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Risks in Large Value Payment Systems

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Abstract

Payment system is an integral part of the entire banking system in every country. Payment systems in centrally-planned economies differ greatly from market-driven economies. Almost all market-driven economies depend heavily on latest technology for efficient functioning of payment systems. The same technology is also a source of risks, which are found only in technology oriented payment systems, such as systemic risk. The discussion on LVPS assumes important dimensions due to its direct implications on financial market. The efficient functioning of payment system is necessary for the efficient functioning of the financial sector. Strong and sound payment system is required not only for long term stability of financial system but also for trouble free day-to-day working of settlements. The transaction on the financial market, generate risks for counterparties who undertake them, for the bankers, for the other intermediaries and for the central bank. The risks are greater in the case of LVPS. The disturbances in these settlements can have wider repercussions for the financial system and the economy as a whole. Due to application of technology the time taken for settling the transactions has been drastically reduced increasing to large volumes exposures. The structure of payment system determines the type of risk, who bears the risks and the vulnerability of the system.

Keywords: **banking; risk management; large value payment system, RTGS, net settlement system**

Introduction

Payment system is an integral part of the entire banking system in every country. Payment systems in centrally-planned economies differ greatly from market-driven economies. Almost all market-driven economies depend heavily on latest technology for efficient functioning of payment systems. The same technology is also a source of risks, which are found only in technology oriented payment systems, such as systemic risk. Regulators are especially concerned that payments systems might turn a local financial crisis into a global systemic crisis (Pu Shen 1997). Transitional economies face a different set of problems while upgrading from conventional paper-based systems to electronic transfer system. These issues are summarized (see Table 1).

Table 1
Payment System Characteristics and Problems for Transitional Economies

Feature	Centrally-planned Economy	Market-driven Economy	Problems of Transitional Economies
Structure	State-owned mono-bank	Privately-owned multiple banks	Expand legal structure to accommodate private ownership
Purpose	Monitor the plan	Speedy value	Improve time

		transfer	sensitivity of payments
Enterprise Payments	Paper-based	Paper and Electronic	Develop electronic payment and communication infrastructure
Guarantees	State guarantee (no credit risk)	Private obligation (credit risk)	Improve credit risk assessment
Settlement	Gross settlement (all transactions through one account)	Gross settlement, net settlement with collateral (many accounts)	Expand retail payment alternatives
Retail Payments	Cash-based	Cash, GIRO, cheque, electronic (debit/credit cards)	

Source: Sato, Setsuya and Humphrey, David, Transforming payment Systems: Meeting the Needs of Emerging Market Economies, World Bank Discussion Paper No. 291, The World Bank, Washington D.C., 1995, pp. 17.

Large Value Payment System: An Analysis

Large Value Payment System (LVPS), which are also known as Wholesale Payment Systems (WPS) are the payment systems used to settle large value money transfers. Although there is no clear definition of "large value", but the term has been used in comparative sense. It generally refers to funds transfer between banks and central bank. They also handle interbank settlements or sometimes for settlements among the branches of the same bank. The word "large value" is generally used in this context. The main difference between Retail Payment System (RPS) and WPS lies in volume and value of transactions. RPS has a large volume but low value of transactions, whereas on the other hand WPS have a small volume but high value of transactions. The volume and value ratio determines the use of technology for the settlement purpose.

The discussion on LVPS assumes important dimensions due to its direct implications on financial market. The efficient functioning of payment system is necessary for the efficient functioning of the financial sector. Strong and sound payment system is required not only for long term stability of financial system but also for trouble free day-to-day working of settlements. All the institutions in the financial market, banking and non-banking are connected to each other through the linkages of payment system. The working of payment system has a direct reverberation on the working of all the financial institutions, which in turn are directly related to the ordinary businessman and all economic units in the society. With the opening up of economies, the domestic financial markets have become more prone to the shocks.

