The audacity of settlement speed - Settlement trade-off for ancillary systems in TARGET2

13th Simulator Seminar of Bank of Finland
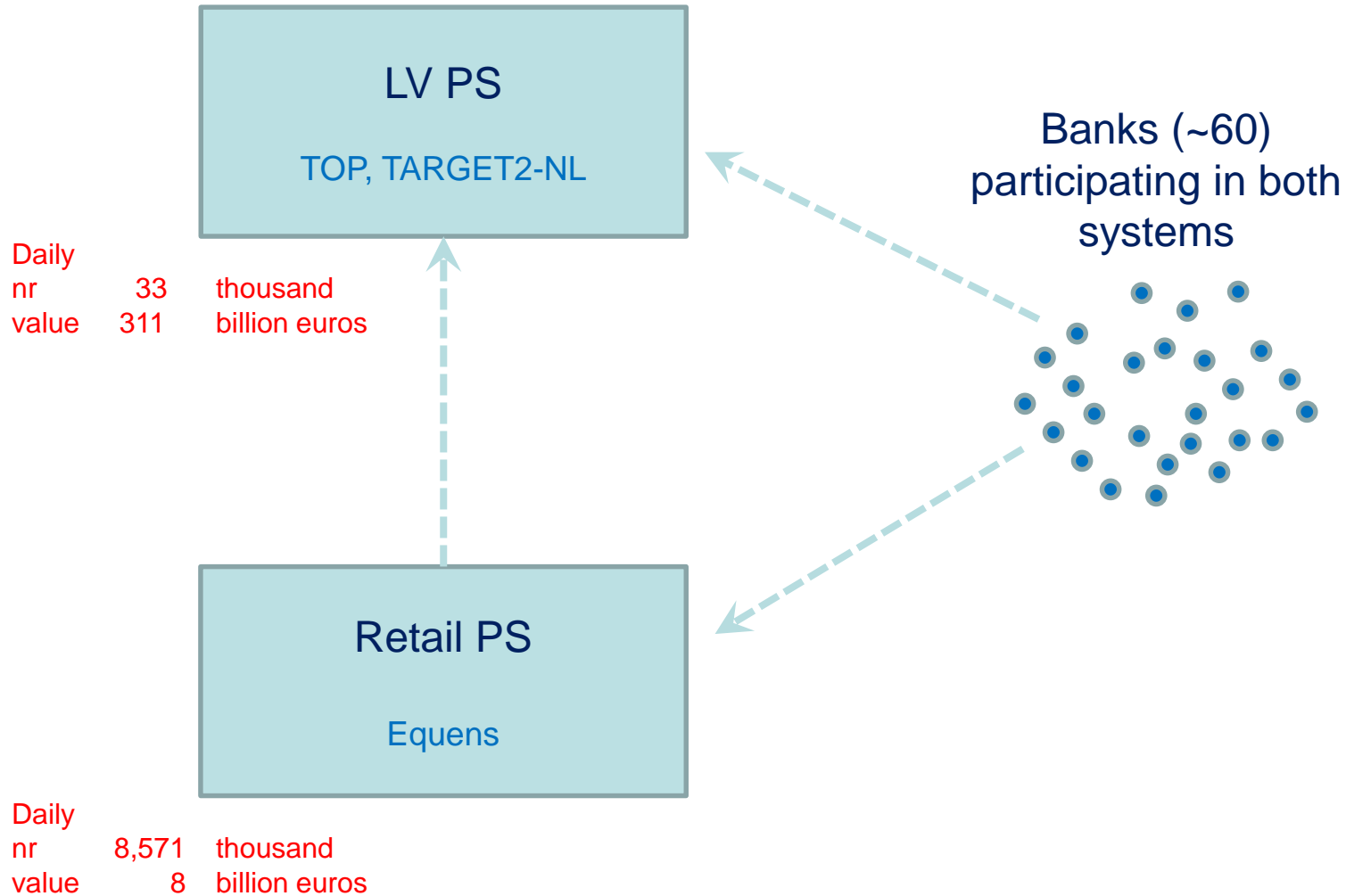## Helsinki

