Risk and Risk Management in Payment Systems

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Agenda: The Ws and H of PS Risk and their Management

- What
- Why
- Who
- How

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OUTLINE

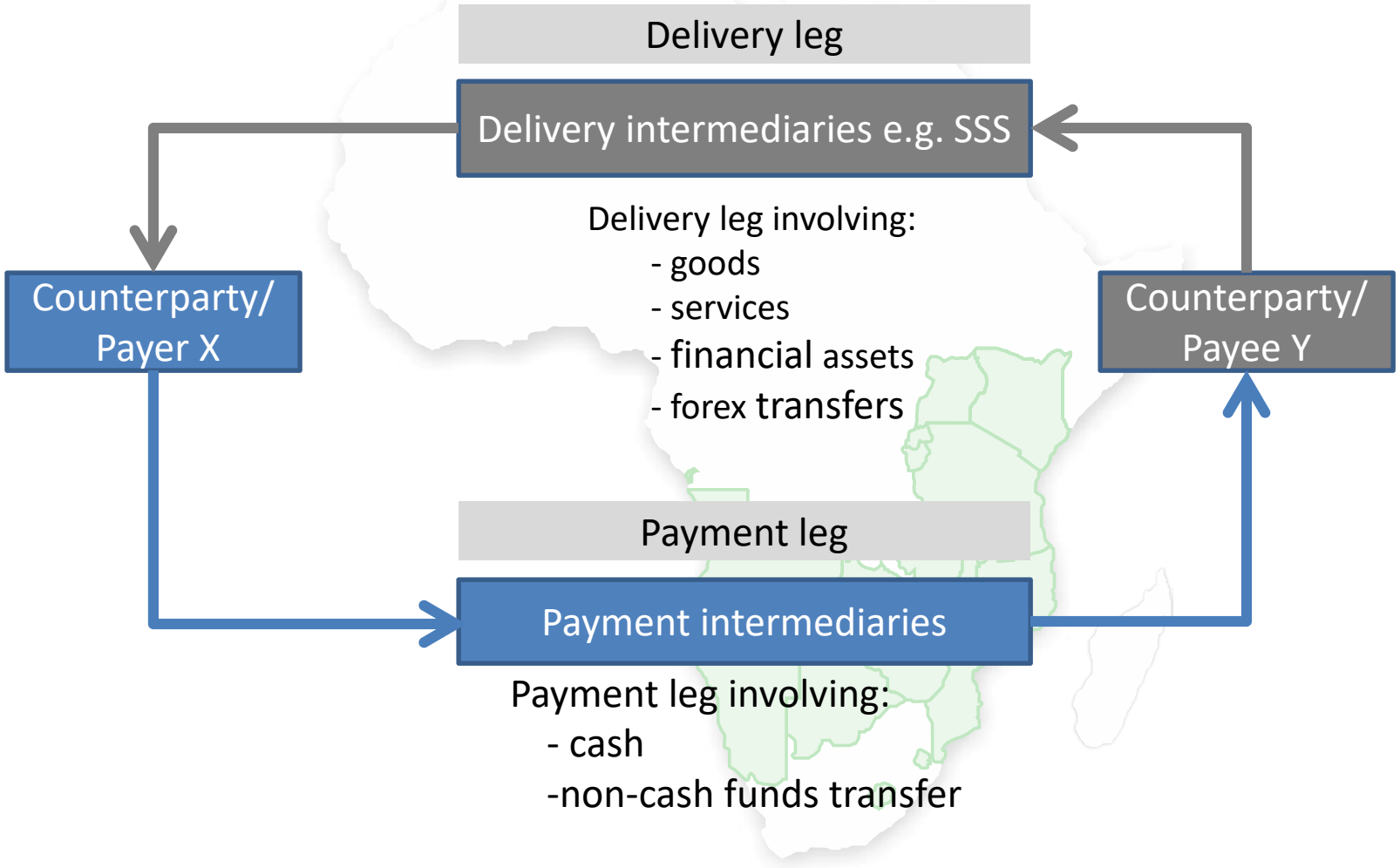
- Scene Setting
- The Nature of PS Risks
- Risks in Large Value Payment Systems
- Risks in Retail Payment Systems
- Risk Management in Payment Systems
- Conclusion