Types of Large Value Payment System

The LVPS can be divided into two categories, depending on the length of the lag between initiation of a payment and its settlement by the delivery of central bank funds. These are, Gross Settlement System and Net Settlement System. In Gross Settlement System all the transactions are finalized immediately, whereas in the case of Net

Settlement System, transactions are settled at the end of the period.

Gross Settlement System

Gross settlement systems are also often called as Real-Time Gross Settlement (RTGS) Systems. In case of RTGS each payment is settled immediately on a gross basis. In RTGS system, each transaction is considered unique and is required to be settled individually and immediately by the participants. They provide irrevocable settlements of payment obligations. The transfer of funds takes place through central bank. In a gross settlement network each payment is settled separately at the time it is sent. The current status of RTGS systems in G-10 countries is as follows (see Table 2):

Table 2
Real-Time Gross Settlement (RTGS) Systems in G-10 Countries

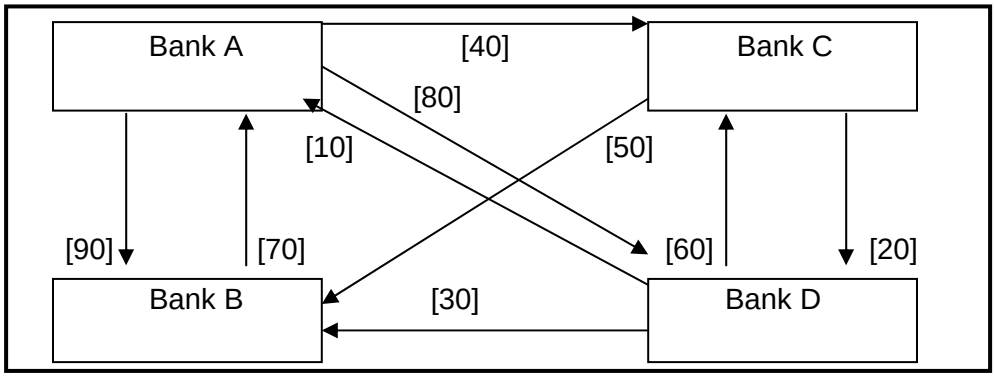
Country	Name of system	Year of implementation
Belgium	ELLIPS	1996
Canada	LVTS	1999
France	TBF/PNS	1997/1999
Germany	RTGS ^{plus}	2001
Hong Kong	HKD CHATS/USD CHATS/Euro CHATS	1996/2000/2003
Italy	BI-REL	1997
Japan	BOJ-NET	1988
Netherlands	TOP	1997
Singapore	MEPS+	2005
Sweden	K-RIX/E-RIX	1990/1999
Switzerland	SIC	1987
United Kingdom	CHAPS Sterling/CHAPS Euro	1984/1999
United States	Ferwire/CHIPS	1918/1970
European Union	TARGET/EURO1/EPM	1999/1999/1999
International	CLS	2002
Germany/Switzerland	SECB/euroSIC	1999

Source: Bank for International Settlements. Committee on Payment and Settlement Systems, New developments in large-value payment systems, Bank for International Settlement, Basle, May 2005, Annex 2.

The diagram 1 explains a typical gross settlement system. Assuming that there are four banks involved in the settlement, namely, A, B, C, and D, the following payment obligations can be noted.

Diagram 1

An Interbank Gross Settlement Funds Transfer System



Note: Figures in the parenthesis are amounts owed in million $. The analysis is only suggestive.

Source: Adapted from Paul Van den Bergh, Operational and Financial Structure of the Payment System, The Payment System, Bruce J. Summers (ed.), IMF, 1994, pp. 36.

Following analysis can be made from the diagram.

