measures e.g. by placing limits on exposure and employing collateralisation. CCP clearing houses manage risks for their members, replacing exposures to multiple counterparties with a single exposure to a single central counterparty. CCPs allow their members to achieve multilateral netting of credit risk exposures on contracts cleared. They also typically employ robust margining procedures and other risk management controls, with the result that they are more creditworthy than most (if not all) of their participants. A CCP has the potential to reduce liquidity risk by broadening the scope of payment netting. Its default procedures are often supported by specific provisions of national law, which tend to reduce legal risk. Thus, central counterparties enable market participants to trade without having to worry about the creditworthiness of individual counterparties. This does not mean that CCPs eliminate counterparty credit risk, but they manage and redistribute it much more efficiently than market participants could do in isolation. Finally, CCPs tend to establish stringent operational requirements for back office operations, including the automated submission of trade information and business continuity planning.

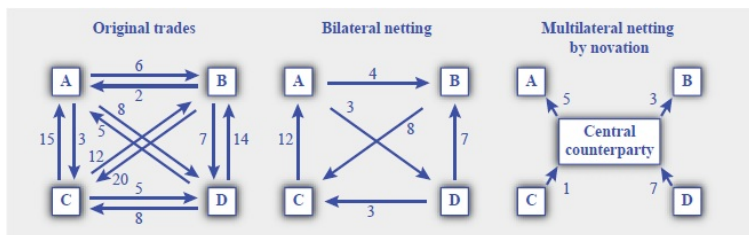


Figure 2.2: Effects of bilateral netting and novation by a CCP

This reduces operational risk.

CCP clearing is of benefit not only to individual participants, but also to the economy as a whole. For instance, since the single counterparty makes it easier for market participants to manage counterparty credit risk, the number of trading opportunities increases. As a result, market liquidity increases, trading is stimulated, transaction costs decline and the functioning of capital markets improves. Given their probable systemic importance from a financial stability viewpoint, CCPs should comply with oversight standards, such as the Recommendations for Central Counterparties produced by the Committee on Payment and Settlement Systems and the International Organization of Securities Commissions (IOSCO).

2.3.3 Risk Management in CCPs

Like any market participant, CCPs are exposed to legal and technical risks. While such risks are not specific to CCPs, it is particularly important that CCPs take appropriate steps to mitigate these risks, given their potential systemic implications.

As its members counterparty, the CCP is exposed to the risk of one or more clearing members defaulting. In the field of securities, this can, in particular, trigger principal risk and replacement cost risk. Principal risk is the risk taken by the CCP if it delivers a security, but is not able to take receipt of the corresponding payment, or if it makes a payment, but does not receive the security it has bought. In principle, this risk has been largely eliminated by the introduction of deliveryversus- payment mechanisms in securities settlement systems. It is, however, very important that CCPs settle their obligations only in settlement systems which can demonstrate that they have put in place DvP mechanisms which are effective and legally sound.

CCPs are also exposed to replacement cost risk, a type of risk that is not prevented by DvP mechanisms. Replacement costs result from the solvent party needing to buy the securities which have not been delivered (or sell the securities which have not been paid for) at a time when market conditions may have developed unfavourably. This kind of risk cannot be eliminated and needs, therefore, to be

mitigated.

Safeguards to protect against the default or insolvency of a participant can be divided into three categories. First, there are safeguards designed to minimise the probability of a clearing participant failing. For example, the clearing of derivatives usually takes place within a tiered structure. The CCP restricts direct

participation in the clearing process to the most creditworthy sub-set of market participants (i.e. those meeting certain financial and operational requirements). Only these members have a principal-to-principal relationship with the CCP for all contracts accepted for clearing. Market participants that are not clearing members need to establish an account relationship with a clearing member in order to effect settlement. This can be a direct relationship with the clearing member, or it can be done indirectly through a clearing broker.

Second, there are safeguards designed to minimise the loss incurred by the CCP if a clearing member fails. Margin requirements are used to collateralise a participants current and potential future credit exposures stemming from trades, with participants required to make deposits in cash or high-quality bonds with the CCP (in accordance with the principle that the defaulter pays). In highly volatile markets, sophisticated systems are used to calculate any additional margin requirements that may be necessary during the day. Such margin calls have to be met immediately

(i.e. cash or securities must be delivered to the CCP that same day). Another way of minimising losses is to limit the build-up of such exposures by conducting offsetting transactions. This is particularly common in the derivatives markets.

Third, there are safeguards designed to cover losses that exceed the value of the defaulting members margin collateral. For this purpose, CCPs employ safeguards such as guarantee (or clearing) funds, member guarantees and insurance schemes all of which involve some mutualisation of risk (in accordance with the principle that survivors pay) and maintain their own resources (i.e. own capital). Clearing members are normally required to maintain two separate groups of accounts at the clearing house: one for their own assets, collateral and positions; and another for their customers assets, collateral and positions. In some jurisdictions, the second group have to be in the form of omnibus accounts, which provides the CCP with a higher level of protection, as the assets of a clearing members other customers may be used to cover the positions of a defaulting customer.

In such a situation, the clearing member or broker is obliged to reimburse any non-defaulting customers assets that are removed from the omnibus account by the clearing house. That said, this obligation is meaningless if the broker does not have sufficient assets to cover the losses of the defaulting customer. However, the CCP cannot use the

assets in the omnibus account to cover positions or losses derived from the clearing members proprietary account. In other jurisdictions, the clearing member may open a separate account for each of its customers (thereby increasing the level of protection provided to customers).

2.3.4 CCP Interoperability

Activities in securities and derivatives markets need to be supported by services at each stage of the transaction chain i.e. trading, clearing and settlement. For the chain of services to be efficient, interoperability should exist between the three stages i.e. between the trading venue, the clearing provider and the settlement provider. This is known as vertical links. There may also be more than one service provider operating at one or more of the three stages e.g. a CCP may

serve two or more trading venues. In more complex markets, each stage may be served by multiple service providers, and the range of services offered may more or less overlap. In order to foster competition and give market participants the freedom to choose their preferred service provider, interoperability is also needed between providers within a given stage. This is known as horizontal links. Links may be cooperative or competitive in nature. Interoperability results in advanced forms of relationship whereby service providers agree to work together to establish solutions i.e. service providers do not simply establish links to standard

services already offered by other providers.

In order to make the clearing of trades more efficient and less costly for their members, CCPs cooperate with each other usually by establishing links between them, but also, in some cases, by resorting to other forms of consolidation (e.g. alliances or mergers). Three main types of cooperation can be identified. Cross-participation: This involves two CCPs setting up a link between them that enables participants in a CCP serving one market to trade on another market served by a separate CCP, while clearing those (new) trades using their existing arrangements. In this way, participation in a single CCP is sufficient in order to clear trades conducted in different markets. There are various types of cross-participation arrangement, one being a situation where a CCP becomes a clearing member of another CCP without any further integration of the two systems. The CCPs involved need to set up a framework for the joint management of positions and, where applicable, the exchanging of margins.

Typically, such arrangements involve the two CCPs recognising each others risk management framework. Moreover, the linked CCPs are not required to meet the same participation criteria as ordinary clearing members. (These have a special status and are not regarded in the same way as ordinary clearing participants.) Cross-margining: These arrangements allow a legal entity participating in different CCPs serving different exchanges to reduce the total

amount of margins and other collateral that have to be deposited with each CCP. Such arrangements are attractive to the extent that there is a significant and reliable negative correlation between the price risk of one product and the price risk of another (in which case the margin required for the two products can, in fact, be offset). However, it should be noted that a CCP accepting multiple products and/or directly serving multiple markets may achieve the same reduction in its margin requirement through internal offsetting, without any need to establish a link with other CCPs. Consequently, these types of link are more common in countries which have a large number of specialist CCPs, each serving different products and/or markets.

Merger of clearing systems: Perhaps the strongest form of integration occurs where two (or more) CCPs merge their clearing systems to create a single system with or without the legal merger of the CCPs involved. In the case of a full legal merger, the CCPs first merge to form a single legal entity and then migrate to a single clearing platform. This form of integration is often driven by mergers at the level of trading. Alternatively, the CCPs may remain separate legal entities and merge only their clearing platforms. A participant in a particular CCP retains its relationship with that CCP, but all risk management is performed by the wholly integrated systems of the linked CCPs. In this case, requirements need to be harmonised in respect of participation, defaults, margins, financial re-

sources and operations, with all CCP participants subject to those requirements.

2.4 Settlement

Settlement is the act of discharging obligations in respect of funds or securities transfers between two or more parties. Settlement of a trade in securities typically involves two legs: the transfer of the securities from the seller to the buyer, and the transfer of funds from the buyer to the seller. The settlement can be organised in different ways. Trades can be settled continuously one by one, with securities and funds being transferred on a gross basis for each trade. Often, however, settlement takes place at a given point in time for a collection of trades. At the time of settlement, securities and cash may each be delivered on a gross or net basis i.e. in accordance with different settlement models, such as gross-gross, gross-net and net-net models.