28 August 2015

Martin Diehl
Richard Heuver

Part 2: Introduction of multiple settlements per day of the retail payment system in the Netherlands
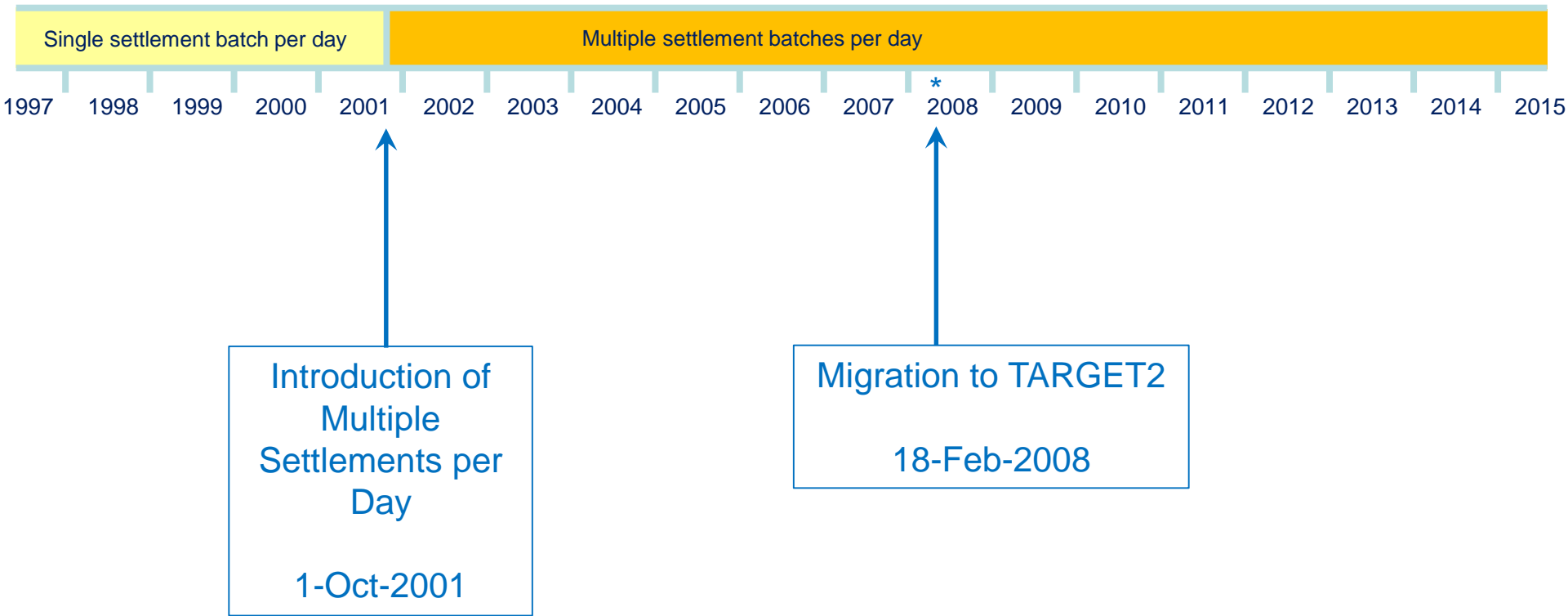
Outline

- Introduction

- Research question

- Background

- Analysis

- Discussion, conclusions, future research

Introduction - Dutch Payment Landscape

LV PS

TOP, TARGET2-NL

Daily
nr   33   thousand
value   311   billion euros

Banks (~60) participating in both systems

Retail PS

Equens

Daily
nr   8,571   thousand
value   8   billion euros

DEUTSCHE BUNDESBANK
EUROSYSTEM

DeNederlandscheBank
EUROSYSTEEM

Introduction - Timeline of Changes

Single settlement batch per day	Multiple settlement batches per day

1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008* 2009 2010 2011 2012 2013 2014 2015

Introduction of Multiple Settlements per Day

1-Oct-2001

Migration to TARGET2

18-Feb-2008

DEUTSCHE BUNDESBANK
EUROSYSTEM

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EUROSYSTEEM

Introduction - Implementing multiple settlements

- Purpose:

  - Decreasing the risk of unwinding

  - Speedup of retail payments (towards intra day settlement)

    Customer-to-customer within two hours

- Implementation; two types of batches

  - Debit lot settlement (one debit, multiple credits)
    Every half hour, or sooner according to a ceiling amount
    set by the debited bank

