

Payment intermediation – evolution and current status

Introduction

Payment intermediation has been evolving rapidly over the past 10-15 years. Although this development has been driven to a large extent by considerations of efficiency, increasing attention is being focused on the risk involved in payment intermediation and ways of reducing it. At an international level, the Bank for International Settlements (BIS) has applied itself firmly to this issue, together with the G10 and the European Union. Payment intermediation obviously involves the transfer of money between two or more parties. Today, funds are largely transferred electronically between accounts and the physical transfer of tangible money from one place to another only occurs on a small scale. Banks and financial institutions are key players in these activities and specific methods of payment intermediation have developed in most countries. Payment systems are the formal methods used in payment intermediation. There are two main types of payment system: netting systems and real time gross settlement systems (both described later in this article), along with a variety of hybrids which combine features of these two main types in different ways. It is widely customary for the central bank to be the forum for payment intermediation settlements when different banks are involved. There are several reasons, including considerations of efficiency, since banks generally have current accounts with a central bank, and also because a central bank can provide liquidity without notice and thus facilitate the payment intermediation process. Central bank money also carries a lower risk than capital from an independent third party, with its inherent credit risk. In

Iceland, a netting system is operated by the Central Bank, the commercial banks and the savings banks. Basically this is a netting system, although certain elements of it resemble a real time gross settlement system (RTGS). Plans are afoot for the Central Bank of Iceland to develop a large value payment system, an RTGS through which all payments between different commercial banks and savings banks above a certain limit will eventually be made.

Developments in recent years

Payment intermediation has been evolving rapidly in recent years. Greater international and intranational capital flows have called for more efficient solutions, while greater awareness of risks has also led to new focuses. Major shocks of various sorts, such as the collapse of the Baring Bank in 1995, the Drexel Burnham Lambert crisis and the bankruptcy of BCCI in 1991, taught a very uncomfortable lesson, and although the reverberations from these shocks did not manage to disturb the payment system, they sometimes came fairly close to wreaking havoc. In many countries special LVTs (large value transfer systems) have been established to reduce the credit risk as far as possible. In an LVT, the largest payments, which are also the most important ones and carry the highest risk, are handled separately and effective methods are used to minimize the risk. In most cases the large value transfer systems are RTGSs (where payment is made immediately if there are sufficient funds or secure authorization for lending), although there are also examples of netting systems which make strict demands regarding reserve funds aimed at ensuring final settlement. In the buildup to European monetary union, the central banks of the member countries were required to establish large value transfer systems, which then

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were linked into a common system under the name of TARGET. When the Euro was launched in the beginning of 1999, the system had been extensively tested and it has largely operated without any setbacks.

Netting systems

Netting is based on summing up all payments between parties and calculating their net position at the end of each period (generally one day or less). This process is called clearing. Afterwards, settlement is made, whereby those with a net-debit position pay those with a net-credit position. The advantage of this method is a sharp reduction in settlement transactions, and also the fact that no party will ever be debited by a greater amount than its negative balance. It has been estimated that the liquidity requirement is reduced by 80% when netting is used instead of real time gross settlement.

Bilateral and multilateral netting

Bilateral netting involves two parties which make a settlement between themselves with a single transaction. Multilateral netting takes place when many participants make settlements among themselves with a single transaction to or from each one. Then the total net balance of each one is calculated, and is positive if in-payments exceed out-payments, and negative if the opposite is true.

Risk

Netting involves a variety of risks. The failure to create a secure legal environment for netting can create significant systemic risk. This risk generally does not emerge unless one or more parties to settlements within the system cannot actually deliver the payment. This creates legal uncertainty which can lead to a system crash or disputes about the treatment of parties damaged by it. If a swift solution is not found, such disputes can halt netting system operations for some time, often causing irrecoverable damage, both directly and indirectly, for example insecurity among users.