Case 1: Liability of Bank A		Case 2: Liability of Bank B	
Towards Bank B	90	Towards Bank A	70
Towards Bank C	40	Towards Bank C	NIL
Towards Bank D	80	Towards Bank D	NIL
Total liability of Bank A	210	Total liability of Bank B	70
Case 3: Liability of Bank C		**Case 4: Liability of Bank D**	
Towards Bank A	NIL	Towards Bank A	10
Towards Bank B	50	Towards Bank B	30
Towards Bank D	20	Towards Bank C	60
Total liability of Bank C	70	Total liability of Bank D	100

Number of interbank communication channels	6
Number of interbank payment messages exchanged	9
Number of actual interbank funds transfers	9
Total amount transferred by all the banks	450

As seen in the diagram and the explanation, the total numbers of exchanges are 9 (A& B - 2, A & C - 1, A & D - 2, B & C - 1, B & D - 1, C & D - 2), and the total amount transferred is 450 (A& B - 160, A & C - 40, A & D - 90, B & C - 50, B & D - 30, C & D - 80). Each bank is required to settle its dues without offsetting any amount. Simply stated no debit is adjusted against any credit.

The problems with all the types of gross settlement systems is the large number of settlements, very huge liquidity requirements for participants, heavy load on the telecommunication lines due to large number of transmitted messages etc. The cost of managing a gross settlement system is also high. There can be a "payment waiting

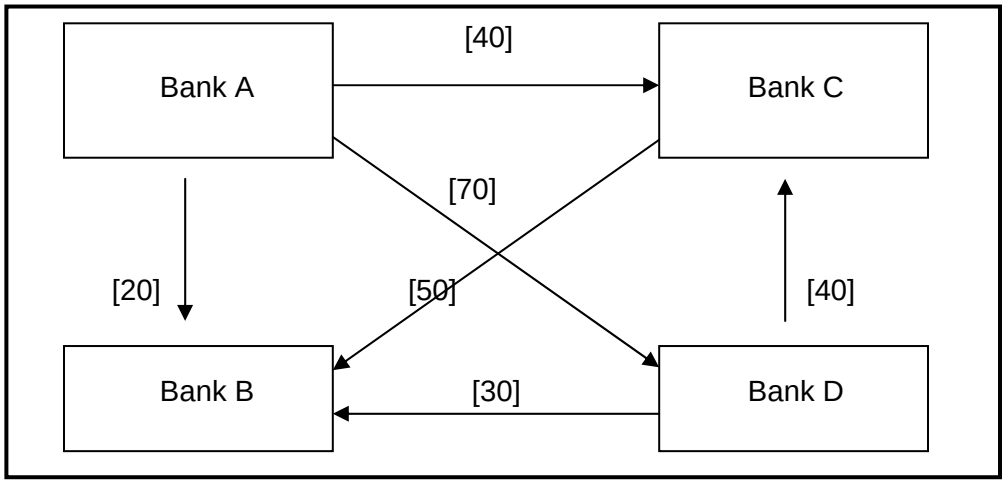
period" when a participant is awaiting credit from another participant. This can lead to disruptions in the system, due to the linkages of each participant. Some of these problems have helped in the development of Net Settlement Systems.

Net Settlement System

On a net settlement network, all payments received and sent by participants is cumulated and a net-final settlement in done at the end of a particular time period. The settlements in net settlement system are not settled individually. The settlement is revocable and not final until the end of the settlement period. The settlement is not finalized until the end of the period, and hence there is no guarantee of their completion until settlement. The main advantage of netting is reduced requirements for the immediate liquidity to meet the payment obligations. Each member gets some time for adjusting its position. Netting also helps in reducing the direct credit exposures. There are two components in netting system, first is transferring the debit and credit order for funds, and second transferring the actual funds between the members. For economic reasons the funds are not transferred with each debit and credit order. The central system keeps a track of all transactions, and only the "net" settlement is done, thus the name Net Settlement Systems.

Net settlement systems can be classified on the basis of type of netting taking place. If the netting takes place mutually between two participants, it is known as bilateral net settlement system. When the netting takes place for all the participants through a central settlement agency at a deferred time, it is known as multilateral net settlement system or deferred net settlement system. Differed net settlement systems are cost effective as compared to RTGS systems, especially when they do not fully collateralize all the net debits incurred (Pages and Humphrey, 2005). In the bilateral netting settlement system, the final amount is calculated which each player owes to the other. The diagram (see Diagram 2 and Diagram 3) explain the two types of netting systems:

Diagram 2
An Interbank Bilateral Net Settlement Funds Transfer System



Note: Figures in the parenthesis are amounts owed in million dollars. The analysis is only suggestive.

