Stress simulations: A Dutch case

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Outline

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- TOP and PSS2
- Assumptions/limitations
- Number of banks affected
- Value unsettled, used collateral and negative end of day balance
- General characteristics
- Conclusions

Research question

- What is the potential impact of a change in the outgoing payments of one (large) participant to the whole payment system?

  - Change in outgoing values
  - (Change in collateral)

TOP as part of TARGET

- RTGS-system

- Queues allowed (with priorities)

- No central limits

- All banks connected directly (no tiering)

- Free intraday credit obtained by pledging collateral

- TOP is currently part of TARGET

→ TOP will be replaced by TARGET2 (Feb 2008)

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TOP data

- Data: December 2005 and April 2006
- disruptions for 3 large Dutch participants
- Decreased outgoing values by 1 participant:
→ 50%, 75%,90%,95%
- Increased outgoing value by 1 participant:
→ 110%, 125%, 150%, 200%
- Single day (SD) vs multiple day (MD)

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assumptions

- Closed system → no liquidity from other systems

- Banks do NOT react

- Overnight credit facility at no extra charge

- Every participant is treated equally
    - AS, credit institutions, CBs
    - some participants controlled by large ones

Characteristics payment system
April 2006

	Average outgoing values per day (bln)	Percentage of total	Maximum Available collateral (bln)
participant A	€ 31.3	29 %	€ 18.0
Participant B	€ 17.8	12 %	€ 9.5
participant C	€ 18.7	19 %	€ 14.1
sum A,B&C	€ 62.8	59 %	€ 41.4
All	€ 106.4	100 %	€ 61

