

OPERATIONAL RISK IN THE ROMANIAN RTGS - a simulation approach from financial stability perspective -

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Outline

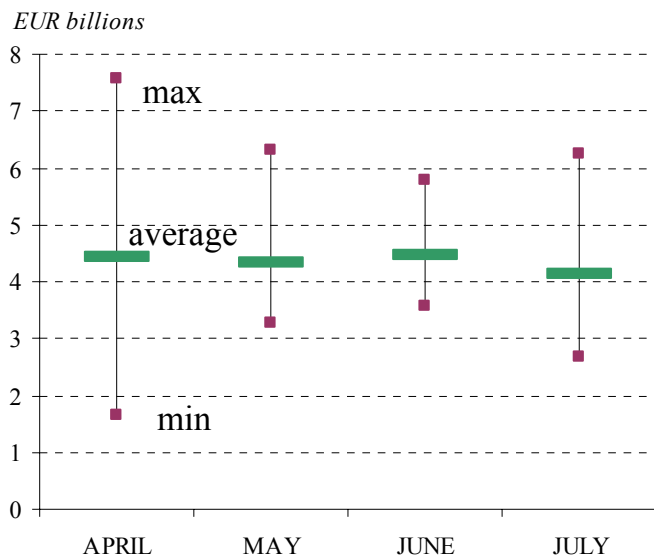
- Why financial stability cares about ReGIS payment system?
- Statistics on ReGIS payment system for April – July 2009
- Domestic financial system distressed in October 2008
- Operational risk in the payment system
- Simulator BoF – PSS2 (software developed by Bank of Finland)
- Stress test scenario
- Conclusions

Why financial stability cares about ReGIS payment system?

- ReGIS is a systemically important payment system → it settles transactions critical to the economy → the problems arising in ReGIS may cause problems in the whole domestic financial system
- A smooth operation of payment system facilitates transmission of central bank monetary policy to real economy
- A sound payment system insulates and absorbs financial shocks, minimizing their impact on real economy
- A smooth and safe functioning of payment system relies on a healthy financial system (at both level - institutions and markets)

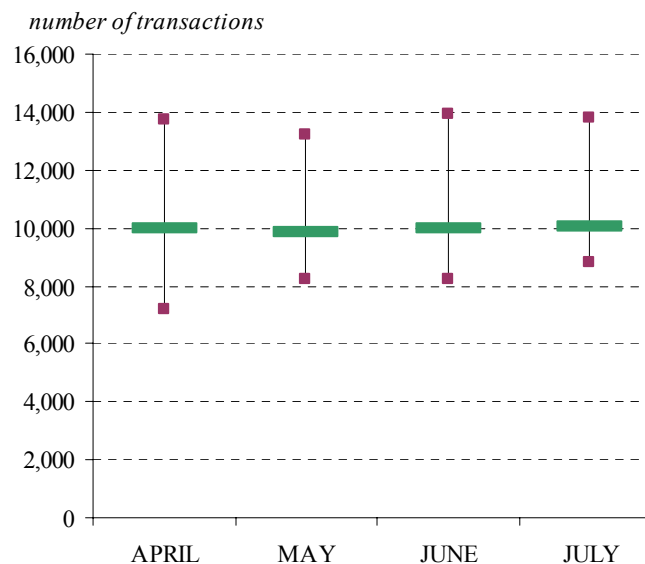
Statistics on ReGIS payment system for April – July 2009