Source: Adapted from Paul Van den Bergh, Operational and Financial Structure of the Payment System, The Payment System, Bruce J. Summers (ed.), IMF, 1994, pp. 37.

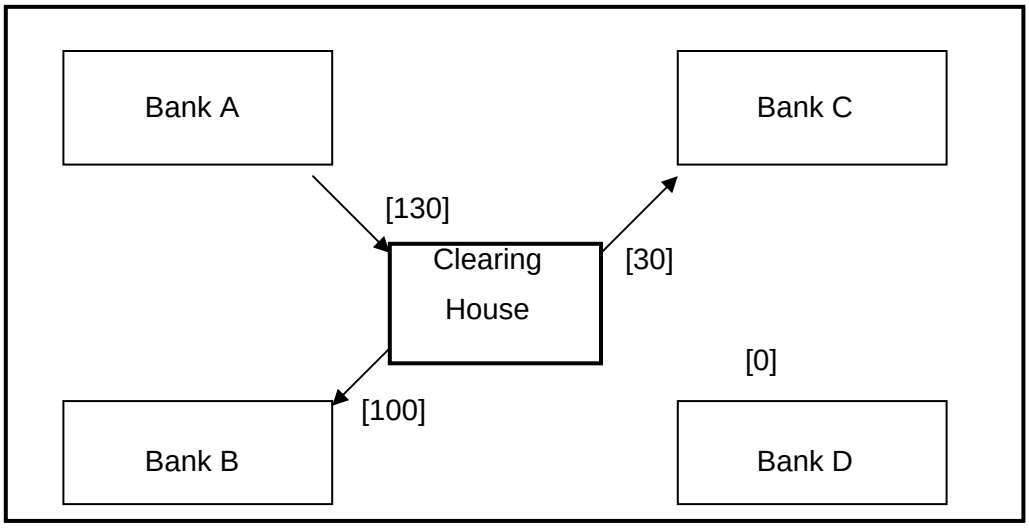
Following points can be noted from the above diagram.

Case 1: Liability of Bank A		Case 2: Liability of Bank B	
Towards Bank B	20	Towards Bank A	NIL
Towards Bank C	40	Towards Bank C	NIL
Towards Bank D	70	Towards Bank D	NIL
Total liability of Bank A	130	Total liability of Bank B	NIL
Case 3: Liability of Bank C		Case 4: Liability of Bank D	
Towards Bank A	NIL	Towards Bank A	NIL
Towards Bank B	50	Towards Bank B	30
Towards Bank D	NIL	Towards Bank C	40
Total liability of Bank C	NIL	Total liability of Bank D	70

Number of interbank communication channels	6
Number of interbank payment messages exchanged	9
Number of actual interbank funds transfers	6
Total amount transferred by all the banks	250

The total number of settlements in this case will come down to 6, and the total amount which will be transferred will also come down to 250. This is because each bank is adjusting its debit against its credit with each member bank, and thus settling only the final amount. This method has minimum involvement of the central bank for the settlement. Members are required to hold less liquidity for settlement.

Diagram 3
An Interbank Multilateral Net Settlement Funds Transfer System



Note: Figures in the parenthesis are amounts owed in million dollars. The analysis is only suggestive.

Source: Adapted from Paul Van den Bergh, Operational and Financial Structure of the Payment System, The Payment System, Bruce J. Summers (ed.), IMF, 1994, pp. 38.

The following point emerges from the above analysis:

Case 1: Liability of Bank A		Case 2: Liability of Bank B	
Towards Clearing House	130	Towards Clearing House	130
Total liability of Bank A	130	Total liability of Bank A	130
Case 3: Liability of Bank C		Case 4: Liability of Bank D	
Towards Clearing House	-30	Towards Clearing House	NIL
Total liability of Bank C	-30	Total liability of Bank D	NIL

Number of interbank communication channels	4
Number of interbank payment messages exchanged	9
Number of actual interbank funds transfers	3
Total amount transferred by all the banks	130

The total number of settlements come down to 3 (Clearing House with A, B & C - one each), and the total amount which will be transferred will also come down to 130.