Number of banks affected
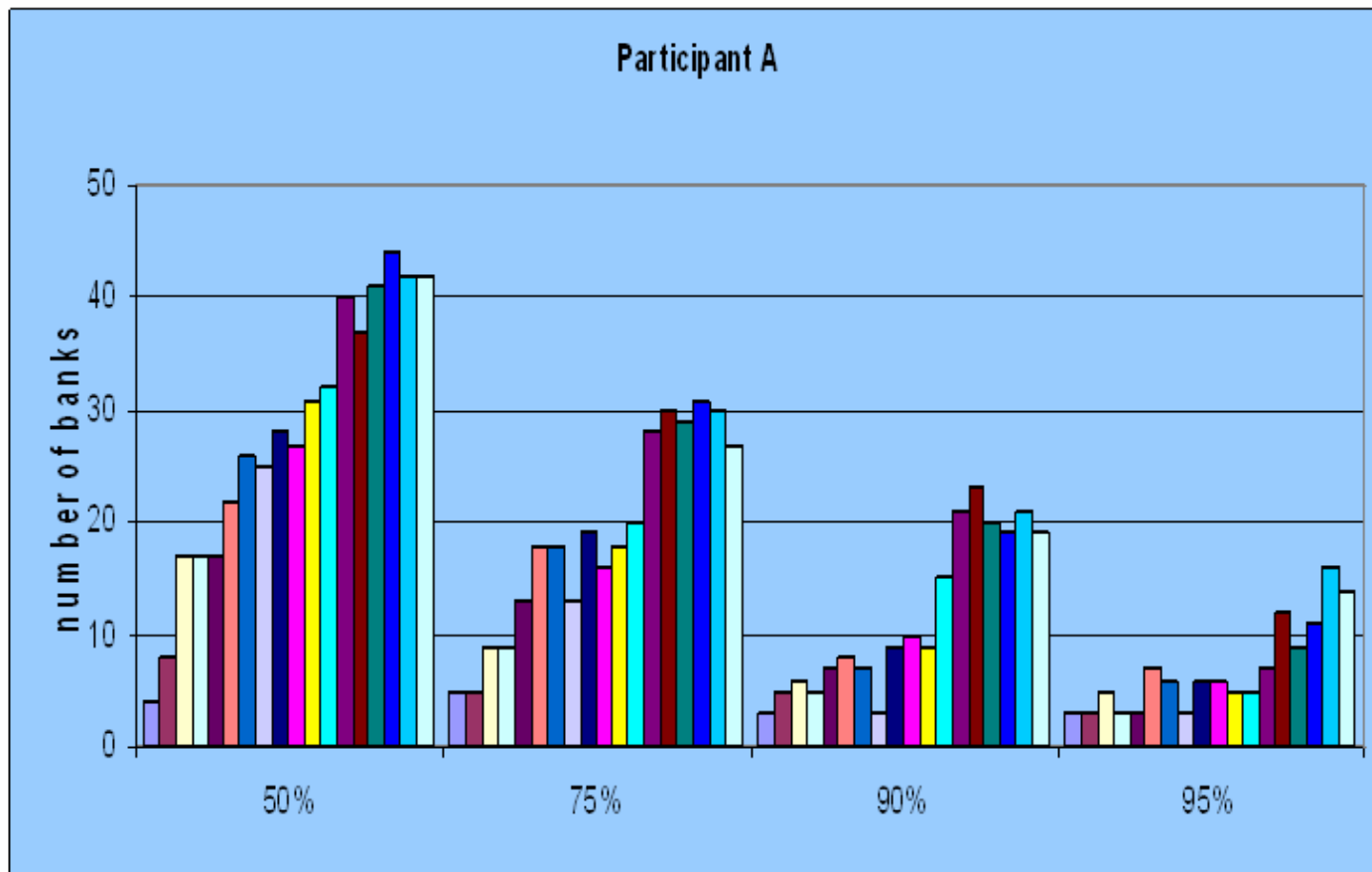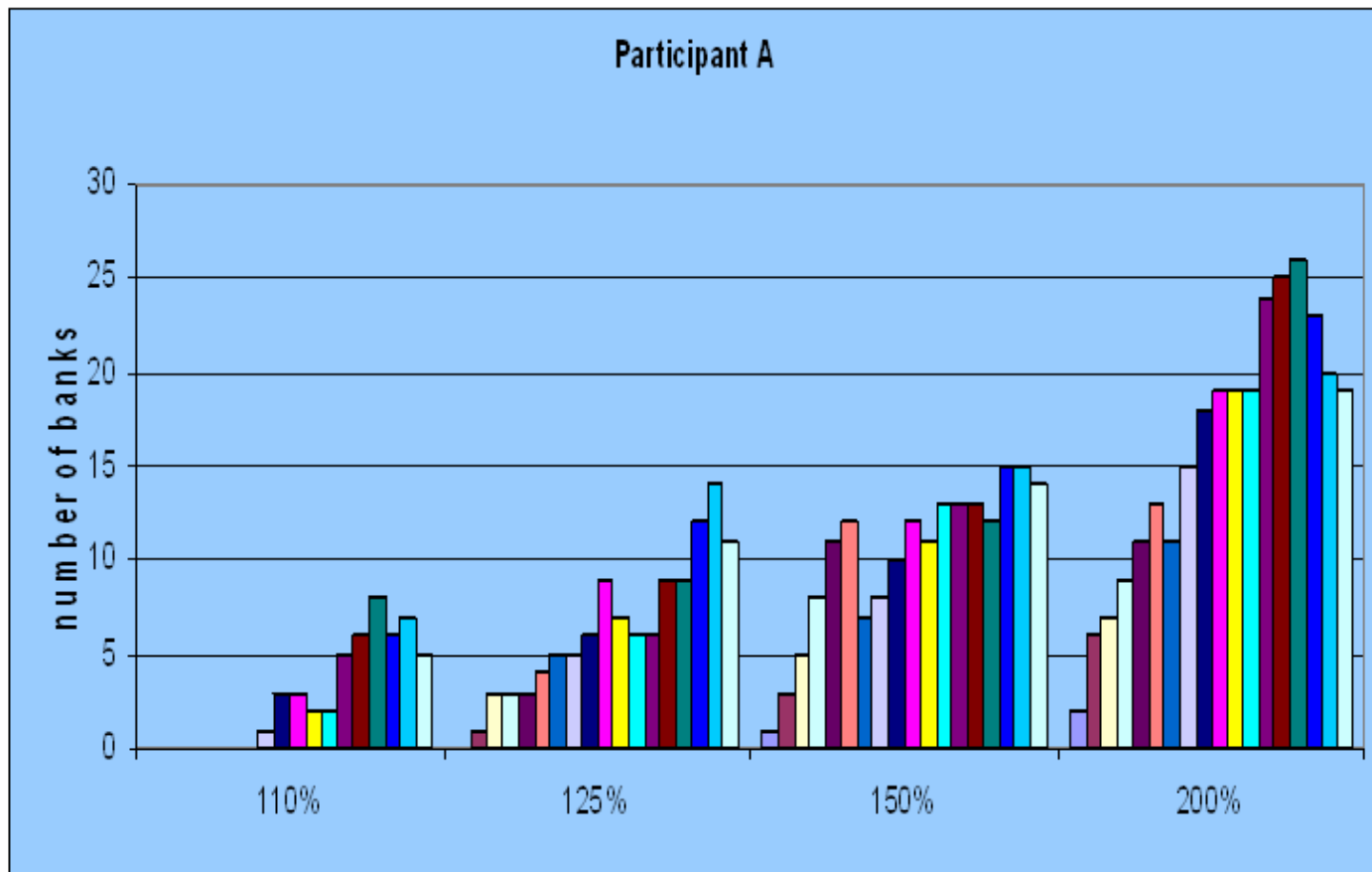# (single