In a securities settlement system, settlement takes place between members of the system settlement members. Membership is governed by access criteria. Thus, investors which sell and buy securities will generally employ different intermediaries for the settlement of such transactions. Moreover, it should be noted that the institutions taking part in trading or clearing may not all be members of the settlement system. Depending on the rules of the system, such institutions may settle their trades as customers of

settlement members (i.e. as indirect participants).

Where an active secondary market exists, the SSS (particularly for public debt instruments) is likely to be of systemic importance from a financial stability viewpoint. It should therefore comply with relevant oversight standards, such as the CPSS-IOSCO Recommendations for Securities Settlement Systems.

2.4.1 Settlement Intervals

The settlement date is the date on which the securities trade is settled i.e. the actual day on which the transfer of securities (and cash) is completed. Although procedures for the handling of securities have developed considerably, in most markets a number of business days still elapse between trading (the trading date) and settlement (the settlement date).

Rolling settlement is a procedure whereby settlement takes place a given number of business days after the date of the trade. This contrasts with accounting period procedures, in which the settlement of trades takes place only on a certain day (e.g. a certain day of the week or month) for all trades occurring within the accounting period. The amount of time that elapses between the trade date (T) and the settlement date (S) is called the settlement interval or settlement cycle. This is typically measured relative to the trade date e.g. if three business days elapse, the settlement interval is said to be $T+3$.

In a rolling settlement cycle, trades settle a given number of days after the trade date, rather than at the end of an accounting period, thereby limiting the number of outstanding trades and reducing aggregate market exposure. An important argument in favour of shorter settlement cycles is that the longer the gap between the execution and settlement of a trade, the larger the number of unsettled trades and the greater the risk of one of the parties becoming insolvent or defaulting on a trade (i.e. the greater the counterparty credit risk and liquidity risk). Moreover, the longer the settlement cycle, the more time the prices of the securities have to move away from the contract prices, thereby increasing the risk of non-defaulting parties incurring a loss when replacing unsettled contracts (i.e. the greater the replacement cost risk). In 1989 the Group of Thirty (G30) recommended that final settlement of cash securities transactions occur by T+3 i.e. within three business days of the trade date. However, the G30 also recognised that, in order to minimise counterparty risk and market exposure associated with securities transactions, same-day settlement is the final goal.

2.4.2 DvP: Delivery Versus Payment

The settlement of securities transfers takes place either on a free-of-payment basis or on a delivery-versus-payment basis. FOP settlement may be employed, for example, when securities are transferred as collateral in a pledge arrange-

ment. In DvP settlement, the discharging of the obligation to deliver securities is made conditional on the successful discharging of the obligation to transfer cash, and vice versa. This is done in order to shield the two parties from the risk of losing the full value of the transaction following the non-delivery or default of their counterparty.

In order to achieve this objective in the most efficient way, CSDs or, more precisely, securities settlement systems need to interact with the payment system. DvP settlement has two dimensions: first, a technical dimension, as a procedure is needed in order to exchange information about the status of the cash and securities legs of the transaction, to make sure that the one leg is made conditional on the successful completion of the other (i.e. to ensure that securities are delivered only if cash is delivered, and vice versa); and second, an economic dimension, in which each party either receives the expected assets or has returned to it the assets that it was ready to deliver. The enforcement of these rights needs to be technically and legally sound in order to achieve the objectives of DvP.

At no point in time should either of the two counterparties be in possession of both assets (i.e. both the cash and the securities). From a procedural point of view, a DvP process usually involves three logical steps:

1. the securities are blocked in the account of the seller to make sure that they are reserved for delivery to the buyer (and thereby made unavailable for any other

transfers), and a message is sent to the application executing the cash transfer;

2. cash is debited with finality from the account of the buyer and credited to the account of the seller, and a message regarding the status of the transaction is sent to the application executing the securities transfer;
3. the blocked securities are either debited with finality from the securities account of the seller and credited to the securities account of the buyer, or, if the cash transfer was unsuccessful, released back to the seller.

2.4.3 Interaction Between Securities and Cash Settlement Systems

The interaction between the systems or applications executing the securities and cash legs can take various forms, as different models have been adopted in the various markets, often as a result of historical developments in the industry and the organisation of payment and settlement functions (e.g. depending on the nature of the settlement asset used to discharge the cash delivery obligation). The main interaction models in place are:

1. the interfaced model, in which the securities settlement system and the payment system (e.g. an RTGS system) interact through a communication interface

in order to exchange information on the status of the two legs in the respective systems;

2. the integrated model, in which both the securities accounts and the cash accounts are maintained on a single technical platform, with settlement achieved (i) in commercial bank money where the CSD has the right to maintain cash accounts, or (ii) in central bank money where either the CSD securities accounts or the central bank cash accounts are outsourced to the single technical platform.

Furthermore, a third model, sometimes called a guarantee model, is used in various countries. In this model, memorandum cash accounts in the SSS, which are pre-funded during the day at the central bank, are used for the night-time settlement of securities (i.e. when the payment system is closed).

Another very important aspect to consider is the frequency of interaction between the SSS and the payment system. Such interaction may follow different modalities depending on the organisation of the settlement process. Particularly important is the question of whether or not securities and cash can be settled during the day with intraday finality. For example, it will not be possible to deliver collateral during the day for intraday credit purposes if securities and cash are settled only once a day (normally at the end of the day).

There are various ways of achieving intraday settlement with finality for securities transactions. One is the real-time gross settlement of securities, in parallel with the real-time gross settlement of cash transfers. This allows trade-by-trade settlement, and interaction is therefore continuous when the operating times of systems settling in securities and cash accounts overlap. This type of interaction produces one cash settlement request for each transaction settled, and it can be used in both integrated and interfaced models.

Another is to allow multiple settlement cycles to take place during the day. At the end of each cycle, the SSS interacts with the payment system in order to effect cash settlement (where the payment system needs to provide settlement with intraday finality). Such batches may be settled on a gross or net basis. Where the number of batches is sufficiently large (i.e. tens/hundreds per business day), interaction with the funds transfer system is almost continuous, with the result that settlement resembles real-time settlement.

2.4.4 Embedded Payment Systems

In some circumstances, the cash accounts used to achieve DvP settlement may be held in the books of the SSS itself. In this case, the SSS has an embedded payment system. If the payment system is embedded, both the securities and the cash are transferred within the same organisation.

Examples of SSSs with embedded payment systems are: central bank CSDs (typically for the settlement of government securities), which naturally use central bank money; and, at the other end of the spectrum, private CSDs (or ICSDs) using commercial bank money.

A payment system embedded in an SSS may handle significant amounts of cash and may have a risk profile comparable to those of systemically important payment systems, which are subject to central bank oversight.

2.4.5 Banking Services for Securities Settlement

In the course of the settlement process, participants may be unable to meet their obligations on account of a shortage of either funds or securities. This may result in settlement being delayed, or even failing entirely. This, in turn, could trigger a chain of subsequent failures (sometimes called a daisy chain) in the case of back-to-back transactions (i.e. transactions where securities are bought and sold with the same settlement date, in which case securities received in a purchase transaction are immediately redelivered to settle the sale transaction). One party's failure to settle a trade may affect other parties' ability to meet their obligations and may ultimately create systemic risk. For this reason, there are various banking services aimed at facilitating settlement. These consist of cash credit facilities and securities lending programmes.

If, in the settlement of securities, a participant has a

shortage of funds, it may be able to overcome this problem by drawing on (intraday) credit lines that it has established with other parties. The credit line could be with a bank, a custodian or, if the participant is eligible, the central bank. In some jurisdictions, the CSD is allowed under national legislation to extend credit to its own participants in order to facilitate settlement. Where this is the case, rigorous risk management is needed to ensure that the CSD function is not endangered by risks incurred in the provision of credit. Moreover, in some countries the CSD holds a full banking licence and is thus entitled to offer its participants a full set of banking services. The two ICSDs, which serve the Eurobond market, hold banking licences.

Securities lending programmes have proved very helpful in increasing market liquidity and facilitating securities settlement. By lending securities in return for a fee, holders of securities portfolios that are not actively traded (e.g. institutional investors) can enhance the return on their portfolio. Borrowers of securities may prefer to pay a lending fee rather than fail to deliver securities. In that case, securities with the same ISIN code will subsequently have to be returned, in accordance with the terms agreed. Securities lending programmes are typically set up and administered by a CSD (with the CSD acting as an intermediary interposed between the lenders and borrowers of securities) or, alternatively, offered by custodian banks to their customers. Securities lending is based on contractual arrange-

ments, with such lending increasingly being collateralised in one way or another.