SCENE SETTING: THE NATURE OF PS RISKS

Taxonomy of risks

- Discussion of PS risks focuses mainly on:
  i. Interbank fund transfer systems (because of risk concentration)
  ii. Analysis of risks connected with execution of transactions (payments)
- To fully understand the various types of risks and their relationship, one needs to analyse the transactions which give rise to the fund transfers
- The transaction leading to a payment is typically a contract necessitating some form of exchange between two parties

SCENE SETTING:
THE STRUCTURE OF EXCHANGES



SCENE SETTING:
THE STRUCTURE OF EXCHANGES

- Each exchange (from initiation to finality) involves risks for the counterparties (X,Y) and for any intermediaries taking part in the payment leg (payment intermediaries) and in the delivery leg (delivery intermediaries)
- Risks may be at level of individual payment or aggregated payments level
- Some causes of failure to settle:
  - financial status of participant, fraud, operational failure

SCENE SETTING: DEFINITION OF RISK

- The likelihood of losses or bad consequences arising from a particular action/inaction
- The possibility that a particular expected outcome may not materialise thereby generating losses of one sort or another

A. TYPES OF RISKS IN PAYMENT SYSTEMS

Arises in relation to certainty as to how the system operates and rights and responsibilities of the various participants

Arises in relation to system malfunctions and abuses. It includes security risk

Arises in relation to certainty of settlement and finality of payments

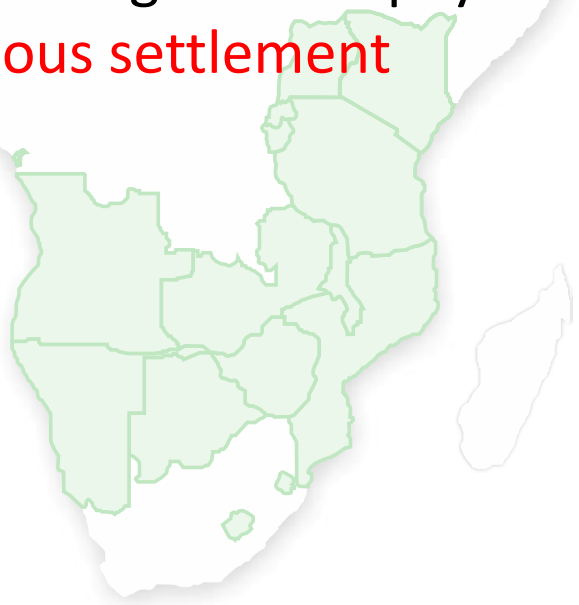
- Credit Risk
- Liquidity Risk
- Unwinding risk
- Systemic Risk

1. ECONOMIC RISKS

- Economic risks:

- Risks that arise in relation to finality of payment/settlement
- Finality is when a payment /settlement cannot be revoked or reversed

- Economic risks arise from time lags in the payment process; settlement lag and asynchronous settlement