Total value of daily payments



Source: National Bank of Romania

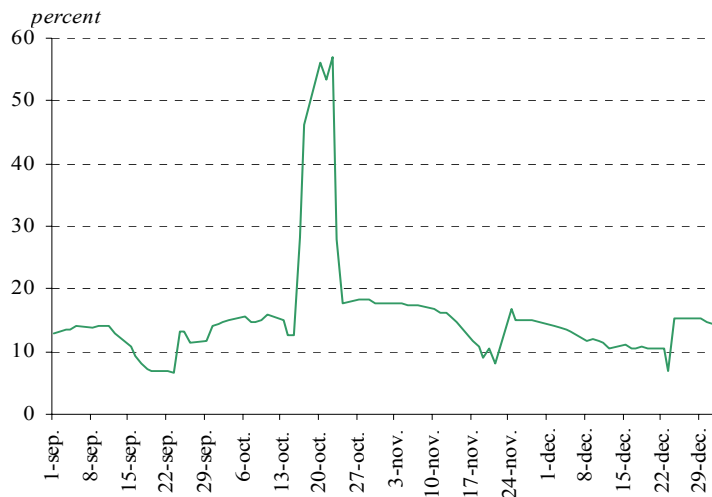
Number of daily payments



Source: National Bank of Romania

Domestic financial system distressed in October 2008

ROBOR-ON (over night interest rate)
September – December 2008



Source: National Bank of Romania

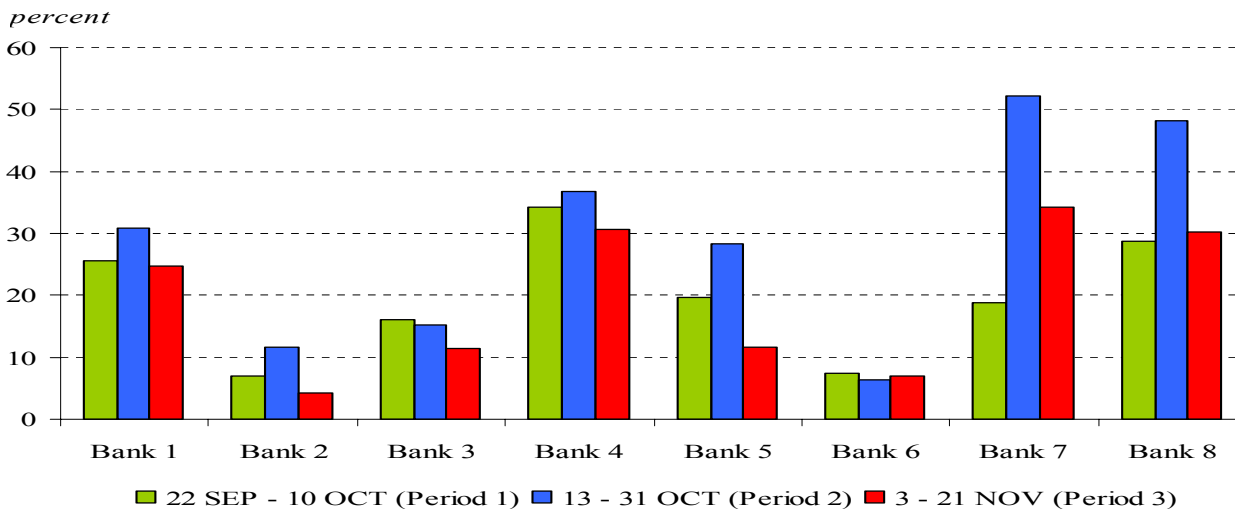
Extensions of ReGIS transitioning
schedule

Date	Schedule extension
16 October 2008	5 min
17 October 2008	1h and 25 min
20 October 2008	20 min
23 October 2008	10 min
24 October 2008	5 min
31 October 2008	50 min

Source: National Bank of Romania

Domestic financial system distressed in October 2008 (cont.)

Intraday volatility of the account balances for the first 8 participants
in ReGIS payment system



Source: National Bank of Romania

Domestic financial system distressed in October 2008 (cont.)

Relative bilateral transactions for the first 8 participants
in ReGIS payment system, sorted in the first column

	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8
Bank 1	-							
Bank 2		-						
Bank 3			-					
Bank 4				-				
Bank 5					-			
Bank 6						-		
Bank 7							-	
Bank 8								-

Note: With green color are marked the higher values of bilateral transactions in period 2 (13 – 31 October 2008), comparing to period 1 (22 September – 10 October 2008) and period 3 (3 – 21 November 2008) and with red color are marked the lower values of bilateral transactions in period 2, comparing to periods 1 and 3

Source: National Bank of Romania

Operational risk in the payment system

Covers a lot of business areas and poses real threat to payment system stability:

- Employee errors
- Technology problems (operational errors, unauthorized use of technology)
- Hardware failure
- Security (hacking, external disruptions)
- Software (computer virus, programming bug)
- Systems (system maintenance)
- Telecommunications failure
- Natural disasters

Operational risk in the payment system (cont.)

Multiple business continuity arrangements....:

- Secondary processing site
- Contingency procedures and bilateral arrangements for performing critical functions
- Crisis management teams
- Business impact analysis
- Back- up facilities
- Possibility of central bank to submit payments into the system if one or more participants fail to access directly the IT platform

Operational risk in the payment system (cont.)

...BUT sizeable losses may arise because:

- Risks can only be mitigated, not completely removed
- Participants can behave irrational during distress events (refuse to announce the problem, get panicked)
- Business continuity arrangements may fail simultaneous
- In many cases there is no experience with extreme events (successfully tests of contingency plans can create a false image of real capacity to deal with problems)

Operational risk in the payment system (cont.)