The multilateral net settlement system allows the members to settle their payment obligations through a central clearing agency, generally the central bank. The settlements do not take place between individual banks instead the final settlement is done with the central bank as the intermediate. The credit requirements are reduced to minimum in the multilateral net settlement systems. In the diagram, it is clear that the settlement takes for only A, B and C. D's position is squared out by debits and counter credits.

It can be seen from the above discussion that net settlement system economizes on the cost of handling non-interest bearing deposits, thus improving the liquidity position of the bank, but at the same time increases the moral hazard problems (Kahn and Roberds, 1997). RTGS systems are more expensive since they enforce banks to maintain large liquid reserves but provide settlement finality since the transactions are irrevocable. Providing an alternate to RTGS system, Johnson *et all* (2004), suggests 'receipt-reactive gross settlement system' which can reduce the intraday credit requirements.

Risks in LVPS

All types of payment systems involve risks depending on the parties involved, the mode and time of settlement, the extent and type of technology used, and the role of provider of payment system. The transaction on the financial market, generate risks for counterparties who undertake them, for the bankers, for the other intermediaries and for the central bank. The risks are greater in the case of LVPS. The disturbances in these settlements can have wider repercussions for the financial system and the economy as a whole. Due to application of technology the time taken for settling the transactions has been drastically reduced increasing to large volumes exposures. The structure of

payment system determines the type of risk, who bears the risks and the vulnerability of the system. The fundamental problem of a payment system is weather promised payments will actually occur and the most basic concern should therefore be the extent to which the rules of the payment system encourage or discourage the fulfillment of payment obligations (Kahn, 1999).

The risks in RTGS differ from net settlement system. In netting, the thrust is on reducing the liquidity requirements thus inducing the economy of funds. To achieve the economy in funds use, a netting system delays the settlement of payments so that all orders remain pending until the net settlement payments are completed successfully. This delay feature creates distinct liquidity and risk management characteristics (Johnson *et all* 2004).

The risks on the payment system can be divided into two broad categories namely, settlement risk and systemic risk.

***Settlement Risk*[1]**

When a participant in payment system fails to meet its obligations due to other participants, it is known as settlement risk. Settlement risk exists in all LVPS. Almost all the risks are associated with the settlement of the transaction, but some of them may arise due to technical snag or frauds. The time gap between release and settlement of funds also affects the settlement risk. A system's risk depends on how likely a participant is to default on obligations to other participants or to the system's settlement institution (Martin 2005). Although the volume of LVT is less, but they are higher in total value, and hence are more important from the viewpoint of settlement risks. The efforts of regulators are mainly directed towards controlling settlement risks in LVPS. The settlement risk may appear in the following forms:

Credit Risk

Credit risk is the "risk that a counterparty will not settle an obligation for full value, either when due or at any time thereafter" (Bank for International Settlement, 1993). It is the risk that participants in the transaction will not be paid for an outstanding claim. The participants include the counterparties the issuer of the settlement medium and intermediaries. Credit risk typically arises where one of the participants become insolvent (Bergh and Veale, 1994). Cash flow shortfall may be an important reason for credit risk. The credit risk can be of two types: First Payer Risk and Receiver Risk.

First payer risk is the risk that the first payer may not receive the payment from the previous party. First payer is exposed to the risk until the payment for the previous party is received. Receiver risk arises when receiver assumes the payment to be final before actually receiving it consequently settles his obligations to counterparties.

The problem of credit risk is less acute in RTGS, since the settlements are final and instantaneous. The netting system faces the problem of credit risk, due to the settlements without finality until the period is over. The credit risk is acute in

[1] This section is largely based on Shen Pu, 1997, Settlement risk in large-value payments systems, Economic Review, Federal Reserve Bank of Kansas City, Second Quarter 1997.

case of foreign exchange transactions also. The working time of various payment systems may create a serious credit risk as in the case of 'Herstatt Risk[2]'.