Sources of Economic Risks/…

1. Settlement Lag

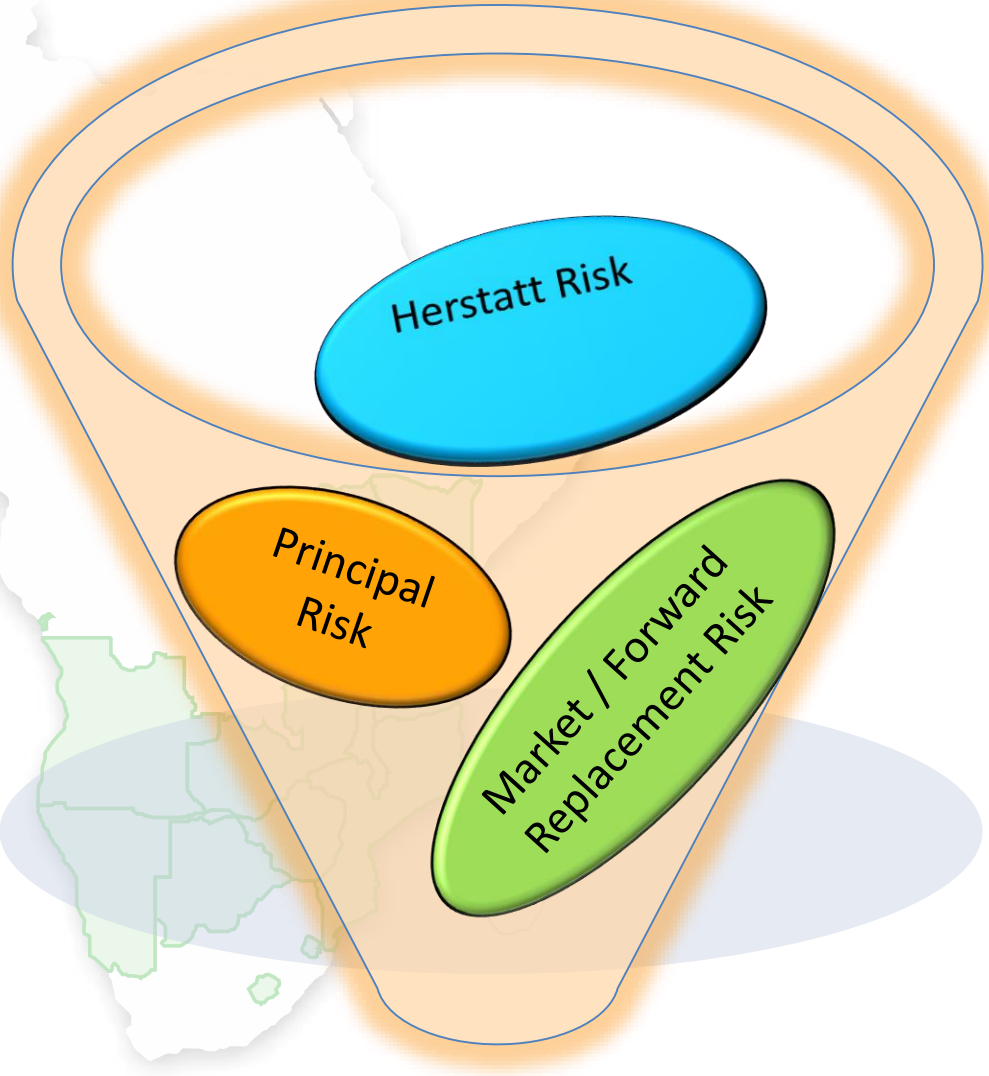
- Lag between the time that a contract is entered into or that a trade takes place **and** the payment and delivery
- There could be a counterparty failure or cancellation during this period

2. Asynchronous Settlement

- Payment and delivery not occurring simultaneously
- Also from default on the settlement medium

CREDIT RISK

- The risk that a payer or netting system participant will be unable to settle obligations for full value when due or at any later time.
- Such risks manifests in different forms: principal, forward replacement (market) and herstatt risks



FORMS OF CREDIT RISK

a) Principal risk

The risk of losing the entire value of the funds

- First payer risk
  - the risk that the party who pays first might not receive the payment or asset from the counterparty

b) Market or forward replacement risk

- The situation whereby a buyer in a securities deal/contract fails before honouring its part of the transaction
- Meanwhile, the price would have moved adversely against the seller – the risk being difference between the new market price and the original contract price

Forms of Credit Risk/…

c) Insolvency / bankruptcy

- Winding up of an entity due to mismanagement, fraud, market conditions

d) Herstatt Risk

- Alternative term for settlement risk with particular reference to FX trade
- Situation where one party in a forex trade pays out the currency it sold but does not receive the currency it bought
- Sometimes its due to differences in time zones

LIQUIDITY RISK

- The risk that a participant will fail to meet an obligation for full value when due but at a later stage
- In an RTGS system, such an instruction cannot be executed
- In a DNS system, the net debit positions cannot be settled due to temporary lack of funds/ liquidity
- Liquidity risk is relatively high in RTGS systems because of gross settlement aspect

FORMS OF LIQUIDITY RISK

- Liquidity risk arise from a number of situations:
  - Failed delivery by a counterparty (non- receipt of expected funds
  - Technical or administrative problems
  - Market conditions
- Frequent recurrences signal some underlying problems

UNWINDING RISK – IN MULTILATERAL NETTING SYSTEMS

- Unwinding is the reversal of a failed participant's transactions for that day
- Outcomes
  - Disruptive
  - Concerns of confidence
  - Possible liquidity problems and losses for other participants
  - Systemic problems could result