Coordinates of our approach:

- Objective: to test the ability of ReGIS payment system to absorb liquidity shocks triggered by operational incidents
- Instrument: stress test scenario
- Data available: account balances at the beginning of the day and transactions for April – July 2009
- **Tool: Simulator BoF-PSS2**

Simulator BoF – PSS2 (Bank of Finland)

- Support a large variety of general system structures (RTGS, CNS, DNS)
- Replicates the payment system operations in real time
- The payment order processing options are defined by selecting appropriate algorithms
- Input parameters: transaction flow, available liquidity, credit limit, bilateral limits, etc.
- Output parameters: liquidity consumption, settlement volumes, gridlock situations, queuing time, etc.
- Comprehensive presentation provide by Leinonen and Soramaki (2003)

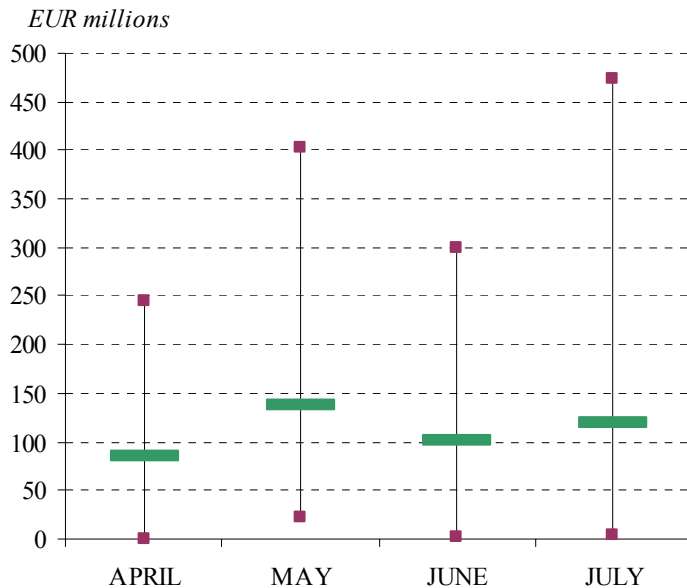
Stress test scenario

Assumptions:

- A malfunction at IT system cut the access of the most important participant in the payment system, therefore it cannot submit payments anymore
- The other participants do not observe the incident and continue to submit payments to the disrupted participant (a “liquidity sink” takes place, Glaser and Haene (2008))
- Payment orders can not be postponed for the next day

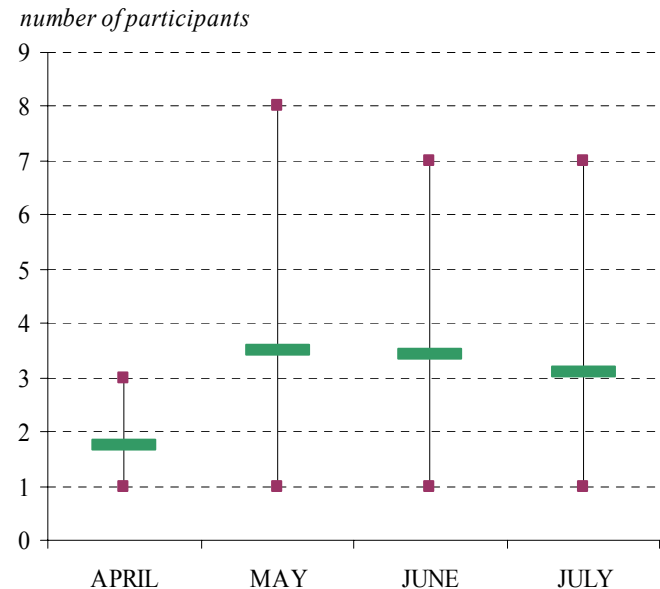
Stress test scenario (cont.)

Maximum daily queues



Source: National Bank of Romania

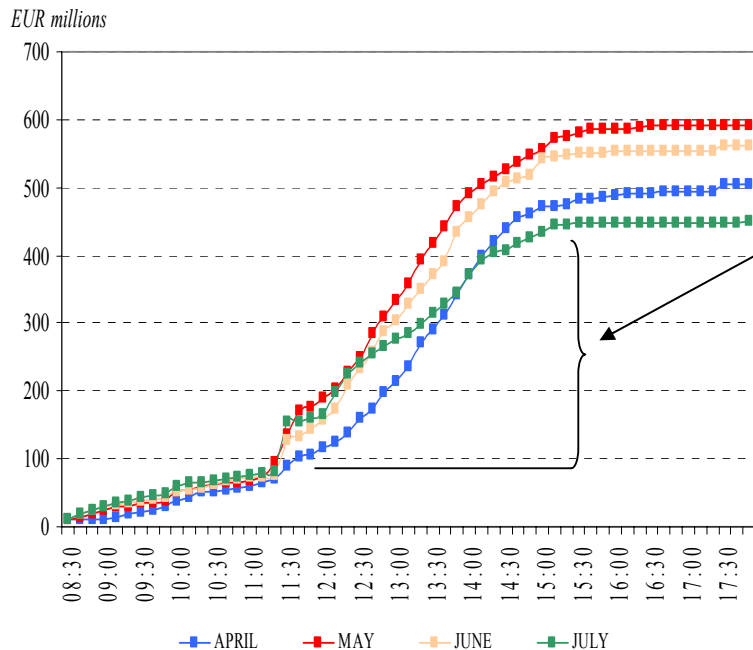
Maximum daily participants with queued payment orders



Source: National Bank of Romania

Stress test scenario (cont.)