days, historical collateral) 1
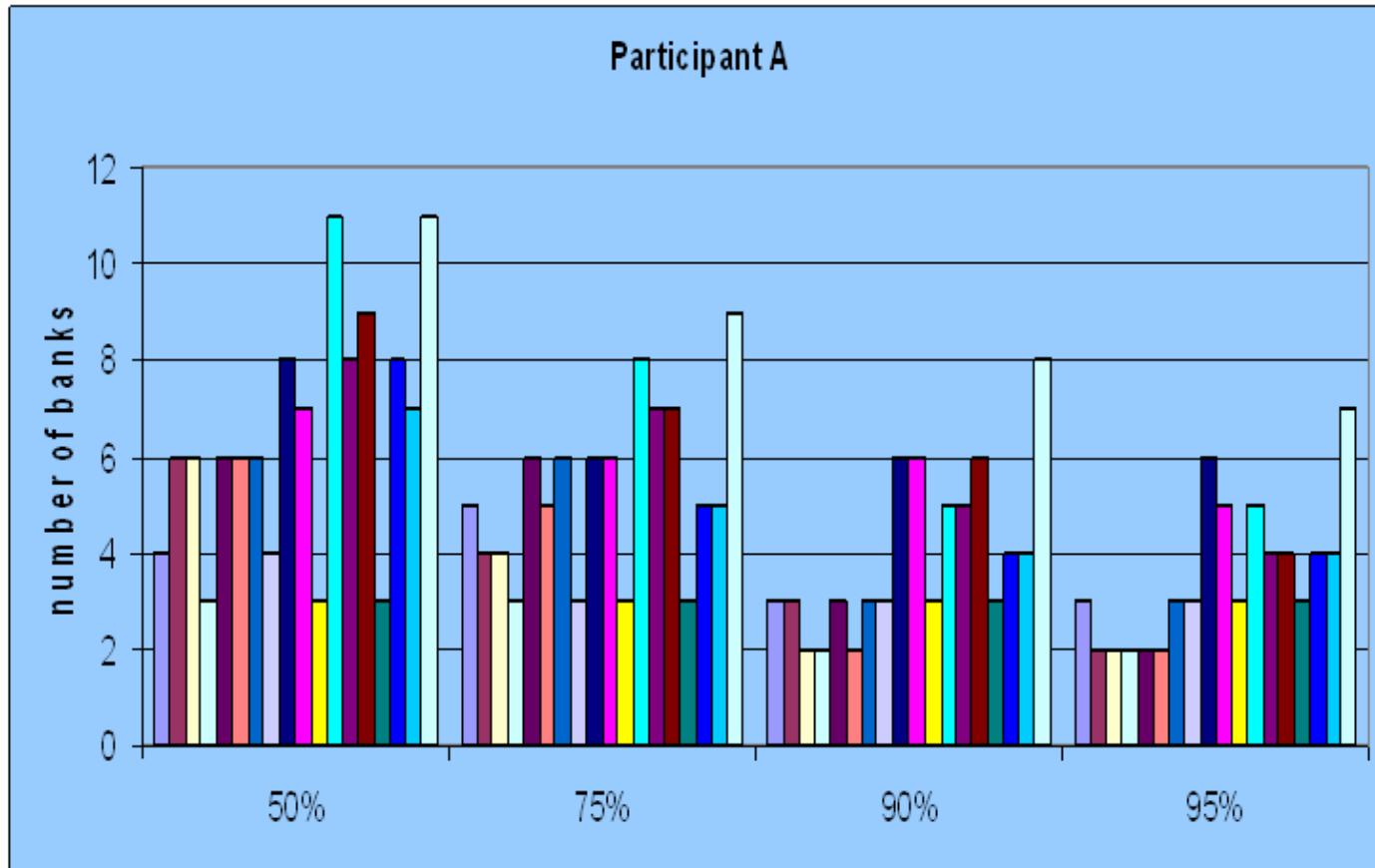
Number of banks affected
(single days, historical collateral) 2