Unwinding Risk

The unwinding risk arises because of revoking (unwinding) of payment instructions by the participants. It occurs due to settlement failure in a netting system. It should be noted the unwinding risk occurs only in net settlement systems because it allows revoking of payment instructions. Unwinding risk is a major concern for individual user as well as regulators of money market. In case of unwinding risk, the affected participant may become a first payer. The unwinding risk can affect many institutions. In contrast to credit risk, unwinding risk is hard to measure and even harder to manage without collective arrangements. Managing credit risk requires an individual user to know the credit worthiness only of its counter parties. Managing unwinding risk, however, requires an individual user to know the credit worthiness of all the members of the same netting system became unwinding could be caused by any member's default on its settlement obligations. The unwinding by one participant creates a chain reaction and alters the position of other members on the system.

The following set of tables explains the chain reaction and thus the unwinding risk arising out of unwinding in a net settlement system. Here we assume that banks use a netting system for settlement. Hence only the final position at the end of the settlement period will be considered. Let us assume there are four participants, bank A, B, C, and D on the net settlement system with individual debit and credit positions calculated in terms of million dollars. Their individual position at the end of the settlement period is given as follows (see Table 3):

Table 3
Liabilities in netting system of settlement before any unwinding

	A	B	C	D	*Total Debit*
A	---	20	10	15	*45*
B	---	---	15	10	*25*
C	30	10	---	10	*50*
D	25	10	10	---	*45*
Total Credit	*55*	*40*	*35*	*35*	
Total Debit	*45*	*25*	*50*	*45*	
Net Position	*10*	*15*	*-15*	*-10*	

Total liability of bank A is 45, of B is 35, of C is 40 and of D is 35 million dollars. Presuming that each bank has liquidity worth only 5 million dollars, and that bank D is not able to meet the liability therefore is allowed to unwind, the system may have a new positions. Once D unwinds, the net positions are recalculated and the new positions of remaining three banks will be follows (see Table 4):

[2] A famous example of foreign exchange settlement risk is the failure of Germany's **Herstatt bank**. On June 26, 1974, Herstatt had taken in all its currency receipts in Europe but had not made any of its US dollar payments when German banking regulators closed the bank down at the end of the German business day. Counterparties were left holding unsecured claims against the insolvent bank's assets. Consequently, settlement risk is sometimes called **Herstatt risk**. www.riskglossary.com

Table 4
Liabilities in netting system of settlement after D's unwinding

	A	B	C	*Total Debit*
A	---	20	10	*30*
B	---	---	15	*15*
C	30	10	---	*40*
Total Credit	*30*	*30*	*25*	
Total Debit	*-30*	*-15*	*-40*	
Net Position	*NIL*	*15*	*-15*	

Now B is in solvent state, A does not have either a liability or a due payment. C with a liability of 15 million dollars and reserves of only 5 million dollars will be asked to unwind. After the unwinding of C, positions will be recalculated and the net positions of remaining two banks will be as follows (see Table 5):

Table 5
Liabilities in netting system of settlement after D and C's unwinding

	A	B	*Total Debit*
A	---	20	*20*
B	---	---	*NIL*
Total Credit	*---*	*20*	
Total Debit	*-20*	*NIL*	
Net Position	*-20*	*+20*	

Note the sudden change in the positions of solvency when unwinding completes. The bank A, who was having a net receipt of 10 million dollar before any unwinding, had nil liabilities after first unwinding, and was subsequently became insolvent after next unwinding with a net liability of 20 million dollars as against a reserve of only 5 million dollars. The unwinding of C has created a critical situation for bank A, who so far was in sound position.