The range of entities providing credit in the form of cash or securities may vary depending on the specific jurisdiction.

2.5 Cross-Border Handling of Securities

The globalisation and internationalisation of financial markets results from investors having the possibility of engaging in securities activities in jurisdictions other than their country of residence. This is done in two main ways.

2.5.1 Use of Custodians

The traditional method has been the use of a custodian bank participating directly in the payment and securities settlement systems of the country of the issuer or having access to clearing and settlement facilities in that country through a local agent (i.e. a sub-custodian).

2.5.2 Link Between CSDs

A more recent solution developed by CSDs and ICSDs in order to support international investors in their own markets and domestic participants wishing to invest abroad involves the establishment of links between CSDs. Links are legal

and technical arrangements and procedures that enable securities to be transferred between CSDs through book-entry processes i.e. allowing securities issued in one country to be transferred to the CSD of another country where there is an active secondary market in those securities. A link takes the form of an omnibus account held by one CSD (the investor CSD) with another CSD (the issuer CSD) and requires the establishment of an IT interface for the transmission of instructions related to securities eligible for transfer through the link.

Some securities may, in addition to being listed on their home country exchange (primary listing), also be listed on an exchange in another country (secondary listing). Most CSDs which have implemented link arrangements offer this service only for foreign securities with a secondary listing on their national exchange. (For example, trades in securities listed and traded on the two exchanges may be settled through a link between the CSDs of the two markets.) Some CSDs offer links allowing the holding of foreign securities for collateral management purposes (one of the arrangements allowing the crossborder use of collateral in the euro area).

Link arrangements also allow CSDs to offer a service similar to that offered by custodian banks i.e. providing their members with a single access point for multiple markets.

Links can be used to deliver securities on an FOP or

DvP basis. When a DvP link is used, securities are usually first delivered free of payment from one CSD to the other, and then DvP settlement is performed using the local DvP settlement procedures.

A link between two CSDs is unilateral when it is used only for the transfer of securities from one system to another, and not vice versa. A bilateral link between two CSDs means that a single agreement regulates the transfer of securities to and from both systems.

In a direct link, there is no intermediary between the two CSDs, and the omnibus account opened by the investor CSD is managed by either the investor CSD or the issuer CSD. In an operated direct link, a third party (i.e. a custodian bank) opens and operates an account with the issuer CSD on behalf of the investor CSD. However, responsibility for the obligations and liabilities associated with the registration, transfer and custody of securities must remain with the two CSDs from a legal perspective.

Relayed links are contractual and technical arrangements for the transfer of securities which involve at least three CSDs: the investor CSD, the issuer CSD and the intermediary CSD. (For example, CSD A holds an omnibus account with CSD B (the intermediary CSD), which in turn holds an omnibus account with CSD C.)

Chapter 3

Requirements & Challenges

3.1 Cross-Border and Cross Currency Payments

3.1.1 Issues in Cross-Border Payments

Cross-border payments can involve just one currency, or they can require currency conversions (in which case, they are cross-currency payments). Cross-border payments add complexity to the clearing and settlement process seen at domestic level, in that they typically involve more than one geographical area or jurisdiction and more than one currency. In addition, most banks do not participate directly in payment systems outside their country of legal incorporation and therefore need another financial institution to act as an intermediary in order to access the system and settle payments in the local currency. In addition, while for domestic payments there are formalized payment systems and other multilateral payment arrangements, this is

rarely the case for cross-border payments:

- there are few formalized systems, with cross-border payment arrangements traditionally based on correspondent banking relationships;
- the bank originating the payment has to arrange for settlement in the local currency of the bank receiving the payment;
- in the destination country, the payment may have to pass through a payment system in the local currency before it reaches the ultimate beneficiary;
- funding is effected in a foreign currency.

With rapid increases in international trade and finance, the need for cross-border payments is also rising fast. There has recently been an increase, for example, in the role played by big international players. Where a payers bank has branches or subsidiaries in many countries, this may give it access to the payment system of the bank of a beneficiary in another country. Thus, there is increasing foreign participation in national payment systems and in national financial markets more generally. There are also linkages between the payment systems of various countries. These linkages can take a variety of forms and can be used, for example, for regularly occurring bulk payments such as pension payments. Payment systems are therefore increasingly

interdependent. One of the main issues considered in international cooperation and discussions between central banks in the field of payment and securities settlement systems is the perceived need to bring all such systems or at least those systems which have the potential to create a systemic threat in the event of their disturbance or failure up to a common level of safety and robustness.

3.2 Different Currencies

Currency change risk should be considered as an important factor in any change-embedded transaction in international trades. This risk shows itself more highlighted when there is a gap between matching, confirmation and settlement of trades. As the currency of almost all OIC countries is different from each other, the participants in inter countries investment have to be hedged against the risk of reduction or elimination of cross border investments because of a change in the exchange rate of two currencies in settlement or ownership period. This gap is inevitable And have to be managed efficiently or eliminated if possible.

3.3 Giovanni Barriers

The Giovanni Group was formed in 1996 to advise the Europe commission on EU financial integration issues. This group prepared several reports on this issue. One of these reports focuses on the current situation and prospects for

cross-border clearing and settlement arrangements in Europe Union securities market and the barriers to integrate different European CSD systems. This report focused on:

- Current arrangements for cross-border CSD operations in EU
- Alternative arrangement and their requirements
- Future provision requirements of clearing and settlement in these markets

The report highlighted the main inefficiencies in terms of national differences in technical requirements, taxation and legal treatment of securities. It identified the obstacles to efficient cross-border clearing and settlement in Europe Union. The basic pillar of cross border trading clearing and settlement, addressed by this report includes:

- Diversity of IT platforms/interfaces
- Restrictions on the location of clearing or settlement
- National differences in rules governing corporate actions
- Differences in the availability/timing of intra-day settlement finality
- Impediments to remote access
- National differences in settlement periods

- National differences in operating hours/settlement deadlines
- National differences in securities issuance practice
- Restrictions on the location of securities
- Restrictions on the activity of primary dealers and market-makers
- Withholding tax procedures disadvantaging foreign intermediaries
- Tax collection functionality integrated into settlement system
- National differences in the legal treatment of securities
- National differences in the legal treatment of bilateral netting
- Uneven application of conflict of law rules [Cross-border Clearing and Settlement Arrangements in the Europe Union, Brussels, November 2001]

3.4 Costly and Risky Alternative Channels

The exhibition below introduces the possible channels for settling an international trade as: (a) the membership in (direct access to) the CSD of the issuer country; (b) through

a local agent (a local bank that is a member of the CSD in the country of issue); (c) through a global custodian that employs a local agent as sub-custodian; (d) through an ICSD that has established a direct or indirect (through a local agent) link to the CSD in the country of issue; or (e) through a CSD in the non-residents own country that has established a link (usually direct) to the CSD in the country of issue.

CSDs usually dont allow foreigners to have direct membership because of principal risk and bank arrangement and also difficulties in corporate actions so the channel (a) can not be considered as an efficient channel. Utilizing a local agent to settle international trades(channel (b)) involves some challenges as local agent can offer such services only if it attracts a critical mass of customers, so that a significant volume of trades involve its customers as both seller and buyer of the securities. A critical mass is achievable in many markets because markets for custody and settlement services tend to be highly concentrated. In fact, the network economies associated with internal settlements may be a significant reason for the concentration of settlement activity in a few local agents. The risks associated with channel (c) in many respects are similar to those associated with settlement through channel (b) A global custodian settles the non-residents trades in the local market through a local agent acting as its sub-custodian. Thus, in this case, too, the non-residents trades would typically

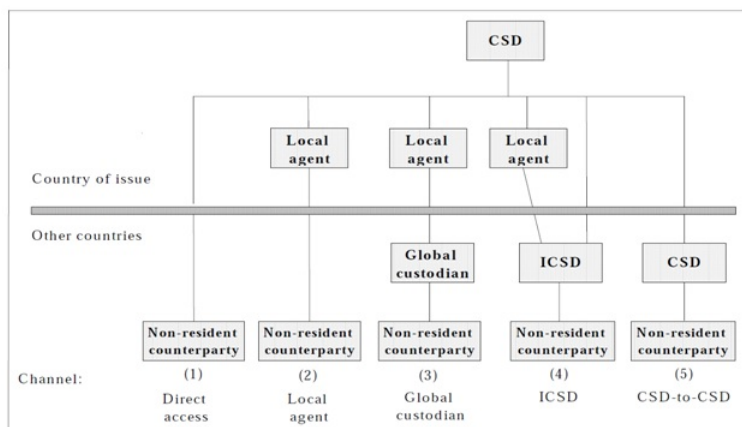


Figure 3.1: Source: BANK FOR INTERNATIONAL SETTLEMENTS: Report prepared by the Committee on Payment and Settlement Systems of the central banks of the Group of Ten countries

be settled in the local CSD, effectively subject to the local CSDs rules. As in the case of use of a local agent, the non-resident faces custody risk, and the further tiring of securities holdings may exacerbate custody risk and certainly makes such risk more difficult to assess. Performing settlement services through ICSDs or channel of CSD to CSD is cost effective in comparison to others channels but it is still so much expensive for individual investors so it always is utilized by institutional investors making the benefit of economy of scale in large amount trades.