Unwinding or collective responsibility

In the event of problems in netting systems, the only available solution may be to remove all payments made by one participant from the system and recalculate the balances. However, this is considered to be

a very unfavourable recourse and in some cases it is unfeasible, both on account of the number of transactions involved and equally because of problems which may arise as a consequence. Thus it is recommended that participants in netting systems assume collective responsibility for settlements. The general arrangement is for participants to put up highly liquid securities, enabling a settlement to be completed even though one or more parties fails. If the securities prove to be insufficient, all the remaining participants have to assume the liabilities of the participant that fails, which in some cases can make the situation even worse. To avoid excessive collective responsibility, in many netting systems a ceiling can be placed on the net balances that participants agree to vis-à-vis other members of the system.

Finality

It is crucial to define precisely when a payment is final and irrecoverable. In many countries this has been legally defined, along with procedures for settling payment intermediation claims in the event of bankruptcy. An EU directive contains a provision that when payments have been received by the payment system they are irrecoverable, thereby superseding provisions of bankruptcy legislation which may contradict this. This directive has been incorporated into Icelandic law with Act no. 90/1999 on the security of payment orders in payment systems.

Real time gross settlement systems

Real time gross settlement systems make final settlements between two different parties when there are sufficient funds on the payer's accounts to cover them. Transactions for which there are not sufficient funds are either rejected or placed in a queue which is then processed according to the rules applying within the system. If the legal foundation is secure, i.e. transactions are considered final when settled, the system entails no credit risk. An RTGS, however, requires more liquidity than a netting system. The main risk in an RTGS is a gridlock, causing a chain reaction whereby all participants are left waiting for the others. The gridlock is described in more detail in the box outlining payment intermediation risks.

Queuing

Queues may be either localized or centralized. When

The Lamfalussy conditions

The Lamfalussy Report published by BIS in 1990 marked a turning point in the netting system debate, by stating minimum conditions that such systems need to fulfil in order to describe their risk level as satisfactorily low. The Lamfalussy conditions are now generally acknowledged as a minimum standard that payment systems need to meet. The Lamfalussy conditions are as follows:

- I. Netting schemes should have a well-founded legal basis under all relevant jurisdictions.*
- II. Netting scheme participants should have a clear understanding of the impact of the particular scheme on each of the financial risks affected by the netting process.*
- III. Multilateral netting systems should have clearly-defined procedures for the management of credit risks and liquidity risks which specify the respective responsibilities of the netting provider and the participants. These procedures should also ensure that all parties have both the incentives and the capabilities*

to manage and contain each of the risks they bear and that limits are placed on the maximum level of credit exposure that can be produced by each participant.

- IV. Multilateral netting systems should, at a minimum, be capable of ensuring the timely completion of daily settlements in the event of an inability to settle by the participant with the largest single net-debit position.*
- V. Multilateral netting systems should have objective and publicly-disclosed criteria for admission which permit fair and open access.*
- VI. All netting schemes should ensure the operational reliability of technical systems and the availability of back-up facilities capable of completing daily processing requirements.*

The Lamfalussy Report considered it normal for the respective central bank to monitor and/or oversee each country's netting system, on account of its importance in the economy and the central bank's role in payment intermediation, both as a participant in settlements and on general security grounds.

transactions are rejected due to insufficient funds to cover the payment, the participants themselves create a queuing system and resubmit transactions to the system. In other cases, transactions are not rejected, but placed in a central queue by the system itself. Different methods are used both to control centralized queues and resolve them. In some places payment requests can be assigned different levels of priority. Various methods are used to clear gridlocked queues, for example rearrangement of transactions in order to try to unblock the system. Sometimes technical netting is applied to the queues, i.e. the balances for all the participants in the queue are calculated. If the outcome is that there are sufficient funds everywhere to cover the balances, all the transactions in the queue are cleared regardless of whether a temporary negative position is created on the occasional account. The ultimate outcome will be that all accounts are in credit.

Payment intermediation risks

The risks accompanying payment intermediation take various forms. The main types of risk are

described in the box on page 49. Systemic risk poses the greatest threat. A chain reaction which disrupts the entire financial system could prove very difficult to unwind and would probably cause irreparable harm to the payment system and its participants. Thus a great responsibility is involved and attempts are made to impose various safeguards in order to prevent such a situation from arising.