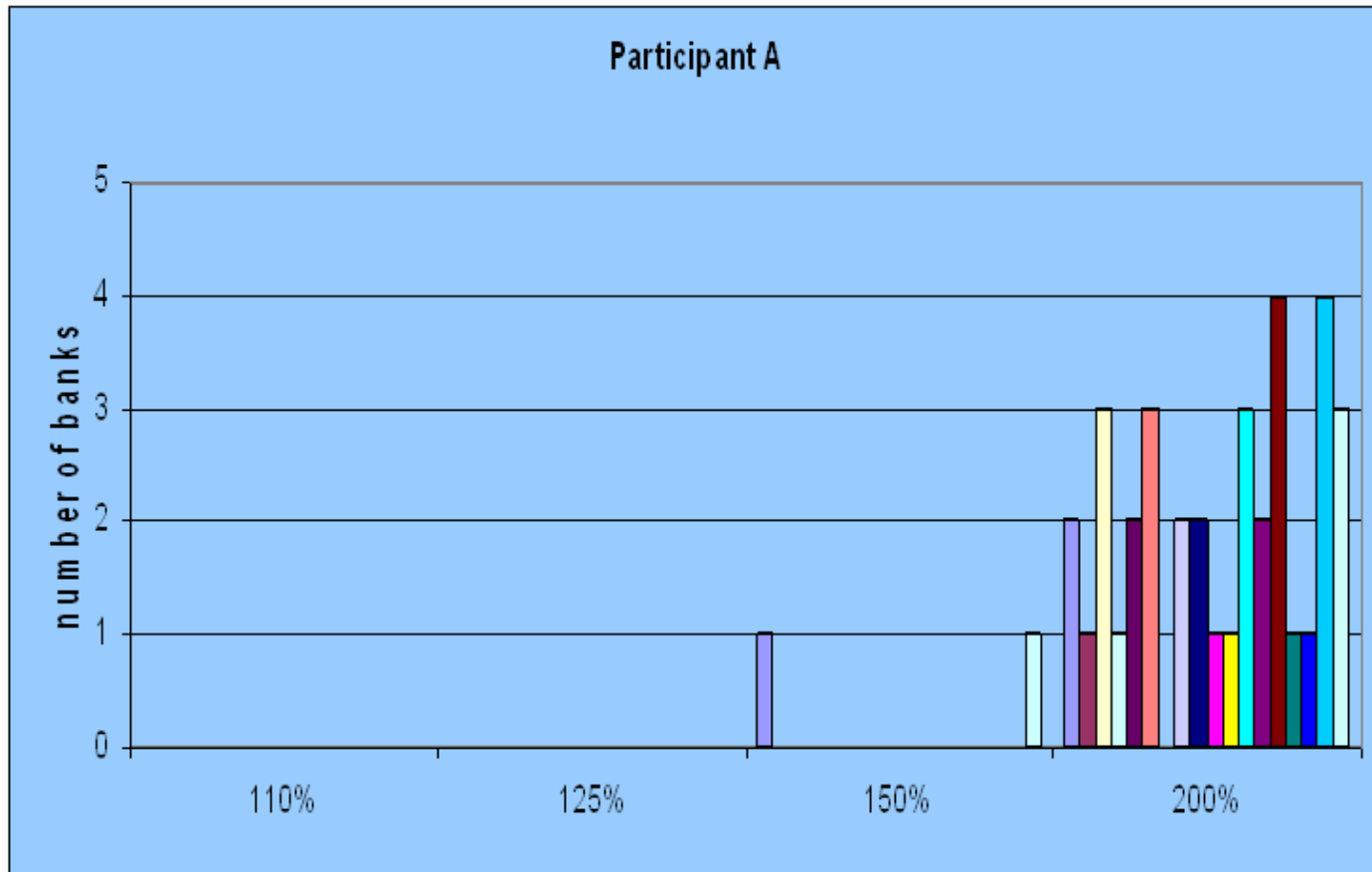
Number of banks affected
(continuous shock, historical collateral) 1