3.5 Heterogeneity in Market Structure

Demutualization and merger & acquisition of main securities market (as companies) has changed the business structures of them drastically while some other are not demutualized yet, this seems to be one of the basic sources of heterogeneity in terms of different legal entities for clearing and settlement. SHARIAH compatibility is one of the critical issues for Muslims communities in international investments. On the other hand in CSD point of view the settlement period, different corporate action rules, different position Keeping Models (direct, indirect or hybrid holding systems), differences in settlement services i.e. models defined for settlement processing (DVP1,2 or 3), heterogeneity of fees and taxes , Controlling book-entry of orders and order routing, reconciliation of positions should be considered as critical factors.

3.6 Difference in Rules & Regulations

The emergence of national-based rules for clearing and settlement has resulted in a wide variation in the provision of post trade services across the world. While some systems utilize the CCP for clearance and settlement some others do not. Centralized operation of CSD and custody services for some countries distinct them of those who are decentralized. Differences in CSD operating hours i.e. been real-time or frequent can be considered as the other source

of distinction. Restriction on volume of foreign trade and foreigners investment raised from different dominant rules has to be mentioned as the other difference. The membership rules of some markets are totally different from the others. The treatment of corporate action may differ from market to market. The differences of netting systems i.e. gross or net or netting restriction to type of counterparty or other factors. The difference in rules are not limited to these, they are fully addressed in Giovanni group report titled Cross-Border Clearing and Settlement Arrangements in the European Union.

3.7 Heterogeneity in IT Infrastructure & Technical Readiness

Coming to technical arena, namely information technology, one faces challenges with design and deployment of very large, international information system featuring high performance and low error probability. Reducing operation cost while increasing compatibility and reliability can be concluded on as the major goals of the system. Thus, cross border transactions in a linkage may involve some other challenges such as: matching of international trades regarding the differences in participants currencies which can make an order unsatisfied due to volatility in currency exchange rates, Controlling foreigners book-entry of orders and order routing, reconciliation of positions between foreign investor

and issuer and vice versa, controlling the participant positions to encounter any over drafts, safekeeping of registry, management of corporate action events for abroad investors and etc.

The cost of integrating different IT systems of different countries can be highlighted as a challenging barrier for interlinking capital markets. IT systems of different countries in general and financial IT tools in particular are subject to various localized properties that might make the different or even incompatible. In other words, the related IT systems might experience challenging differences in area including but not limited to the followings:

1. Localization issues: Localization aspects like character codings, right-to-left issues and calendering require integration to take place by defining mutually agreed upon settings.
2. Modeling basics: Different data modelings and storage requirements in different countries for actors and role players in the system's context make marshaling and design internationalization inevitable.
3. Hardware & networking: Although almost all the modern networking technologies rely on the famous IP protocol but some counties might run specialized hardware and networking systems (e.g. IBM's protocol stack) which should be taken care of.

4. Hard-coded features and rules: The most challenging aspect of the integration is the probable features hardly coded in the software systems making straight integration impossible. A good idea is to use wrappers to hide differences and gain a common system level interface.
5. Licensing issues: In accordance to license agreements between stock exchanges and software providers, some licensing issues should be handled to make the entire job legal and possible.

On the other hand, OIC countries are not equally ready and capable of joining the interlinking hub (SAMIP here) in terms of technical and regulation issues. Therefore, it is better to develop *Adaptation Packages* in technical, regulations and business issues. The package should involve as less augmentations and enable as much feature as possible simultaneously.

Chapter 4

Efforts in Markets Interlinking

4.1 European Linkup Markets

Link up Markets is a joint venture by ten CSD aiming to create a technical platform which links together multiple CSD markets. The idea is to overcome hurdles and inefficiencies in cross-border equities business by establishing a single cross border operating organization. Link up Markets plans to deliver a central linkage to the national systems. While CSDs will still provide the single point of access for customers for domestic and cross-border business and all domestic institutions and infrastructure will remain unchanged, savings are expected as only one organization needs to implement and to manage the cross-border network. The need to maintain several different access points will recede for market participants. Reduced interconnection costs are expected regarding negotiations, link processing, interfaces, and synchronization of systems,

data formats, link contracts, liquidity requirements, and effective use of collateral. In addition, Link up Markets targets to achieve network externalities leading to further cost savings shared by the whole community, as a centralized linkage of domestic systems can help standardize processes and practices and catalyze common technical standards, harmonized rules and regulations, and identical tax treatment. The first markets went live in March 2009 with six CSDs connected as of December 2009.[The Impact of Information Technology on European Post-Trading Torsten Schaper Michael Chlistallay, Americas Conference on Information Systems (AMCIS)]. Matching and settlement take place in the Issuer CSD (home market principle).

4.2 TARGET2-Securities

4.2.1 Securities on TARGET-2 Infrastructure

The integration of bond and equity markets relies on the integration of the underlying infrastructure, particularly that of securities settlement systems and central counterparties. However, in the euro area, progress in the integration of securities infrastructures has not kept pace with that of large-value payment infrastructures. This is largely because securities are inherently considerably more complex, which has led to cross-country differences in terms of market practices and legal, regulatory and fiscal regimes.

While the post-trading infrastructure is fragmented for

bonds, it is even more fragmented for equities. Cross-border settlement for bonds is largely concentrated in the two international central securities depositories, whereas the cross-border settlement of equities still relies heavily on national central securities depositories. This high degree of fragmentation results in substantial post-trading costs for EU cross-border securities transactions, reduces the potential for economies of scale and is an obstacle to the emergence of a level playing field in Europe in this area. Although Europe is comparable to the United States in terms of its economic size, it lags behind it in terms of both the volume and cost of securities transactions. The price gap is particularly large for cross-border settlement. An important element in the integration of securities infrastructures within the Single Market is the establishment of a common, neutral securities settlement platform that will foster effective interoperability and competition between service providers. Consequently, with a view to promoting financial integration and overcoming the fragmentation of the securities settlement infrastructure through the provision of central bank services, the Eurosystem has launched its TARGET2-Securities initiative in order to provide this missing element.

T2S will be a pan-European platform to be used by CSDs for the settlement of securities transactions in central bank money. The participating CSDs will maintain their legal relationships with their customers and will continue

to perform their custody and notary functions.

Moreover, it has been decided that, in addition to settlement in euro, T2S will also offer settlement in other currencies. Thus, participation in T2S will be open not only to the CSDs of euro area countries, but also to those of other EEA countries and Switzerland, which will have the option of joining T2S not only for settlement in euro, but also (subject to a formal decision by their respective markets and relevant authorities) for settlement in their national currencies.

4.2.2 Fundamentals of T2S

The T2S initiative builds on the fact that the securities settlement services of CSDs and central banks are closely linked to the services provided by payment systems. A securities trade typically results in the delivery of securities (i.e. the securities leg) in exchange for the transfer of cash funds (i.e. the cash leg). If the cash leg is settled in a central bank settlement facility, it is settled in central bank money. To avoid credit risk, the completion of one leg is conditional on the completion of the other through delivery-versus-payment arrangements.

While this method of settling securities trades is very effective within individual countries, it is so far hardly available at all at a cross-border level in Europe. Holding securities accounts and central bank cash accounts on the same platform for settlement purposes is considered the most ef-

ficient way of settling the two legs of securities trades. With the launch of TARGET2, the Eurosystem now offers a single platform for the settlement of payments (i.e. the cash leg) in central bank money. However, securities are still held on multiple platforms (i.e. individual CSDs). Outsourcing the central bank cash accounts to multiple CSDs would have reversed the gains from bringing central bank accounts together on TARGET2s single platform, while outsourcing to only a small number of CSDs would have given those CSDs a competitive advantage. Furthermore, the outsourcing of central bank cash accounts could pose a threat to the Eurosystems ability to maintain full control over the provision of central bank money in all circumstances.

Consequently, with its T2S initiative, the Eurosystem has invited European CSDs to outsource their securities accounts to a single platform, which it will operate. The main underlying aim of T2S is to bring all securities and cash accounts together on one technical platform with a view to settling nearly all securities transactions in Europe on that platform.

CSDs will, for settlement purposes, hold all of their clients securities positions in T2S. The underlying account information (relating to the custody and notary functions) will still be held by the CSDs themselves. Each securities account held in T2S will be attributable to one CSD only.