  - Credit lot settlement (multiple debits, multiple credits)
    Every half hour

(mini) Research Question

What was the liquidity impact

of the changeover

from one settlement batch per day

to multiple settlement batches per day

for participants in the RTGS ?
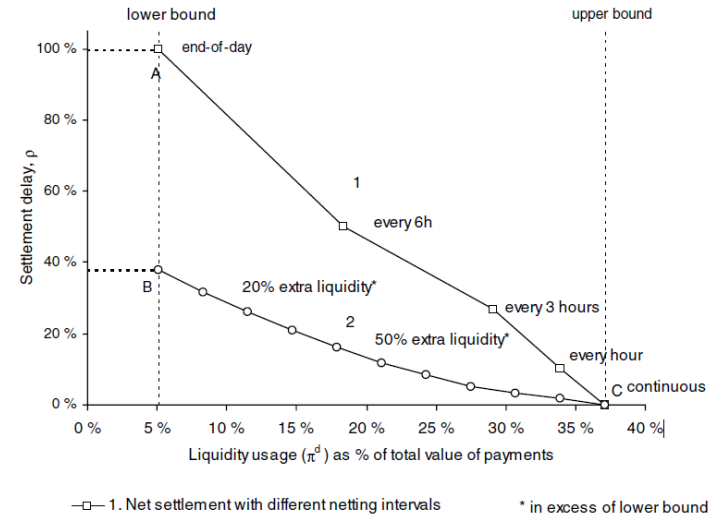
PM. No data from retail system available.

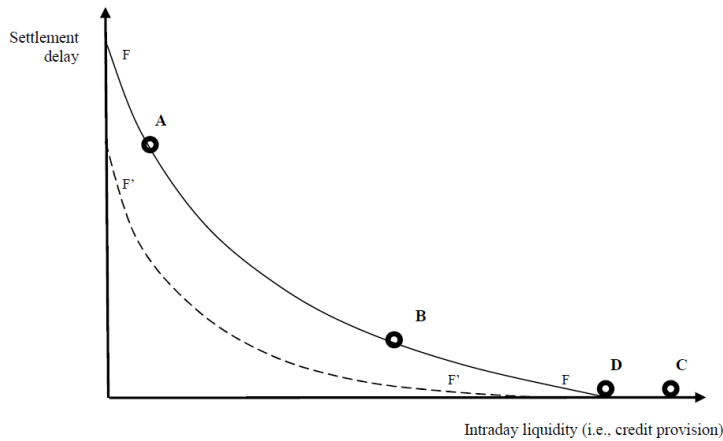# Background
Net towards Gross - Literature on liquidity usage
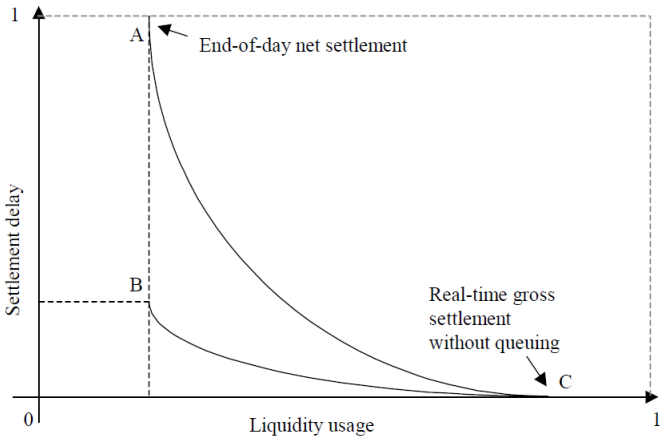
Koponen/Soramaki 1998