MULTILATERAL NETTING & SETTLEMENT ARRANGEMENT

a. Multilateral Netting Matrix – Before Unwinding

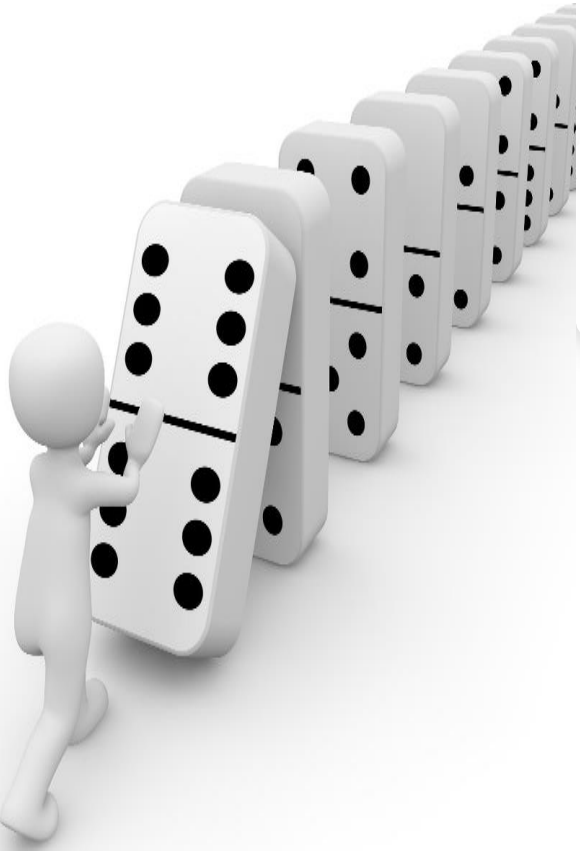
Collecting Banks (Sending)	Drawee Banks (Receving)					Total in clearing (obligations)
	P	T	R	C	K	
P		20	125	80	60	285
T	30		95	45	35	205
R	55	45		60	40	200
C	75	105	10		155	345
K	70	75	30	20		195
Total out-clearing (Claims)	230	245	260	205	290	1230
Less: Obligations	285	205	200	345	195	1230
Net Position	-60	35	55	-140	95	0
Avail. Balance at Central Bank	Cr. 110	Cr. 50	Cr. 40	Cr. 35	Cr. 20	

MULTILATERAL NETTING & SETTLEMENT ARRANGEMENT

b. Multilateral Netting Matrix – After Unwinding

Collecting Banks (Sending)	Drawee Banks (Receving)					Total in clearing (obligations)
	P	T	R	C	K	
P		20	125		60	205
T	30		95		35	160
R	55	45			40	140
C						
K	70	75	30			175
Total out-clearing (Claims)	155	140	250	0	135	680
Less: Obligations	205	160	140		175	680
Net Position	-50	-20	110	0	-40	0
Avail. Balance at Central Bank	Cr. 110	Cr. 50	Cr. 40		Cr. 20	

SYSTEMIC RISK



- The “domino” or chain reaction effect of the inability of one or more participants to settle thereby causing other participants not to settle their own obligations
- Failure of one participant (or more) could lead to the failure of others
- This could trigger domestic and international crises
- Systemic risk is a major concern for Central Banks and other regulators of the financial system

Systemic Risk/…

- If uncontrolled, liquidity and credit risks could lead to systemic failure with devastating effects on both domestic and cross border economies
- Common indicators include recurrent failure to meeting clearing and settlement obligations by participants

2. OPERATIONAL (INCLUDING SECURITY) RISK

- This covers the possible consequences to a payment system participant should it suffer some calamity thereby being unable to function

- Sources
  - System malfunctions and abuses
  - Conditions of infrastructure e.g. utility services
  - Prolonged settlement cycles (delays in establishing finality)
  - Deficient internal controls
  - Human errors
  - Security concerns (fraud, counterfeiting etc.)