Similarly, T2S will maintain dedicated central bank cash

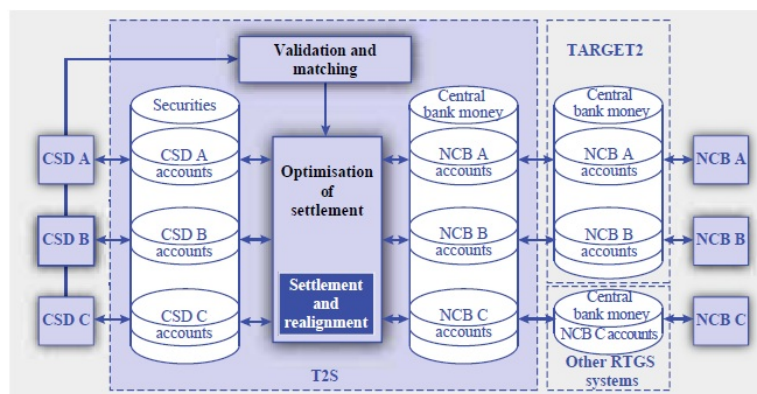


Figure 4.1: T2S for clearing securities and cash (T2) - Source ECB

accounts for all CSD clients that are eligible to open them. It will be possible to use a clients cash account to settle any transactions relating to that clients securities accounts, which may involve one or more CSDs. This cash account structure will foster efficiency improvements for clients that use more than one CSD. Ultimately, it will be possible for a client to access nearly all European securities using just one securities account and one cash account in T2S. Where a CSDs client does not itself have access to an account with a central bank, it may be authorized by a settlement bank (i.e. a TARGET2 participant) to operate a dedicated cash account in T2S. Operating TARGET2 and T2S in tandem will result in synergies being achieved. This will allow considerable cost savings and, at the same time, enable banks

to improve their liquidity and information management.

T2S will be able to validate and match settlement instructions and provide real-time DvP settlement with optimization procedures, regardless of which CSDs and central banks provide the respective underlying securities accounts and central bank cash accounts. T2S by linking, in real time, any securities account at any participating CSD with any cash account at any participating central bank will ensure that future cross-border settlement is identical to today's domestic settlement.

T2S will result in benefits relating to both economies of scale and competition. Economies of scale will result from the use of a single platform for the settlement of both the securities leg and the cash leg, as well as from moving transaction volumes from multiple platforms onto one single platform. This will also allow the pooling of securities on one single platform and significantly reduce settlement-related liquidity needs. Moreover, T2S will also trigger the harmonization of back office procedures and market practices in the securities industry, thereby further improving efficiency. This will result in significantly lower costs and fees both for national and, in particular, for cross-border settlement.

As regards competition, national CSDs currently operate in a monopolistic market environment in which they are largely protected from competition with other CSDs. Once T2S has been established, CSDs will be able to provide ser-

vices for securities that are issued in another CSD. Furthermore, although CSDs will continue to provide services other than settlement, the use of a common settlement platform will make it easier for issuers to issue securities outside their national borders and for market participants and investors to determine where they wish to hold a given security. T2S will encourage CSDs to offer their participants the opportunity to centralise their securities holdings in one place. It will therefore be easier for investors to choose their CSD on the basis of cost and the level of service, rather than the location of the securities. This increased competition is expected to drive down fees.

Chapter 5

SAMIP as a Low Cost & Low Risk Approach

5.1 Ideas & Motivations

Context Awareness [13], is an interesting idea coming to large scale integrated system. It does not violate the abstraction of modeling nor the demutualization of market players. The philosophy behind SAMIP is to reduce the risk of settlement by providing some intelligent agents from the CSD-Interlink to the trading engines in both buyer and seller legs. The agents are in the form of some highly abstracted routines in a specialized computer language which we call it FTDL; the Financial Transaction Description Language. These agents provide the trading agents with some valuable information about the conditions of a successful settlement by which high risk trades are avoided to be confirmed. SAMIP does not require the participat-

ing countries to change their IT infra-structure of capital market and just makes very small augmentations. Besides, SAMIP provides a clear and straightforward T+0 international settlement hub which is compatible with every clearing/settlement system. The idea behind this system is to break clearing into two layers, one between participating CSDs and another between the local CSDs and brokers. Obviously, there must be a clearing between broker and the customers which varies from a system to the other.

SAMIP is mainly a means for market interlink which its implementation effort is more allocated to its CSD-Interlinkage that not only provides the common basis for international settlement but the FTDL agents to the trading engines as well. In other words, SAMIP does not require the trading engines to become unified or even interlinked because it poses dramatic overheads providing less benefit. It should be an open option for the brokerage houses whether to become a member of a foreign exchange or to facilitate a proxy brokerage partner. In each case SAMIP should work seamlessly.

5.2 Issues and achievements

In accordance to the realistic context of the problem in OIC, SAMIP challenges with the following problems:

- **Different Currencies:** since there is no common currency for OIC also the currencies are not fixed mutu-

ally.

- Limited Currency Exchange Opportunity: One can not trade the currencies infinitely.
- Different Regulations: As described in section 3.
- Settlement Risks: due to system-level circumstances subject to OIC (e.g.: supervisory,etc.)

SAMIP achieves a highly adaptable architecture taking care of all the known issues for international trade, clearing, registry and settlement for OIC stock exchanges. SAMIP does not require a common currency but can take its advantage if present. Also, SAMIP does not enforce same regulations, settlement periods, supervisory tasks and corporate actions such that each stock exchange connects to SCH with minimum effort.

5.3 Building Blocks

Figure 5.1 shows a big picture of SAMIP. The major role players in a minimalistic SAMIP scenario are:

1. Local CSDs: Local CSDs play as a clearing proxy for international clearing.
2. Local Trading/Matching Engines: The trading engines should be subject to a small modification to enable them to run the FTDL modules and match through them.

3. CXR (A Currency Exchange Market): This market is used to identify an agreed upon exchange rate instantly.
4. SCH (the SAMIP Clearing House): SCH is responsible for international clearing between CSDs.
5. ICF (International Clearing Fund): This fund should be supported by central banks of participating countries to exchange money in realtime according to the FTDL message issues by TH.

Although any financial transaction could be easily described in FTDL (Even the local clearing & settlement), SAMIP just requires the SAgents to be developed using FTDL. Obviously, more employment of FTDL in domestic & international trade capturing, confirmation, settlement and clearing results in better system-level outcomes concerning cost, effectiveness and reliability and overall simplicity. It simply reduces the cost of developing such software module taking advantage of advances in hardware technologies providing better processing powers covering the performance issues behind interpreted scripting languages.

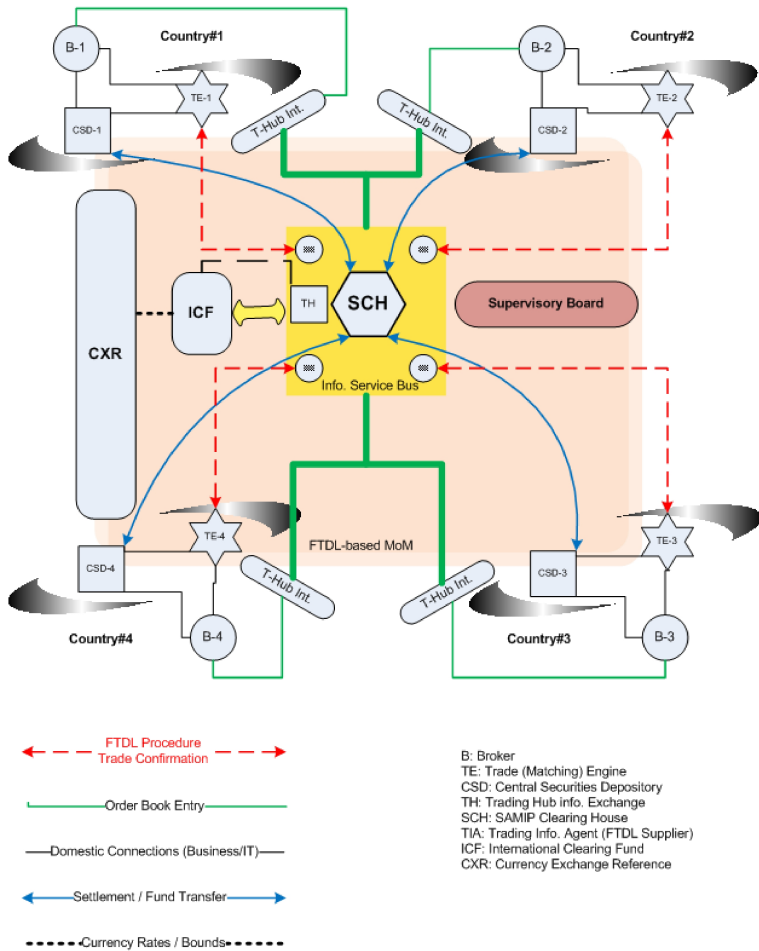


Figure 5.1: A Big Picture of SAMIP

Chapter 6

SAMIP-Business Specification

6.1 Position Management

Position limits for each participant country will be defined due to each countrys contribution to ICF resources. The position sizing (i.e. the amount of money being invested into a particular security by a foreign investor) will be managed through FTDL channel in time of position building. So both cash and securities position management have pre-defined mechanism in SAMIP protocol.

