Risk in payment and settlement systems

A discussion of three papers

by Cyril Monnet (ECB).

- Risk is pervasive. How to deal with it?

- Modify the rules of the game to reduce risk...

  1. Introduce collateral
     (Mark Manning & Matthew Willison - cross-border use)

  2. Design a system that is most resilient to shocks
     (Giulia Iori, Johan Devriese & Janet Mitchell)

- ... But also change participants' incentives.
  Kahn and Roberds (1998): "Small variations in settlement procedures can result in significant changes in bank incentives and ultimately bank behavior".

- What types of incentives should we consider?
  - incentives to default
  - incentives to trade

I. Cross-border use of collateral (Mark Manning and Matthew Willison)

- In the Eurosystem, cross-border use of collateral now represents 41% of total collateral.

- Main trade-off in collateral choice:
  cost *versus* fungibility.

- cost and fungibility are exogenous... but they should interact:
  - Adding fungibility modifies the properties of collateral.
  - Price of a more fungible collateral higher.
  - **In equilibrium**, it is not clear that more fungibility implies market players are better off holding the more fungible asset.

- Example: Single List of eligible assets.
  Including assets in the single list could increase their price by 0.05%.

- Modelling incentives to trade may affect free rider result.
  If country A accepts collateral B,
  collateral B more expensive,
  cheaper to trade in country A,
  B does not benefit from not accepting collateral A.

Other comment :

- Market for collateral is Pareto improving (shock negatively correlated). Somehow shut down.

II. Systemic risk in alternative SSs architecture (Giulia Iori)

- Another focus: **Settlement frequency and systemic risk**.

  Number of shares: S

  Length of trading cycle: W (=7: one working week, say)

  N settlement intervals during week, with length: W/N.

  Typically, W/N=1 (i.e. all day trades have to be settled).

  λ: probability of a trade per unit of time.

  μ: probability that there is a settlement delay. $\tau \in (0, \tau_M)$.

- Timing of settlement (trade+1,2,3 days - as in Devriese/Mitchell) not an issue,

  Rather the number of trades that have to be settled is.

- Within each batch (each W/N), we have real time settlement...
  Giulia interprets $N \to \infty$ as real time settlement.
  I interpret $N \to \infty$ as more frequent settlement.

- ... But settlement can be delayed by τ.
- Gross settlement: Default if $t + \tau > T/N$.

- Increasing N has 2 effects (trade-off):
  – less trades to settle (as trading day shorter),
  – more probability to have a default (as τ_M is given)

Given technology, what is the **optimal mechanism**?

- Pull all trades in a batch together and settle them at the start of the following batch.
  The length of a batch N is set such that $W/N > \tau_M$ (no default ever occur).

- Interestingly, looks like T+1 to me...

Introducing **cost of default**,
why would players take the risk to trade late?

Other comments:

- Net system: Defaults are defined by defaults that would have occurred IF we were under gross settlement (and then net trades).

- Why not another netting algorithm?

  1. Net position n_i calculated at end of trading day W/N - ε.

  2. On each position to be settle, probability μ to have a delay $\tau \in (0, \tau_M)$.

  (I could not map Giulia's mechanism into this one).

III. Liquidity risk in securities settlement (Johan Devriese and Janet Mitchell)

Study both cash and securities leg of settlement.

Look at how a default affects trading and settlement dynamically (i.e. in days following settlement).

Provision of intraday credit. Trades are given.

Worst case scenario

1. "largest participant" (highest trading volume) defaults
2. largest participant dies.

On the effects of not modelling trade:

- Trades are 'decided' on the basis of expected holdings of securities and cash at settlement time.

- Conservative expectations and credit are partial **substitutes**.

- When trading is a choice variable (and there is cost of default), following default:
  - rationally expect low holdings,
  - low trade today,
  - need large liquidity supply

- conservative expectations and credit are rather **complement**, as conservative expectations imply few trades.

- 09/11 ample liquidity supply from Fed.

Conclusion

- All papers are about the properties of some given systems.
- What frictions can explain features we observe?
- How to design our systems better?