3. LEGAL RISK

- Arises in relation to certainty as to how the system operates and rights and responsibilities of the various participants
- Certainty as to what should happen in different circumstances
- Ultimate legal obligations
- Ultimate legal settlement obligations
  - Gross vs. Net
- Book entry systems
  - Immobilisation/dematerialisation
  - Electronic marking
  - Insolvency and bankruptcy – implications

SOURCES OF LEGAL RISK

- Unclear rules and agreements
- Netting arrangements not legally recognized
- Bankruptcy administrator may challenge positions and liquidation of defaulting member's assets
- Legal disputes that delay settlement can give rise to liquidity, credit and possibly systemic risk
- Can also lead to failure of financial institution
- New payment instruments usually not supported by legal foundation

4. OTHER RISKS

1. Reputational Risk

- This is the risk that negative publicity regarding an institution's business practices will lead to a loss of revenue or litigation
- Sources
  - Customer expectations
  - Not meeting regulatory and consumer protection obligations
  - Failure to conduct business securely and responsibly
    - Reputation can be tarnished irrevocably

Other Risks/…

2. Strategic Risk

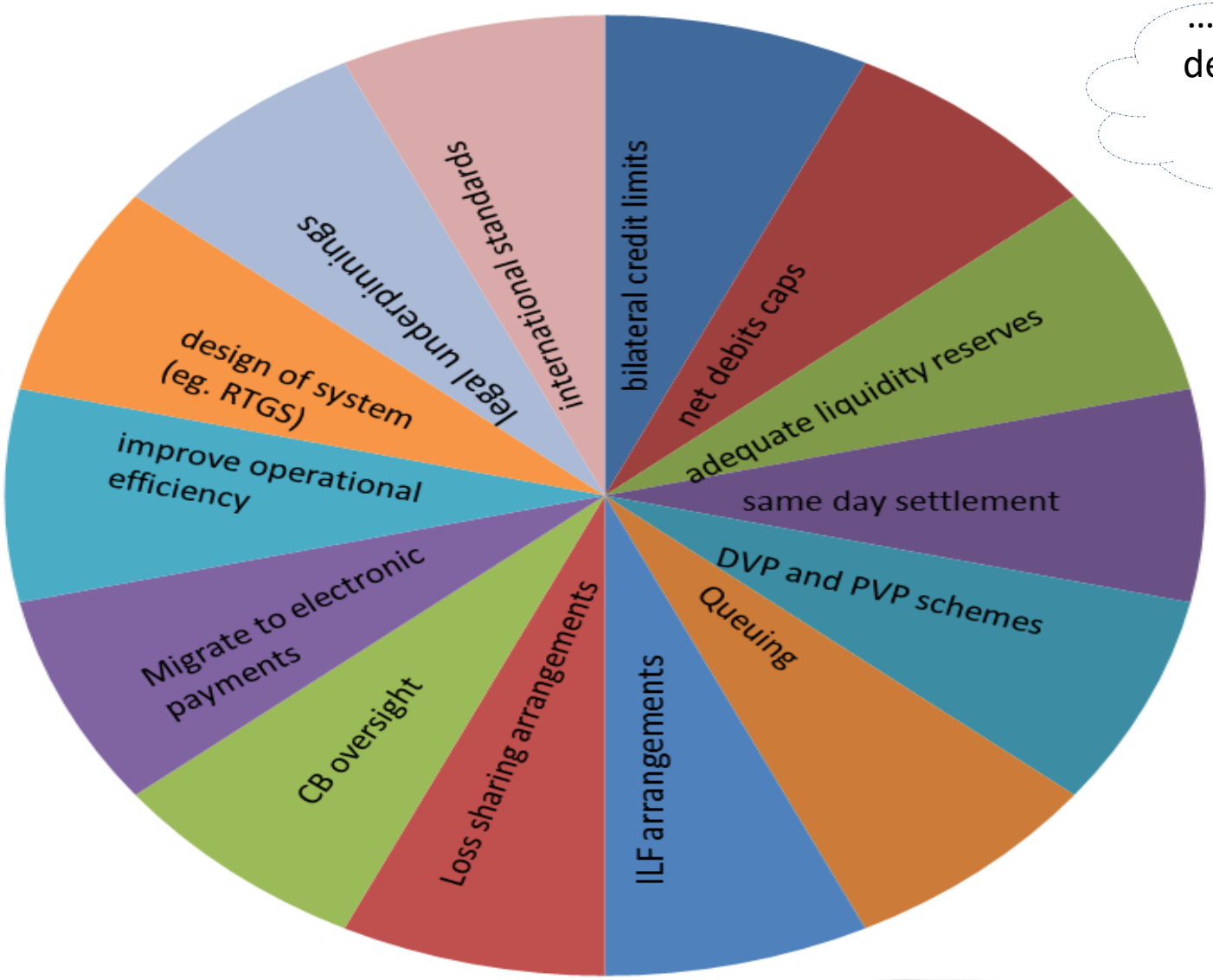
- This is the risk associated with the financial institution's future business plans and policies
- Sources
  - Lack of new product acceptance by consumers
  - Expanding existing business through mergers and acquisitions
  - Competition benefits consumer through enhanced product offerings at lower cost
    - Additional pressure on FI to protect profitability