6.2 ICF mechanism and specification

Currency change risk should be considered as an important factor in any change-embedded transaction in international trades. As the currency of almost all OIC countries is different from each other, the participants in SAMIP protocol have to be hedged against the risk of reduction or elimina-

tion of cross border investments because of a change in the exchange rate of two currencies in settlement or ownership period. The hedging mechanism can be handled by a hedge fund which we call it International Clearing Fund (ICF).

As mentioned before the European T2S program for interlinking the markets follows T+0 period of settlement and this is inevitable in SAMIP too due to the function of ICF. ICF will play its clearing rule as the cross border transaction has been matched. The purchase price will be deducted from the buyers domestic CSD account on behalf of sellers domestic CSD account and simultaneously the domestic central banks will change the purchase price to domestic prices for both parties to avoid exchange rate risks. After that the position management and multilateral netting can be done on CSDs layer in ICF in a period of T+0 and the domestic CSD will charge the buyer (broker, custodian, investor) for purchase price in buyer side and domestic CSD of seller can pay the price of transaction to him on its own rule and period of settlement. As soon as clearing accomplished the delivery of securities on both sides will be done. Obviously the buyer has to pay the interest of money to domestic CSD in settlement duration.

Financial resources for ICF can be provided by Central Banks, Participant CSDs or participant stock exchanges. They can be motivated to mobilize such resources due to fund profits of commissions paid by participants and the interests on deposited fund resources in a withdrawable in-

vestment account. Finally it should be noted that financial resources in ICF should be deposited in one or two exchangeable base currencies which will pave the way for central banks to change domestic and destination market (primary) currencies to each other.

There are some limitation to the ICF as proposed. Hence, in the next chapter we propose a significant improvement and simplification to the ICF such that almost all the key points elaborate.

6.3 SCH as the heart of model

SCH is responsible for international clearing between CSDs. It receives messages from trade engines through FTDL channel and after analyzing send them to ICF in a real time manner to allocate the money needed to accomplish the clearing process on behalf of seller CSD and simultaneously allocates the traded securities to buyer CSD as the hierarchy determined in data dissemination system of SAMIP which follows the participants rules through FTDL channel. So the SCH will follow the DVP standard for clearing and settlement. Although the SCH have to clear gross in real time to avoid currency exchange risk but bilateral netting can be managed if in real time counterpart CSDs have trades. Corporate action events will be managed through SCH by messages sent buy issuer CSD on the benefit (dividend, right) of security owners CSD. Any

kind of data needed for hierarchal registry or data dissemination or any kind of corporate action effect on registry is recorded by SCH. SCH is responsible for safekeeping of registry related to international trades which is a mirror of internationally traded records but this registry is held and recorded on behalf of (CSD, broker, customer).

6.4 Supervisory and inspection

Supervisory board in SAMIP utilizes a data dissemination channel which brings about the capability of monitoring all rule players of SAMIP. As this board consists of delegates of supervisory board of participants capital market the legal power for monitoring of interaction and transactions is maintained. The delegates of each country have to supervise common rules and regulations of SAMIP as well as their own rules which are defined in FTDL. As mentioned before if for example one country has limitations for foreign investments it can be executed in FTDL channel as the agents from the CSD-Interlink will encounter the trading engines in both buyer and seller legs to match trades more than limitations. The supervisory of national and international provision fulfillment is performed by the board.

6.5 CXR rules and specifications

This market is used to identify exchange rate instantly as an international trade is matched. It should report the ex-

change rate of buyer participant to base currency and base currency to seller participants currency in real-time. The base currency should be an agreed upon exchangeable currency. The exchange rate of base currency to national currencies can be announced by national central banks. The availability and amount of national currency necessary for clearing should be supplied by national central banks. CXR only provides information and is a kind of data dissemination for providing base currency exchange rate to the other exchangeable rates.

6.6 Corporate Actions

SAMIP supports corporate action events occurs during the withholding of foreign securities. Accurate processing and recording of corporate action events can be managed in SAMIP. The rights and dividends can be delivered through ICF on behalf of hierarchy of SCH, local CSD, Investor as the originating CSD have identified foreign investors in its registry through the data dissemination network. Stock Split and spin offs are done on behalf of SCH, local CSD, local Custodian, investor due to the owners hierarchy rules. The redemption of debt securities also can be managed through messages between CSDs via SCH.

6.7 Position Management

Position limits for each participant country will be defined due to each countrys contribution to ICF resources. The position sizing (i.e. the amount of money being invested into a particular security by a foreign investor) will be managed through FTDL channel in time of position building. So both cash and securities position management have pre-defined mechanism in SAMIP protocol.

6.8 Defaults and Canceling

SAMIP data dissemination will bring about the capability of any order canceling management as the orders are administrated by SCH book-entry which involves direct registration system (DRS) through Trading Hubs. The cancellation may be made by investor itself or due to order dissatisfaction (limit, fill or kill, immediate or cancel etc.). The T+0 period of settlement in SCH occurs between CSDs is an embedded mechanism to hedge the risk of any participants defaults. If the investor or even broker defaults to pay the cash or to deliver the security, the domestic CSD can punish him/her according to the local punishment regulations or employ predefined local compensation mechanism, hence the investor or broker participants dont bear the default risk of international party.

6.9 Tax and Commissions

Taxes will be charged for seller according to the sellers domestic market tax rates through the FTDL channel. It can be deductible at time of matching. FTDL has the capability of charging more or less tax rates for foreign investors and even charging taxes for international buyers or executing tax discounts or any tax pattern due to the participants rules. All commissions will follow the primary commissions of each market and there will be no need to change them. But if any market desires to change commission rates for foreign investors, it can be implemented in FTDL channel as well. FTDL will enable the participants to prescribe a verity of commission rule due to any local and international dominant rule.

Chapter 7

SAMIP-Technical Specification

7.1 FTDL: *the* Financial Transactions Description Language

It is a widely profited experience to make business objects and routines abstract from their implementation details in order to achieve scalability and flexibility in computerized business systems. A revolutionary advance for this issue has been the XML (eXtended Markup Language) which itself has influenced its specialized successors like FPML [14]; the Financial Products Markup Language; and MDDL [15]; the Market Data Definition Language.

FPML is mainly intended to describe a products adjectives and properties like any other XML-based data. However, in order to supply the trading engines not only with data and constraints about the candidate trade matches but with sophisticated and deeply flexible scripted routines, we need to propose a highly abstracted and flexible script-

ing language capable of describing any financial event and as well as data.

FTDL is our response to such a challenge. It uses FPML for describing the properties of objects and facilitates a formal single-pass interpreted language capable of multi paradigm programming. The programmer can easily derive new object classes from FPML objects (in XML) and add new properties (again in XML) and methods to the new objects while taking advantage of modular or object-oriented programming paradigm.

For the sake of simplicity, a SAMIP routine always process a vector of FPML objects retuning another vector of such objects. Hence, a simple *true-false* results should be regarded as an always settled transaction. Obviously, any other local & global parameter in SAMIP will an array of such objects. The programmer does not have to declare any parameter and any parameter will be initialized on its first use automatically. The language takes advantage of a lazy binding, seamless type conversion and automatic garbage collector.

Coming to integrated libraries, FTDL should be equipped with libraries providing at least the following facilities:

- Seamless data retrieval interfaces from web services, RSS, BBS, etc. to enable the programmer to use broadcast data from other sources (here FOREX) and convert them to FTDL vector seamlessly.

- Security modules to encrypt, decrypt and share keys in Financial Cryptography as well as providing code signing features.
- Measurement modules in order to enable the programmer to predict the performance of the modules and take it into account in its calculations. This property will be immediately addressed in specification of SAMIP.
- Concurrency management to avoid violation of shared parameters and communication channels just like ensuring the uniqueness of a buyer in the currency market.
- Seamless multi-threading to enable the programmer to keep some equivalences to be always held.
- Interfacing Modules to provide services to third parties using an Enterprise Service Bus and vice versa. For example, a money transaction integrated with the banking protocols like RTGS and ACH should be described and performed as a single atomic instruction.

7.2 From Book Entry to Trade Confirmation

A broker might be granted to trade in one market but not in an other. Therefore, SAMIP proposes a method for an international portfolio to be made by a single brokerage

house by using a proxy broker in the destination market which will clear on behalf of the desired brokerage house.