Number of banks affected
(continuous shock, historical collateral) 2

General characteristics

- Strong variations between business days.

  Number of banks affected between 3-11 banks for SD → 2 other large banks never face liquidity problems beyond their collateral.

- increasing trend number of banks affected for 50-95% for MD,

  → but not continuously increasing!

- increasing trend 110-200% but decreasing at the end of the month for MD

Comparison December 2005: number of banks affected

- Number of banks affected generally higher in December:

  → 1 – 2 banks for 50 to 95% scenarios (single day)

  → equal for 110 to 200% cases (single day)

  → 0 – 3 banks for 50 to 95 % (multiple day)

 → -1 – 2 banks for 110 to 200 % (multiple day)

Comparison with participant B

- Participant B:
  - SD: Disruptions for A affect up to 4 on participants on average more for 50 to 95%. Maximum number of participants affected is the same.
  - SD: Up to 2 fewer participants are disrupted for the 110-200% than for C
  - MD: Disruption for A affect up to 10 participants on average more for 50, 75 and 90% and up to 5 for 125, 150 and 200% for .
  - For the small disruptions (95 and 110%) more banks are affected than for participant A

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Comparison with participant C

- Participant C:
  - SD: Disruptions for A affect up to 1 bank on average more than for C
  - MD: Disruptions for A affect up to 8 banks on average more than for C (50-95%) and between -1 to +2 less/more for 110-200%
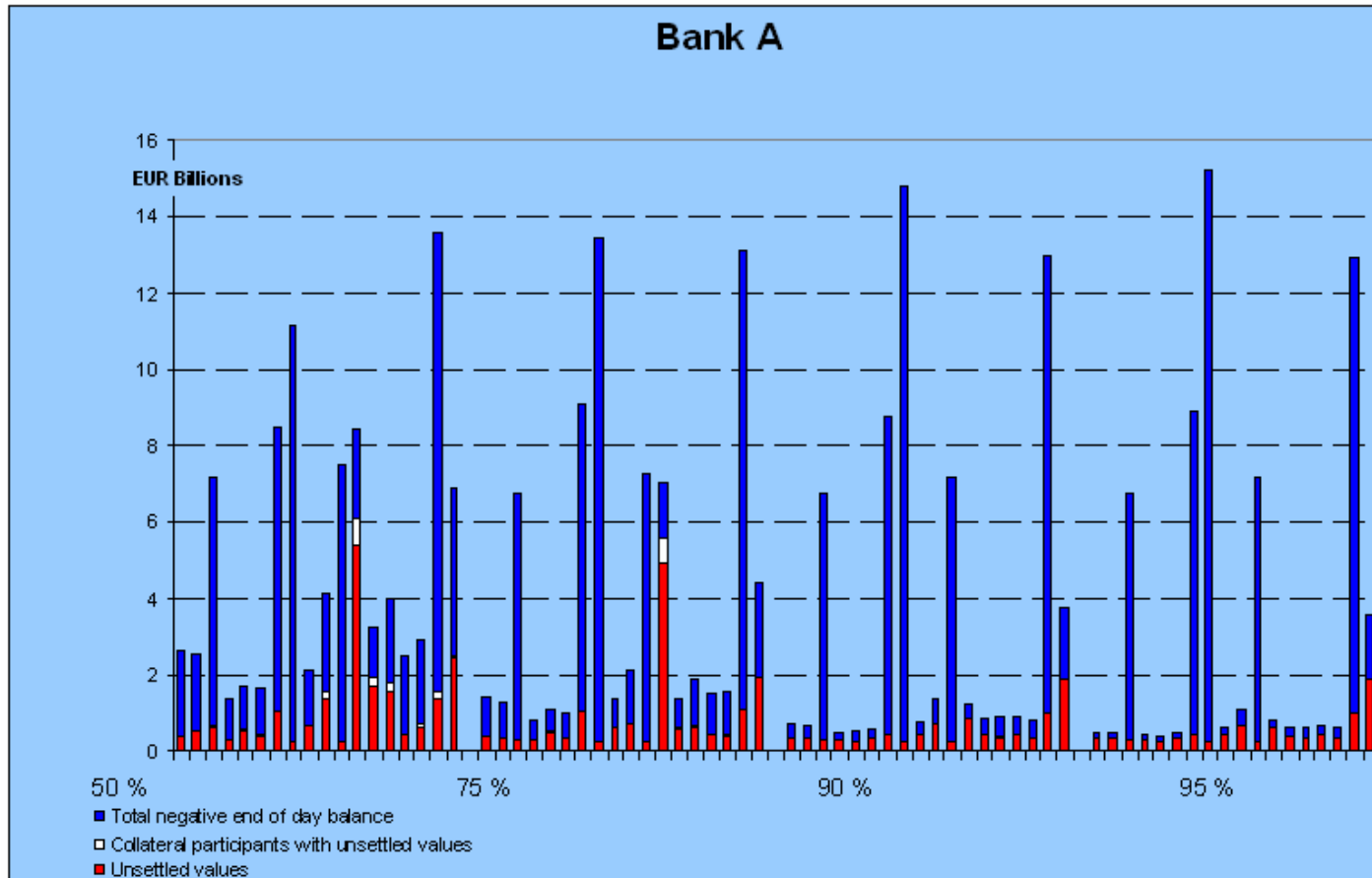
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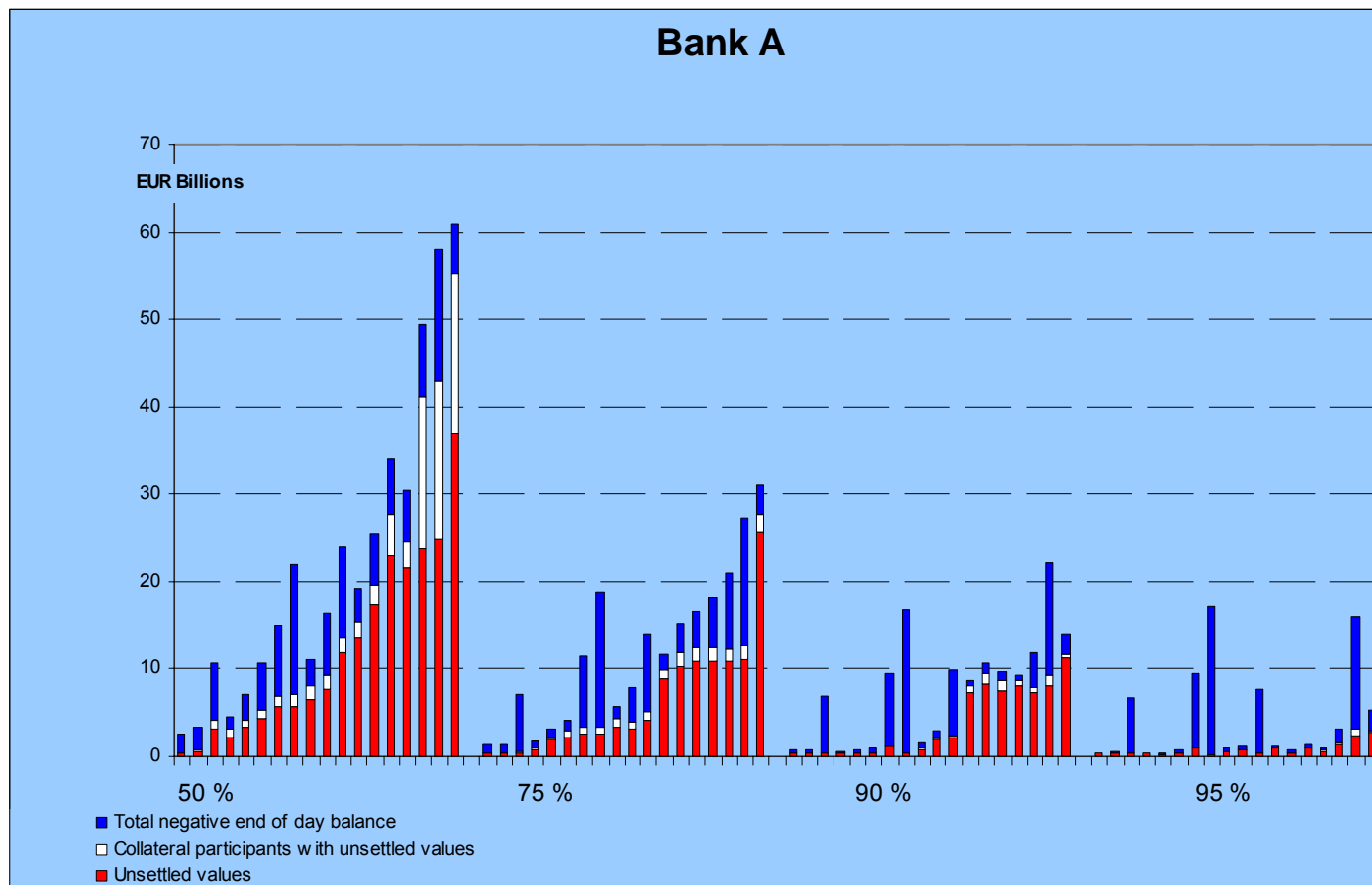# Values unsettled April 2006 (single days, historical collateral) 1
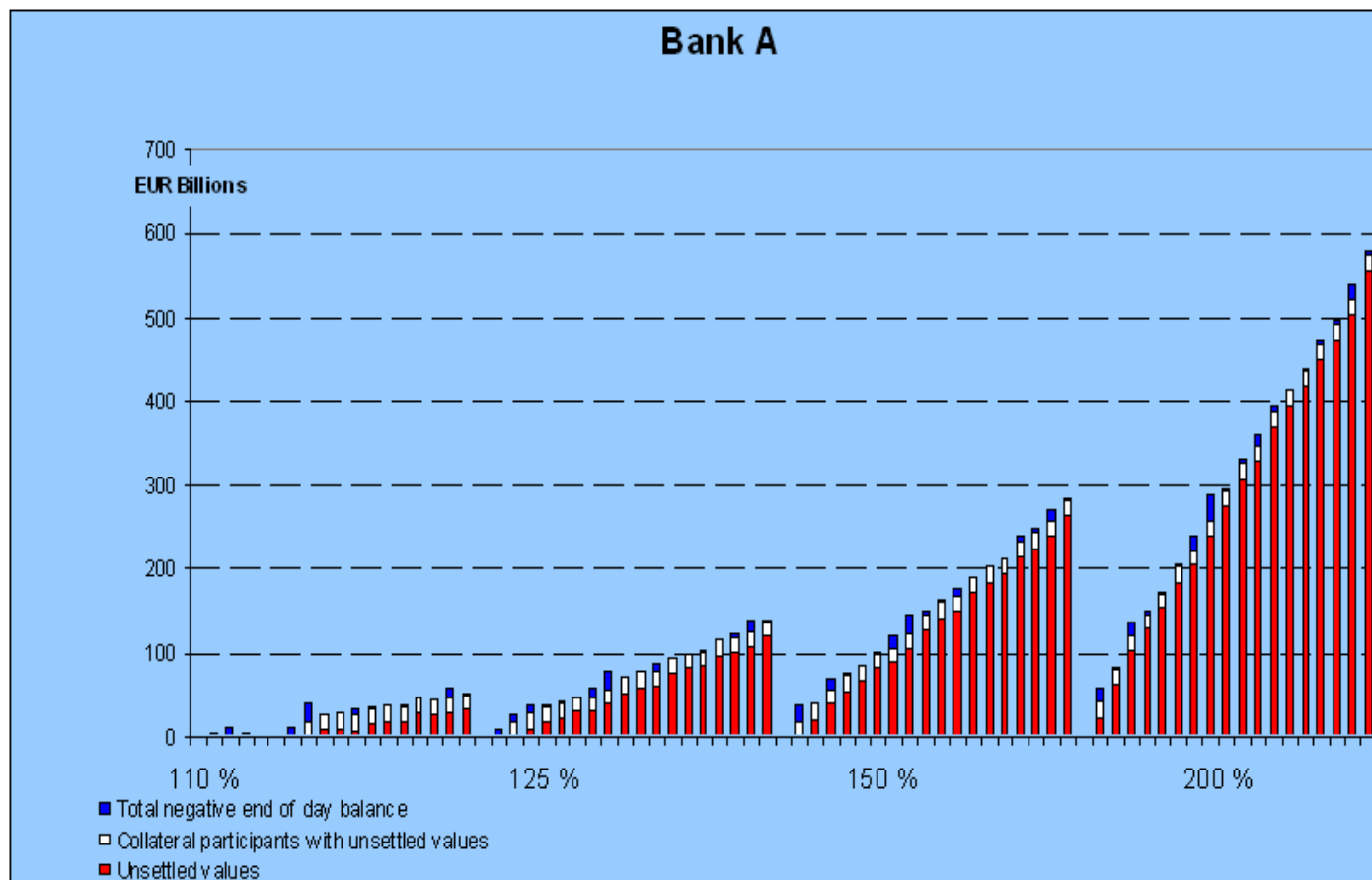
Values unsettled April 2006 (single days, historical collateral) 2