Other Risks/…

3. Situational/circumstantial Risk

- This is the risk associated with the financial institution's future business plans and policies
- Sources
  - Lack of new product acceptance by consumers
  - Expanding existing business through mergers and acquisitions
  - Competition benefit consumers through enhanced product offerings at lower cost
    - this exerts additional pressure on a financial institution to protect profitability

MANAGING PAYMENT SYSTEMS RISKS



…choice of option depend on system and risk to be contained

1. MANAGING PAYMENT SYSTEMS RISKS IN LVPS: RTGS SYSTEMS

- The nature of transactions in an LVPS and their importance to the economy compels overseers to institute risk mitigation measures so as to ensure smooth operation of these systems.
- In RTGS systems, the system design and features of a real time gross settlement (RTGS) system helps in the management of some of the risks

RTGS SYSTEM DESIGN AND MANAGEMENT OF LVPS RISKS

i. Real time aspect

– eliminates settlement lags

ii. Settlement finality

– precludes unwinding and hence systemic risk from knock-on effects of recalculated positions in net settlement systems

iii. Prefunding of settlement accounts (credit push)

- eliminates settlement lags and mitigates liquidity and credit risks

iv. Settlement assets (central bank money)

- Central Bank money carries little or no credit risk

RTGS System Design/…

v. Continuous gross settlement

-individual fund transfers are settled on a continuous basis throughout the day without netting debits against credit

-Eliminates settlement lags

vi. Liquidity management features

- Queuing

– eliminates liquidity risk

- Gridlock resolution mechanism

- eliminates liquidity problems that persist even after queuing

vii. Possibility of integration with other systems for DVP and PVP

- eliminates asynchronous settlement in value-for-exchange systems

RTGS System Design/…

Other controls

- Limits on daylight overdrafts (to avoid abuse)
- Full collateralisation of daylight overdrafts
- Pricing daylight overdrafts
- Good treasury management practices
- Central Bank oversight

1. Managing Payment Systems Risks in LVPS: 2. Multilateral DNS

- Note: In DNS systems payments are batched and settled at predesignated periods usually at the end of the day
- This exposes the systems to liquidity, credit, settlement risk etc.
- Mitigating measures in Multilateral DNS include:

i. Bilateral credit limits

-a bank indicates the maximum amount it can pay to another bank within the netting arrangement