A broker from country A places its order in country B's trading engine using the 'Trade Hub Interface' which is itself a message oriented middleware. A major strength point is that the order is made in country A's currency and the later clearing will be done in this currency.

7.3 Registry Management

Registry of international investment will be done in a hierarchical fashion. We make this choice not only to enable the local CSDs to apply local regulations on stock holding but to simplify implementation of such a system by making no significant augmentation in the current systems.

To achieve such a flexibility, the target CSD which has firstly listed the traded company, registers the share for a non-trivial subset of (SCH, Buyer CSD, Investor). Obviously, more information kept, more flexibility in terms of law enforcement and monitoring achieved. SCH does the same but registers the share on behalf of (Buyer CSD, Investor). Finally, local (buyer) CSD registers for the investor as a SCH share.

Following this approach, both CSDs and the SCH itself can monitor the flow of cash to prevent money laundering and they can originate tasks for legal transfer of securities as well. Heterogeneity in legislation can be easily accommo-

dated since each CSD just applies the local rules. Besides, an implicit replication of registry data in business layer is also made as an advantage point.

7.4 Data Dissemination Fundamentals

In order to build a practical interlinkage between capital market, one needs to establish live, secure, reliable and easy ways to disseminate data from trading engines, local CSDs, SCH and other role players like supervisory board.

It is worth noting that factors like security and reliability of a data channel are in a direct accordance with type and importance of data and threats for it. Therefore, SAMIP proposes three channels for data dissemination as follows:

- TICH (Trade information channel): This channel simply broadcasts the prices, conditions and messages of trading engines among other participants.
- OTCH (Order Tracking Channel): This channel routes unicast messages between participating countries about the status of the placed orders. Obviously, data for this channel is provided by the FTDL module. OTCH-Routers should be provided by domestic trading systems to route each part of the message properly and in accordance to local infrastructure.
- SLMCH (Settlement, Legislation, Monitoring Chan-

nel): As the name indicates, this channel should provide information used for managing and monitoring. SCH will be responsible for these messages to take place.

According to the nature of data for each channel, various technologies might be put into practice for data dissemination. The major candidate is FIX [16] (the Financial Information Exchange) but candidates include but not limited to RSS, Web Service Messaging, use of a MoM (Message Oriented Middleware) can be applied.

Chapter 8

ICFv2: International Clearing Fund Revisited

8.1 What is/What for ICF

ICF (the International Clearing Fund) plays the role of cash clearing between participants in the SAMIP model. Currency change risk should be considered as an important factor in any change-embedded transaction in international trades. As the currency of almost all OIC countries is different from each other, the participants in SAMIP protocol have to be hedged against the risk of reduction or elimination of cross border investments because of a change in the exchange rate of two currencies in settlement or ownership period. The hedging mechanism can be handled by a hedge fund which we call it International Clearing Fund (ICF). A big picture of clearing and settlement in SAMIP is shown in Figure 8.1

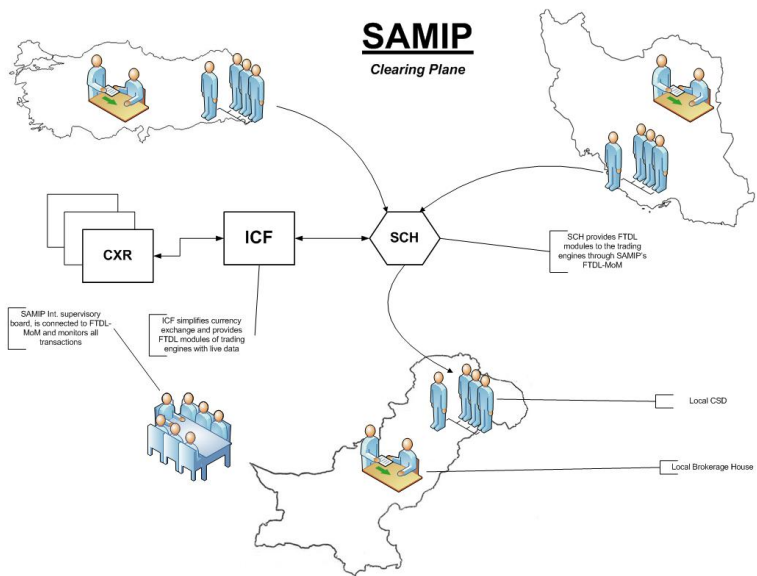


Figure 8.1: Clearing and Settlement in SAMIP

Best practices and academic researches show that the establishment of linkage between different jurisdictions securities Market is a post trade and specially Clearing and settlement problem more than being a trade problem. For instance European linkup market is designed as a link between CSD'S. And as Giovanni's report indicates cleaning and Settlement is considered as challenge even in European link up market whose participants enjoy the same currency. Besides complex nature of cleaning and settlement in terms of role players, verity of rules and procedures makes us believe about the necessity of awareness of settlement in international investments before having it performed.

8.2 Review of ICFv1

As seen in previous version of ICF (in first version of the book), this component was playing clearing role as the cross border transaction has been matched. The purchase price will be deducted from the buyers domestic CSD account on behalf of sellers domestic CSD account and simultaneously the domestic central banks will change the purchase price to domestic prices for both parties to avoid exchange rate risks. After that the position management and multilateral netting can be done on CSDs layer in ICF in a period of T+0 and the domestic CSD will charge the buyer (broker, custodian, and investor) for purchase price in buyer side and domestic CSD of seller can pay the price of transaction

to him on its own rule and period of settlement.

As soon as clearing accomplished the delivery of securities on both sides will be done. Obviously the buyer has to pay the interest of money to domestic CSD in settlement duration. Financial resources for ICF can be provided by Central Banks, Participant CSDs or participant stock exchanges. They can be motivated to mobilize such resources due to fund profits of commissions paid by participants and the interests on deposited fund resources in a withdrawable investment account. Finally it should be noted that financial resources in ICF should be deposited in one or two exchangeable base currencies which will pave the way for central banks to change domestic and destination market (primary) currencies to each other.

8.3 Challenges to ICFv1

International clearing involves some challenge in terms of volume of money have to be transformed from buyer to seller and also the limitation of each participant to maintain the money needed to guarantee clearing and settlement in $T + 0$, because each member or participant will contribute to the clearing fund depending on the status and amount of its transactions and it's given status of clearing as well as it's total margin requirement. Currency exchange rate volatility is an important factor has to be hedged in any link between countries whit different currencies. Besides

each link participant has to guarantee clearing and settlement procedures in ICF. Money provider can be motivated through the interests on money in the period of settlement in charge of debtor CSD on generally agreed to mutual agreed upon rate determined at the time of joining the link. The other challenge can be considered are ICF overheads including money transfer fees, management fees and etc. This cost can be minimized due to mechanism of netting in ICFv2 described in next parts.

As most of link participants countries may not have the support of local central banks to manage the convertibility of their local currency to proxy currencies in ICFv2 Central Banks are substituted by Currency Exchanges. These exchanges are either delegates or nominees (agencies) of ICF. ICF it self owns a big currency exchange unites. ICF plays the role of cash cleaning as well as managing different settlement periods. As mentioned before the European T2S program for interlinking the markets follows $T+O$ period of settlement. SAMIP joins this period of settlement as well avoid settlement risks in CSD's layer. And to ensure the international market integrity as well as protecting participant's different period of settlement.

Links solution for netting of international transactions is mandated as an integral part of international clearing and settlement. Since gross clearing seems to increase the cost of international investment and makes link useless. The Gap between settlement periods of different link par-

ticipants is the other main challenge of any link which brings about the risk of unsettled transactions as a result of difference between occurrence of due date in payment of two counterparties in a single transaction.

On the other hand, any money exchange embedded link in large scale makes the existence of exchanging body who exchanges the foreign currencies obtained of international transaction to local currencies and vice-versa so central banks interference or not is a matter of challenge in any link with different currency participants. These are all matters have not been addressed in ICFv1.

8.4 ICFv2 Design Principles

The design of ICFv2 should be done having the challenges of the first version addresses while maintaining acceptable complexity and hitting the principle of modularity. For this purpose we divide the tasks of ICF into two major categories:

1. Currency-level clearing
2. CSD-Level clearing

The first issue will address the challenges with different currencies and their limited exchange opportunity while the second one will solve the problems caused by different cash settlement periods.