First participant payment behavior during the day



Payment system is put under severe pressure approximate between 11:30 and 15:30

How payment system behaves:

when liquidity deficit mounting significant

during the end of day when liquidity shock intensity slumps

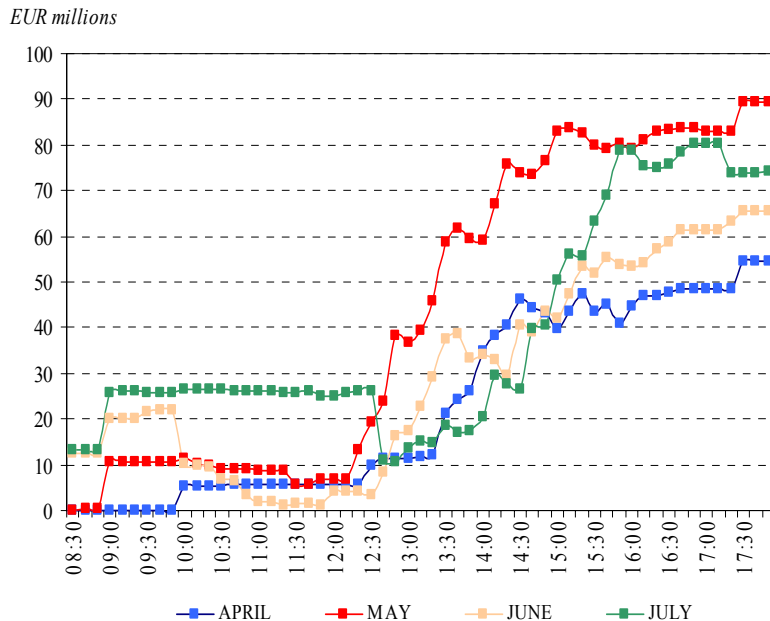


Source: National Bank of Romania

Stress test scenario (cont.)

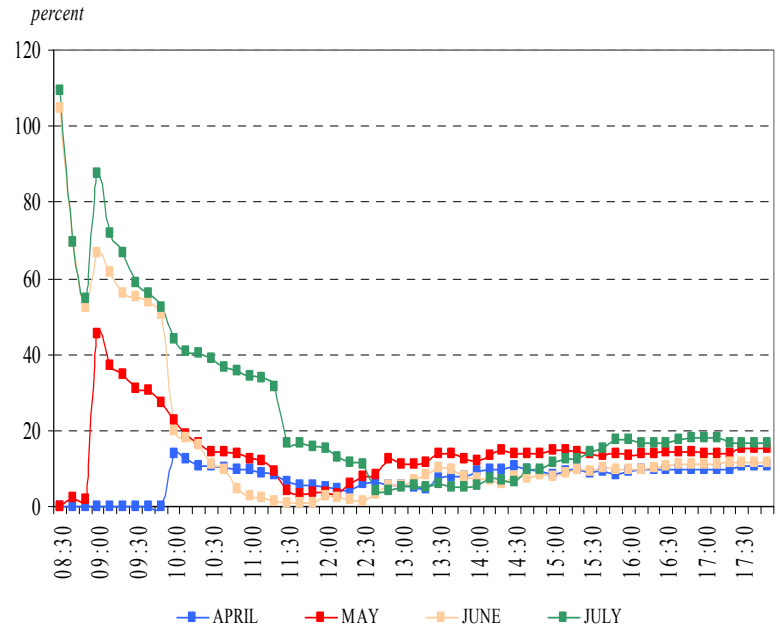
Shock transmission through payment system during the day

Total queue values



Source: National Bank of Romania

Impact relative to non injected liquidity



Source: National Bank of Romania

Conclusions

- Global financial crisis caused imbalances in ReGIS payment system, but their intensity was low; notwithstanding, the last fall shock has produced structural changes in liquidity flow into the domestic banking system.
- Payment system reveals significant resilience to a severe liquidity shock; value of unsettled payment orders is low.
- Participants has incentive to delay high value payments mainly for cost reasons and their behavior increases liquidity risk in the second half of day.
- The settlement risk is close to zero because central bank provides liquidity whenever is necessary, but participants must own enough collateral.
- Liquidity tensions can boost interest rates and compress money market, with direct impact on real economy.

Thank you!