ii. Net Debit Caps

- where a participant is allocated an overall debit position

iii. Limits on daylight overdrafts

iv. Loss sharing arrangements e.g. Survivors Pay

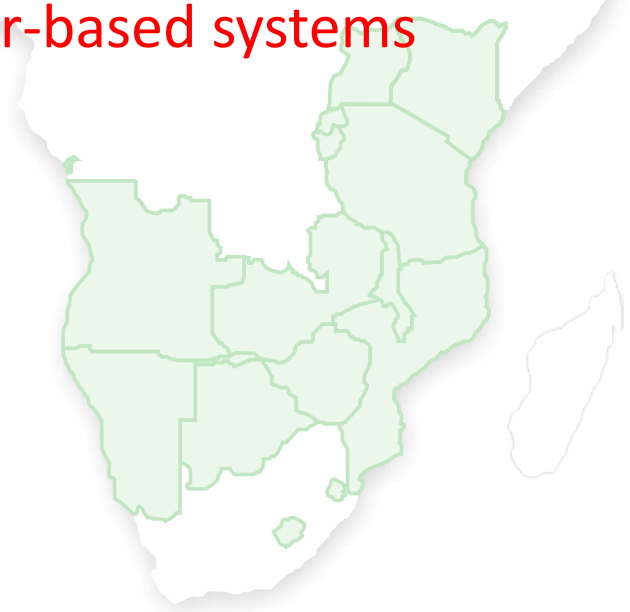
2. MANAGING PAYMENT SYSTEMS RISKS IN LVPS: MULTILATERAL DNS

v. Indemnification agreements

- Whereby the Central Bank guarantees that it will fund the failed participant's net obligations
- This guarantees finality of settlement at the end of the day

vi. Same-day settlement

vii. Reduced reliance on paper-based systems



MANAGING PAYMENT SYSTEMS RISKS IN RETAIL PAYMENT SYSTEMS

- Legal underpinnings
  - Clearly outline the rights, responsibilities and obligations of the various parties to a transaction
  - System design - credit push vs debit pull instruments
- Migration - cash and paper based to electronic
- Security controls

- High level security features in physical payment instruments
- Authentication, encryption of messages, passwords, backups
- Restricted access to facilities, Dedicated communication lines Good banking practice

- Central bank liquidity assistance (lender of last resort)
- Credit limits and loss sharing arrangements
- Central Bank oversight

…but, controls can fail – be on the look out!

Some of the reasons that risk controls breakdown:

1. Blind Trust: believers vs doubters
2. Wilful Blindness: I choose to see vs. I choose to ignore
3. Ignoring Controls: implications on policies, procedures
4. Not Questioning: the strange, the odd, the curious
5. Situational Incompetence: people in wrong positions
6. Insufficient information to verify transactions
7. The process mentality
8. Insufficient time to do the control procedures
9. Subordination of needs / human greed
10. Those in charge are CROOKS

CONCLUSION

- Payment systems involve risk
- Proper management is critical to avoid financial system instability
- Generally poor perception or underestimation of risk by participants
- Central banks still carry some risk from the market
- Payment systems should be strong enough to help minimize the effects of a crisis, rather than themselves adding to the crisis
- In managing payment system risks, overseers tend to employ different techniques depending on their history, experience, perceptions, current objectives and capabilities.

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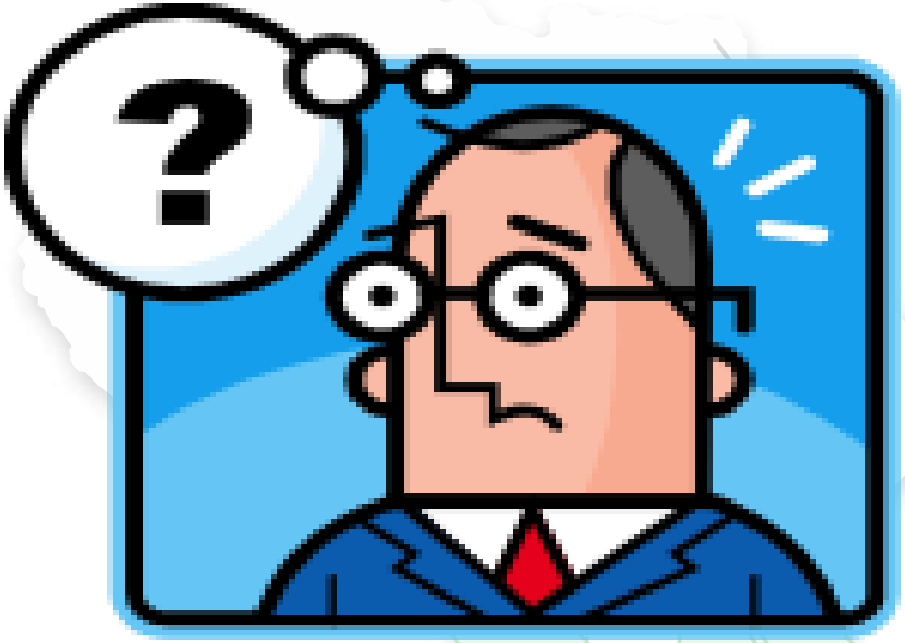

QUESTIONS