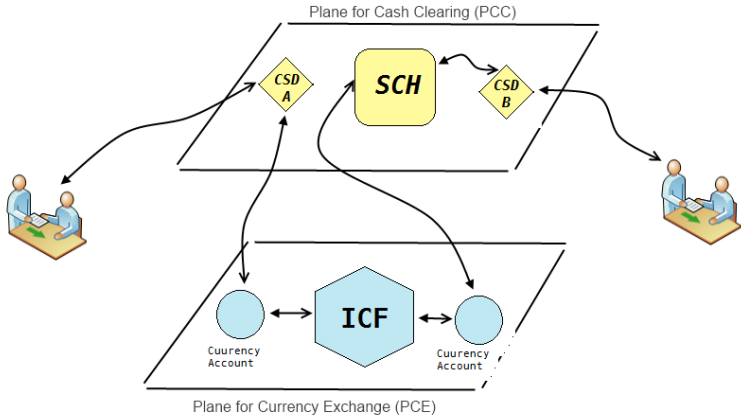


Figure 8.2: Two plane approach of ICFv2

For the sake of modularity, we divide the tasks into two cooperating but yet separated planes named PCE (standing for Plane for Currency Exchange) and PCC (standing for Plain for Cash Clearing) as depicted in Figure 8.2.

8.5 ICFv2 Architecture

8.5.1 PCE

Handling of different currencies will be done in ICF by the plane called Plane for currency exchange (PCE). This

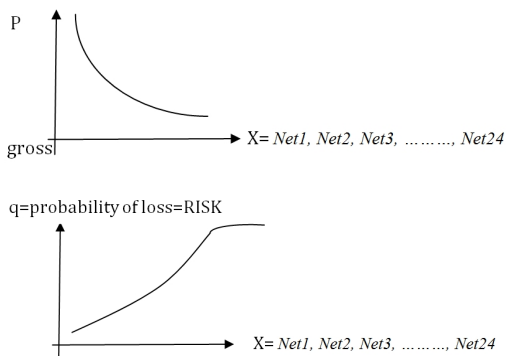


Figure 8.3: Appropriate probability behavior against netting period to profit from save or suffering loss due to fluctuations

plane bears the opportunity for ICF to make benefit of optimizing the time of netting during the day (in $T + 0$) by obtaining the optimum point of $F(p, q, x)$ while $x = Net1, Net2, Net3, \dots$

Taking all the possible clearing hours of a trading day and P as Probability of performing real netting in action and say q to represent the probability of loss in different settlement periods, PCE will perform netting per hours so gains of two sources the earning one for fees of unexchanged currencies but charged for applicant (buyer CSD) and the other for saving of transfer fees for netting more than one transaction at the time. The following figures show the expected behavior of the optimum function for PCE.

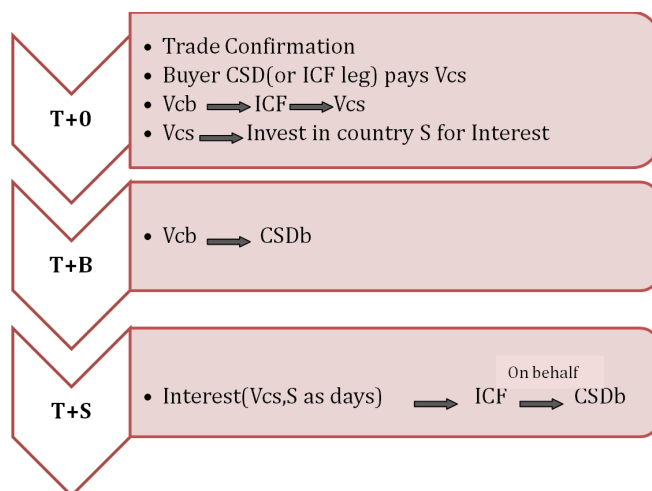
8.5.2 PCC

In this plane, ICFv2 clears cash between participating CSDs. It is worth noting that ICF will only be interfaced with CSDs and no investor relation or information is directly stored. However, everything from Investor information to clearing account status will be kept in SCH.

Clearing cash between some CSDs with different settlement periods is a challenging issue since each CSD must clear on its own while the cash related to the international trade will be needed for local clearing with brokers and investors.

ICFv2 maintains a plain for this purpose named 'Plane for Cash Clearing(PCC)' . In this plane, ICFv2 is faced with the problem of different times for trade confirmation, buyer and seller-leg settlement periods. To handle it, ICFv2 maintains some funds to be lend to the requiring leg, hence charging it for fees as well as interests. Also it should accept the unneeded money for the seller legs with longer settlement periods than the buyers and pays its interest to the appropriate CSD and hence investor. Note that we hope some kind of netting in unneeded and sonner-required cash in ICF aiming much less required funds and fees.

Considering $V = \text{volume of Trade}$, $T + S$ as seller's settlement period, $T + B$ as buyer's settlement period, C_s as the currency of seller, C_b as the currency of buyer and $T + 0$ settlement period as criteria the possible scenarios

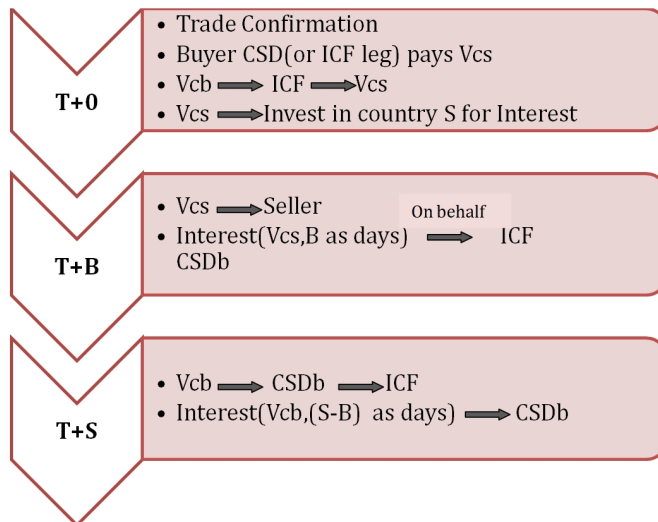
Figure 8.4: If $S = B = 0$:

can be considered as:

8.6 Parameters and Joining Configurations

As the reader might noticed, ICFv2 features some parameterized configuration on the joining exchanges determining:

1. How they will clear bi-lateral cash in either currency exchange level and trade level. In the other words, a participating country might prefer to net cash flow for multiple trading hours with a certain exchange whose currency does not have hazardous fluctuations against its own featuring significant save in exchange

Figure 8.5: if $S > B > 0$:

fees or it might shift the issue towards gross settlement in case of a more fluctuating one.

2. The political, economical and managerial limitations to the maximum amount of money to be exchanged for example in a trading day.
3. The issues, considerations and limitations for customer-level supervisory which might cancel the trade if not accounted. For example in Iranian exchange will not allow certain investors from opposing countries or might accept them with some predefined conditions.

All the above considerations should be clearly mentioned, documented and then converted to FTDL scripts which will be provided to the trading engines as settlement-awareness. The provided information integrated within the FTDL routines, will decrease settlement risks drastically.

Chapter 9

Conclusion & Future Plan

SAMIP can be a good framework to provide efficient basis for international investment especially among countries that have not enjoyed common currency. Since SAMIP does not require the legislation methods, IT infrastructure and local regulations of the participating counties to change radically, it can be put to practice with less effort.

SAMIP has undergone the identification and specification phases and now it needs simulation then pilot implementation and then accomplishment by all members of OIC. We believe that each community of securities market aims to have interlink bears its exclusive motivations, boundaries, challenges and relatively exclusive solution. For examples one of most concern in interlinking OIC capital markets is diversity of currencies which is not a big deal in European link up markets.

The FTDL and its channel are exclusively designed in

SAMIP to pass through the heterogeneities of OIC participants by means of modern technology and IT infrastructure and to maintain dynamic control of international orders before matching. This means that SAMIP proposes a comprehensive solution for the main challenge of international trade which is CSD operation. This protocol not only provides data necessary for trade engines but also in an intelligently manner preserves the hole system from failed trades.

The next step will be to specify the model and its related technological issues (like FTDL) and business players (like ICF) in detail then to focus on modeling, design, simulation and final implementation. Of course a working group of at least two counties will be needed and the first simulation results are estimated to be obtained within a year followed by full implementation in a couple of years depending on funding, support and the will to achieve such a point.

9.0.1 Conclusion of the Second Edition

In this edition we discussed about two main problems in cross-border clearing and settlement; currency exchange and different settlement periods. Simulation of functions as a conclusion of PCC scenarios of ICF resulted in the design of an optimized solution for managing cash clearing in ICF while in absence of customized derivatives the handling of different settlement periods is undertaken by

PEC. This plane will manage different settlement periods by preparing a mechanism to clear international trades in $T + 0$ and charging the debtor CSD on behalf of ICF or creditor CSD depending on the scenarios of PCC.

In ICFv2 the central banks are substituted by currency exchanges which are representatives of ICF and ICF itself joins a currency exchange unit. The constraints and limitation of money transfer through exchangers in any country can be defined in the model by FTDL majors.

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