Payment intermediation in Iceland

Payment intermediation in Iceland is effective and efficient in many areas compared with general world standards. Iceland operates a single netting system in which settlements are made on the morning following the day of the transaction, while netting amounts are calculated on the evening of the preceding day. The greatest difference between this system and similar ones in other countries is its nominal booking of payments, i.e. the account balance is immediately increased or decreased as soon as the bank handles the transaction. The account balance is updated immediately, so that the owner of the account can then dispose of those funds even though final book-

Payment intermediation risks

- *Credit risk* is when a participant who is liable to pay a specified amount is unable to do so.
- *Liquidity risk* is when a participant who is liable to pay a specified amount is unable to do so in a suitable form. Funds may be available, but not in the form needed to meet the liability. For example, payment may be stipulated in Deutschmarks but the only funds available are dollars, which cannot be converted into Deutschmarks within the stipulated time.
- *Settlement risk* is a collective term for credit risk and liquidity risk.
- *Systemic risk* is when default by one participant produces a chain reaction among the others, preventing the completion of settlements. Two main methods are used to reduce systemic risk: *Collective responsibility* among all system participants for a default on the part of one participant, whose net debit is then shared out according to specified rules. However, this arrangement may lead to defaults by other participants. *Unwinding*, which may conceivably lead to defaults by other participants who expected the delivery of substantial funds from the defaulting party.
- *Gridlock* mainly occurs in real time gross settlement systems where insufficient credit is available. It occurs when participants expecting payments make payments of their own, in the faith that the expected payment will be delivered before their own accounts are debited. If the payment order is refused or queued, this can produce a chain reaction in which all participants are left waiting for the others. Since this is not a default, unlike systemic risk, the gridlock can be unblocked with temporary measures, e.g. technical netting of the queue.
- *Moral hazard* is a false sense of security among participants, whereby the general market has an unfounded faith that, for example, the central bank or state will come to the system's rescue in the event of any trouble. The risk is that participants acting in such faith will make decisions in order to take advantage of the situation.
- *Technical risk* is when a technical failure leads to substantial disruption of the payment flow and/or settlements. Technical risk can also lead to lack of confidence in the system as such and uncertainty regarding its finality and efficiency.
- *Herstatt risk* is named after the German bank Bankhaus Herstatt, which was closed at short notice in 1974. This is a form of credit risk, whereby delivery and payment do not take place simultaneously and one party to the transaction can cancel either delivery or payment. This risk occurs mainly in foreign exchange trading.

ing does not take place until the following night and settlement not until the morning of the next day. This has the advantage that the owner of an account has immediate access to funds deposited in his account, and Iceland's payment system is apparently the fastest in the world. The problem with this method, however, is that payment does not become final until the morning after the final settlement has been made. If a settlement participant (bank) were to go bankrupt, it would be absolutely impossible to unwind its transactions within the system, since each individual one could have spawned many others which would then also be thrown into disarray. If an individual customer of a bank were to go bankrupt, it is unlikely that the effect would be felt to any extent in the payment system.

It is planned to channel large payments (in excess of a specified amount, e.g. 5 million krónur) into a

special system (large value transfer system) where they would be finally booked, immediately upon being received if there is a balance to cover them, but otherwise be placed in a queue which would be processed when the balance is sufficient to cover it.

Dematerialisation of securities is planned this year and it will mark a turning point in payment intermediation and settlement of securities. Instead of the purchaser needing to pay for securities and then wait for a certain time until the seller has endorsed them and delivered - with an accompanying risk of delays and conceivably fraud - the electronic equivalent of the security will be stored in a specified place and the transfer of ownership and payment will take place simultaneously.

The RB netting system

The netting system operated by commercial banks,

savings banks and the Central Bank of Iceland evolved from a system used when cheques were manually cleared at the Central Bank. This system is generally known as the Icelandic Banks' Data Centre system or RB. RB is jointly owned by the commercial banks and savings banks and handles various other collective aspects of their operations, e.g. accounting and cashier systems, as well as netting and settlement. The procedure for netting is that all payments to and from individual participants are collected at the end of the day and then cleared by calculating the balance, i.e. net-credit or net-debit position. Settlement is then made on the participants' accounts with the central bank. This system is now highly advanced and has a high capacity. At the moment an independent reserve facility with a complete reserve system is being taken into service, which will be available if the main system fails.