Bank A
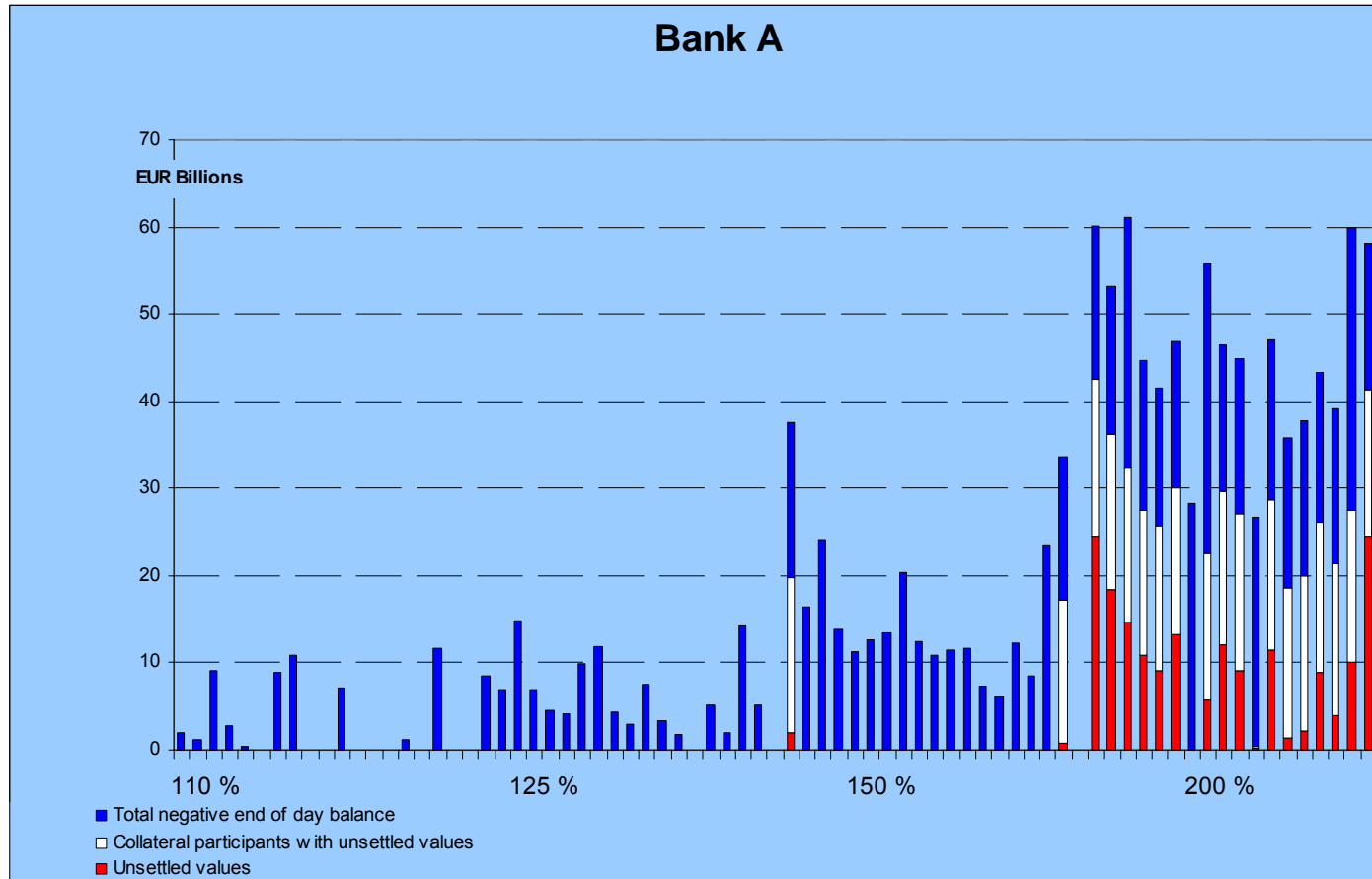
Values unsettled April 2006 (continuous shock, historical collateral) 1

Values unsettled April 2006 (continuous shock, historical collateral) 2

General characteristics

- SD-MD unsettled values usually for participants with little or no collateral. Participants with no collateral are often controlled (funded) by larger participants

  → part of the shock could be neutralised

- SD: 150 & 200%: used collateral (white bar) from the large participant only.

- MD:

Comparison : unsettled values

with December 2005:

- Trends similar

- Peaks at different days of the month

other 2 large banks

- Trends similar

- Values lower for both banks

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Conclusions (1)

- It is not possible to find a general rule for the potential effect of a shock.

  - Depends on:
    - day of the month
    - length of the shock (one day or longer)
    - the participant type: large vs smal(ler)

Conclusions (2)

- The effect of a shock of one large participant is limited with respect to the other two large ones.

→large participants provide liquidity to participants (small and large), which have a negative end of day balance

- Affected participants (usually) relatively small if the shock is up to a few days.
- Fluctuation in the upper and lower bound collateral high wrt large participants between different days.

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