Liquidity Risk

Liquidity risk is the "risk that a counterparty (or participant in a settlement system) will not settle an obligation for full value when due. The chance of payment gridlock is the source of liquidity risk (Freixas et all 1999). Liquidity risk does not imply that a counterparty or participant is insolvent since it may be able to settle the required debit obligations at some unspecified time thereafter" (Bank for International Settlement, 1993), it is the risk that the participant's own funds will not be able to meet its payment obligation on time, thus adversely affecting the expected liquidity position of the recipients of funds.

It is the risk that payment instrument cannot be executed or settled inspite of soundness of parties. A bank could be financially in a sound position but may not be able to meet its payment obligations due to technical failure in the systems. It can also arise due to insolvency of counterparty in the system. The liquidity risk has special importance in case of payment system because the immediate liquidity at the time of settlement is extremely important. The liquidity risks are

more acute in RTGS systems, because gross settlement system needs more funds to settle, as the number of settlements are more and they takes place throughout the day.

Systemic Risk

Systemic risk is "the risk that the failure of one participant in a transfer (payment) system (or in the financial markets) to meet its required obligations will cause other participants or financial institutions to be unable to meet their obligations (including settlement obligations in a transfer system) when due. Such a failure may cause significant liquidity or credit problems and, as a result, might threaten the stability of financial markets" (Bank for International Settlement 1993). It is the risk that credit or liquidity problems incurred by one institution or some of the institutions lead to similar difficulties for others. Systemic risk can arise due to various other risks such as credit risk, liquidity risk, etc., but it is generally referred to the risk created due to settlement risk. Systemic problem results when the system collapses on complete unwinding.

Due to payment systems, a large number of financial linkages are established between participants. These linkages can be instrumental in spreading risks throughout the financial system. The risks can be greater and banks may be required to hold a large amount of liquidity with them in an uncertain environment. The ability to complete transactions, and confidence in counterparties to do likewise, underpins the smooth functioning of the payment systems. Inevitably, therefore, the payment system itself is a key channel for the transmission of shocks across institutions and markets. It is primarily the real costs associated with a systemic payment system crisis that explains public concern for the safety and soundness of the financial system in general, and the payment system in particular. Humphrey (1986) conducted a pilot study of systemic risk in net settlement systems. He found that default of one bank could lead to default of other banks, leading to a systemic crisis.

Measures to Control and Reduce Risk

With the increasing complexity of payment system and with simultaneous increase in the risks, there have been consistent efforts by authorities to device methods to control risks. Most of these efforts are directed towards controlling settlement risk and systemic risk. Some of the methods of controlling or reducing risks are:

Intraday Credits

The banks do not wish to forego the interest benefits blocking funds in larger amount of liquidity holdings. Also, the liquidity with an individual bank may not be sufficient to cover the risk for the entire system. The liquidity risk can be reduced by intraday liquidity by central banks. The cover can be provided by either collateralized loans or daylight overdrafts, as provided by Fed wire in USA. In case of treasury securities, the underlying securities are used at collateral. The daylight overdraft does not require any collateral and it minimizes the liquidity risk. In RTGS systems, the collateral protects the central bank, whereas in DNS systems, it protects the participants (Martin, 2005).

The method of daylight overdrafts can be costly for central bank. In real sense the daylight overdraft are the loans to participating banks. By providing a daylight overdraft, the central bank is exposing itself to credit risk that participating bank may fail to pay up. Inspite of this, the central bank is generally ready to take up the credit risk, because the

cost of systemic risk and liquidity crunch will be higher.

The efforts of central bank to limit systemic risk may encourage undesirable risk taking by bank. Due to the safety cover provided by the central bank, participant banks may develop a careless attitude leading to greater risk exposures. This problem of provision of daylight overdraft has been termed as a 'moral hazard'. The participating banks tend to take greater risk due to certainty of availability of daylight overdraft. An intermediate solution to this problem is charging a small 'fee' and fixing a limit on daylight overdraft to discourage the participating banks from misusing it. Moreover a progressive fee structure may prove to be a deterrent for the members who borrow freely.