Adaptation to the Lamfalussy conditions

In a report published at the beginning of 1997, the Central Bank of Iceland assessed the RB netting system with respect to the Lamfalussy conditions. It emerged that the Icelandic system fulfilled none of the six conditions. Since then, however, some progress has been made. Legislation has been passed on the security of payment orders in payment systems (Act no. 90/1999), which greatly firms up the legal basis of payment systems. Rules and agreements are also being drawn up which will ensure that the RB netting system completely fulfils the Lamfalussy condition I which stipulates a well-founded legal basis. With these new rules the system will also fulfil condition III on clearly defined procedures for the management of credit risks and liquidity risks (although it is still not possible to set conditions on the maximum level of credit exposure with respect to other participants) and condition IV on completion of daily settlements in the event of an inability to settle by the participant with the largest single net-debit position. Condition II, that a participant should have a clear understanding of the impact of the scheme on financial risks, should have been fulfilled by now, although it is necessary to maintain the knowledge base that has been built up. Work is under way to split netting from other RB systems and establish a separate company to handle this function, thereby opening general access to the netting scheme. This would fulfil condition V on fair and

open access. When the RB reserve system enters service, condition VI on operational reliability and availability of backup facilities will be fulfilled. Thus fulfilment of the Lamfalussy conditions is pending within the next few months.

Planned Central Bank large value transfer system

For some time the Central Bank of Iceland has been interested in establishing a large value transfer system which would be an RTGS. The main reason for the Central Bank's interest is that the largest payments entail the largest risk, besides which such a system would significantly diminish potential problems arising from nominal booking in the netting system and conceivable unwinding of transactions. Immediate and final settlement of payments on current accounts with the Central Bank would largely eliminate credit risk and greatly reduce systemic risk as well. The Central Bank can be expected to offer participants intraday loans against guarantees, to increase liquidity within the system.

The Icelandic Securities Registration Centre

Securities dematerialization is pending in Iceland. The Icelandic Securities Registration Centre will probably enter full operation in the very near future, resulting in some change in securities trading procedures. Securities certificates as such will be discontinued and the ownership of rights accompanying them will be recorded electronically. Iceland Stock Exchange will notify the securities registration centre of trading taking place on it. Transactions will then be sent to buyers and sellers, i.e. members of Iceland Stock Exchange (which then add details such as the bank account through which the payments should be made). These bank transactions will then be submitted to the RB netting system. When final netting of the settlement takes place on the morning of the following business day, the rights of ownership (securities) will then be transferred. This represents delivery versus payment, one of the main aims of an effective and low-risk securities payment system.

Role of the Central Bank

Central banks perform very different roles in payment systems in various countries. Partly this is the result of different traditions, while changes in pay-

ment system structures in recent years have often transformed central bank functions too. In many cases central banks are the forum for settlements, i.e. the netting settlement takes place through the participants' accounts with the central bank in the country in question. For the same reason, central banks generally own and operate large value payment systems in each country. Because of the importance of payment systems in the financial system, central banks

have regarded it as one of their functions to monitor not only their operation and operational reliability, but equally their impact on the stability of the financial system as a whole. The amendment made to Iceland's Central Bank Act in 1998 designated one of its main roles "to promote smooth, efficient and secure payment intermediation within Iceland and with other countries." The legislative has seen it fit to grant the Central Bank a role in this field too.

BIS Principles

The latest move in payment system arrangements is a BIS report published at the end of 1999. Named after John Trundle, chairman of the BIS working group, it addresses the principles that should apply in payment systems. These principles extend the scope of the Lamfalussy conditions, which only cover netting systems. The Trundle conditions cover all payment systems and can be expected to achieve the same status as the Lamfalussy conditions in the near future. The Trundle conditions are as follows:

- I. *The system should have a well-founded legal basis under all relevant jurisdictions.*
- II. *The system's rules and procedures should enable participants to have a clear understanding of the system's impact on each of the financial risks they incur through participation in it.*
- III. *The system should have clearly defined procedures for the management of credit risks and liquidity risks, which specify the respective responsibilities of the system operator and the participants and which provide appropriate incentives to manage and contain those risks.*
- IV.* *The system should provide prompt final settlement on the day of value, preferably during the day and at a minimum at the end of the day.*
- V.* *A system in which multilateral netting takes place should, at a minimum, be capable of ensuring the timely completion of daily settlements in the event of an inability to settle by the participant with the largest single settlement obligation.*
- VI. *Assets used for settlement should preferably be a claim on the central bank; where other assets are used, they should carry little or no credit risk.*

VII. *The system should ensure a high degree of security and operational reliability and should have contingency arrangements for timely completion of daily processing.*

VIII. *The system should provide a means of making payments which is practical for its users and efficient for the economy.*

IX. *The system should have objective and publicly disclosed criteria for participation, which permit fair and open access.*

X. *The system's governance arrangements should be effective, accountable and transparent.*

* Systems should seek to exceed the minima included in these two principles.

Central bank areas of responsibility

The Trundle Report states guidelines for central bank areas of responsibility in applying these principles:

A. *The central bank should define clearly its payment system objectives and should disclose publicly its role and major policies with respect to systemically important payment systems.*

B. *The central bank should ensure that the systems it operates comply with the core principles.*

C. *The central bank should oversee compliance with the core principles by systems it does not operate and it should have the ability to carry out this oversight.*

D. *The central bank, in promoting payment system safety and efficiency through the core principles, should cooperate with other central banks and with any other relevant domestic or foreign authorities.*

Supporting remarks presented with the parliamentary bill show that this is done with regard to developments in other countries. They also refer to a new report on domestic payment intermediation where several issues are said to be in need of improvement. It can therefore be deduced that the bank is supposed to initiate improvements in this field. In recent years finance companies have made increasing demands for equal access to basic elements of financial services, and central banks have supported these claims.

Settlement accounts and liquidity

Central banks are in a fairly unique position in the financial system. Most of the credit institutions have current accounts with the central bank, which is also an important source of liquidity. By using their accounts with a central bank, financial market participants can be certain that payments passing through them are final and involve no credit risk, and that conflicts of interest are minimal. A central bank is in the key position of being able to print money if needed. Although this is exceptional and only done after very careful consideration, it is a very important safety valve. In general the central bank demands securities for all loans, but having received them can technically provide unlimited funds. This is crucial in payment systems, especially where temporary liquidity shortages can develop and need to be addressed swiftly.

Monitoring and supervisory role

In most parts of the world one of the central bank's functions is seen as promoting healthy and secure trading in financial markets. Since a payment system is one of the basic components of the financial market, it is crucial for the security of the economy as a whole that payment systems operate as reliably as possible. A payment system which has lost confidence and trust is virtually useless. Central banks have thus been widely involved in the building up of payment. However, it is important that the market should not misunderstand the central bank's role and expected it to bale participants out of any difficulties they may encounter. This could create a moral hazard which is potentially difficult to keep in check.

Although it is only in recent years that central banks have explicitly been expected to intervene in the process or development of payment systems, most of them monitor them closely and have taken action when they appear to be going astray.

Access to payment systems

Financial sector liberalization has been accompanied by various complications. One is the difference which develops between the position of old-established financial companies and new ones which are gaining a foothold. Payment systems are a basic service which must be in place in all financial systems. However, they have evolved along very different lines in various countries. Some countries have many highly diverse payment systems in operation with little or no linkage between them, while elsewhere there is one main system to which all financial market participants have access. An own payment system need not be an insurmountable obstacle for a new market participant, but the cost of setting up a new system may be on such a scale that it severely distorts the competitive position of new entrants compared with established participants. The Lamfalussy conditions address the question of access and also firmly underline that access to multilateral netting systems should be open and unhindered. The European Union went further in this respect and declared its interpretation that access to necessary institutions must be open to other participants, provided that they fulfil normal access conditions.

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