Bilateral Credit Limits

The credit limits can take three forms. Firstly, bilateral net credit limits restrict the maximum amount of daylight overdraft exposure an institution can have with any other single institution. Secondly, system net debit sender caps limits restrict the overall net debit position an institution can have with respect to all other institutions in a system. And finally, cross-system net debit sender caps limits restrict the overall net debit position an institution can have with respect to all other institutions on all the wire transfer payment systems on which it operates. In netting system, it is the source through which all obligations arise, as payments are not settled until the end of settlement period. Lateral credit limits cap the maximum receiver risk. For a multilateral transaction system a debit limit is set specifying the maximum aggregate net amount an institution can owe to all other participants. The multilateral debit limit can be the sum of all bilateral credit limits on the system.

Collateral Requirements

A system can ask a participant to keep collateral in a system account which can be equivalent to the total multilateral debit limit, thus minimizing the risk to zero. The settlement thus will have zero settlement risk, and also minimum unwinding risk. But such situations are ideal situations which cannot be implemented in practice due to the very high cost of collateralization. The bank keeping collateral securities although will earn some interest on them but will still be losing some income because the interest income on collateral would be much less than that on other kinds of assets such as corporate bonds or consumer loans. Some of the European central banks have been providing only fully collateralized loans.

Loss Sharing Agreements

In case of failure of a participant to meet its payment obligations, all the other participants can share the loss as per a pre-determined agreement. Due to such an arrangement, there may not be a need to keep collateral to the extent of multi lateral debit limits. The participant may be required to maintain collateral only to the extent of individual share according to the loss sharing agreements. The loss sharing agreement will also help in toning down the chain reaction of a failure, thus reducing the unwinding risk. The participants may misuse the loss sharing agreement and tend to go for larger volumes of bilateral credits because they are not required to bear the full cost of default. A solution to this can be in the form of connecting the shared loss to the bilateral credit limit.

In October 1990 CHIPS implemented loss-sharing agreement. Under the agreement

every member bank will pay an agreed amount if a participant fails to settle. The amount of loss-sharing of all the members other than defaulting member can be calculated as per the rules framed by New York Clearing House Association as follows:

$$\alpha = \beta \times \frac{h_i}{\sum_{i=1}^{n} h_i}$$

Where

α = the amount of collateral owed by the banks individually other than defaulting bank.

β = net debit balance owed by the failed participant

h_i = the highest bilateral credit limits granted by all the remaining banks to the failed bank

$\sum_{i=1}^{n} h_i$ = the sum of all the highest bilateral credit limits granted by all the remaining banks to the failed bank

Shortening of Time Lags

Reducing time lag in settlement can be a very useful method of reducing risk. Most of the large-value interbank funds transfer systems follow same-day settlement procedures. With the shift to RTGS systems, the exposure time is practically reduced to zero. In RTGS systems, the settlement takes place in real-time, thus eliminating the risk to a great extent.

Delivery versus Payment (DVP) System

DVP eliminates the credit risk inherent in a transaction because it requires finality of both the payments at exactly the same time. DVP is possible only in RTGS payment system. It is generally used for government security market. Although DVP eliminates credit risk but it is costly to implement. The cost of developing infrastructure in form of computer and data processing facilities is a prohibitive factor. DVP system has raised doubts that it could exacerbate systemic risk. DVP allows a liquidity shortage in a payment system to tie up one clearing process with another in a linked system. A DVP will not only spread risk to payment system on one clearing house but also to the other clearing houses.

The relative merit of a particular measure to control risk depends on the nature of payment system, the extent of central bank intervention in the system, the mode of settlement, the development of the financial market etc. A standard set of measures cannot be applied to all the payment systems. Constant supervision is also necessary to modify the method of controlling risk regularly.

Conclusion

In this paper an effort has been made to identify various risks involved in the LVPS. The nature of the risk depends on various parameters, such as parties involved, mode and

time of settlement and extent and type of technology used. The main risks identified are the Systemic and the Settlement risks. A brief overview of the measures to control and reduce risks is also discussed. It can be concluded that the institutional support such that of central bank seems prerequisite and crucial in making payment systems and thus settlements safe and less risky.

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