Leinonen 1999

Arjani 2006
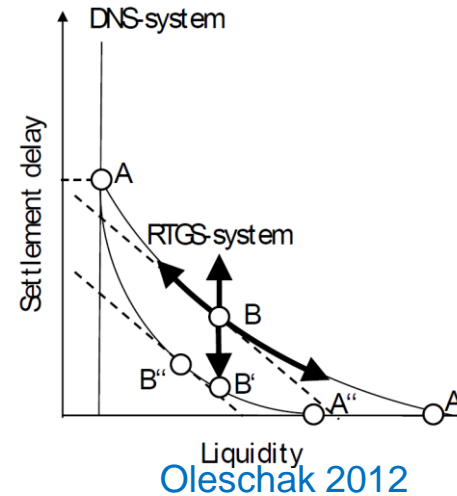
Oleschak 2012

Background
Net towards Gross - Literature on liquidity usage

DNS - one day settlement

RTGS - realtime settlement

When moving from DNS to RTGS

liquidity usage is expected to increase

from Lower Bound towards Upper Bound

1 day

Settlement delay

Real
Time

Lower
Bound

Liquidity usage

Upper
Bound
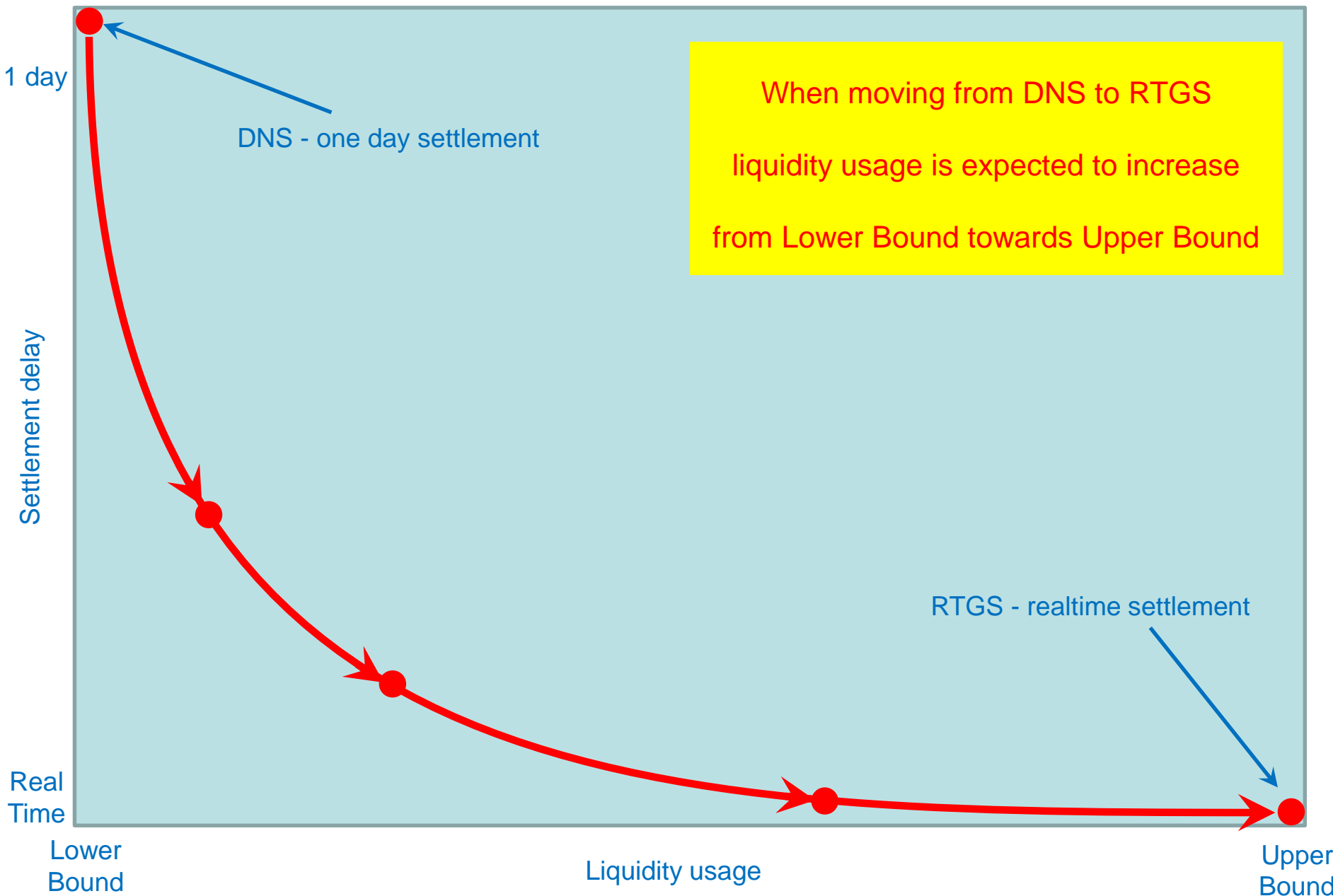
Analysis - Transaction data

Daily Number of Settlement Batches

Total of
56 thousand
settlement
transactions

Introduction of
Multiple Settlements
per Day

1-Oct-2001

Total of
16 million
settlement
transactions

PM. Dataset comes from settlement batches in the RTGS; underlying retail transactions are not available.
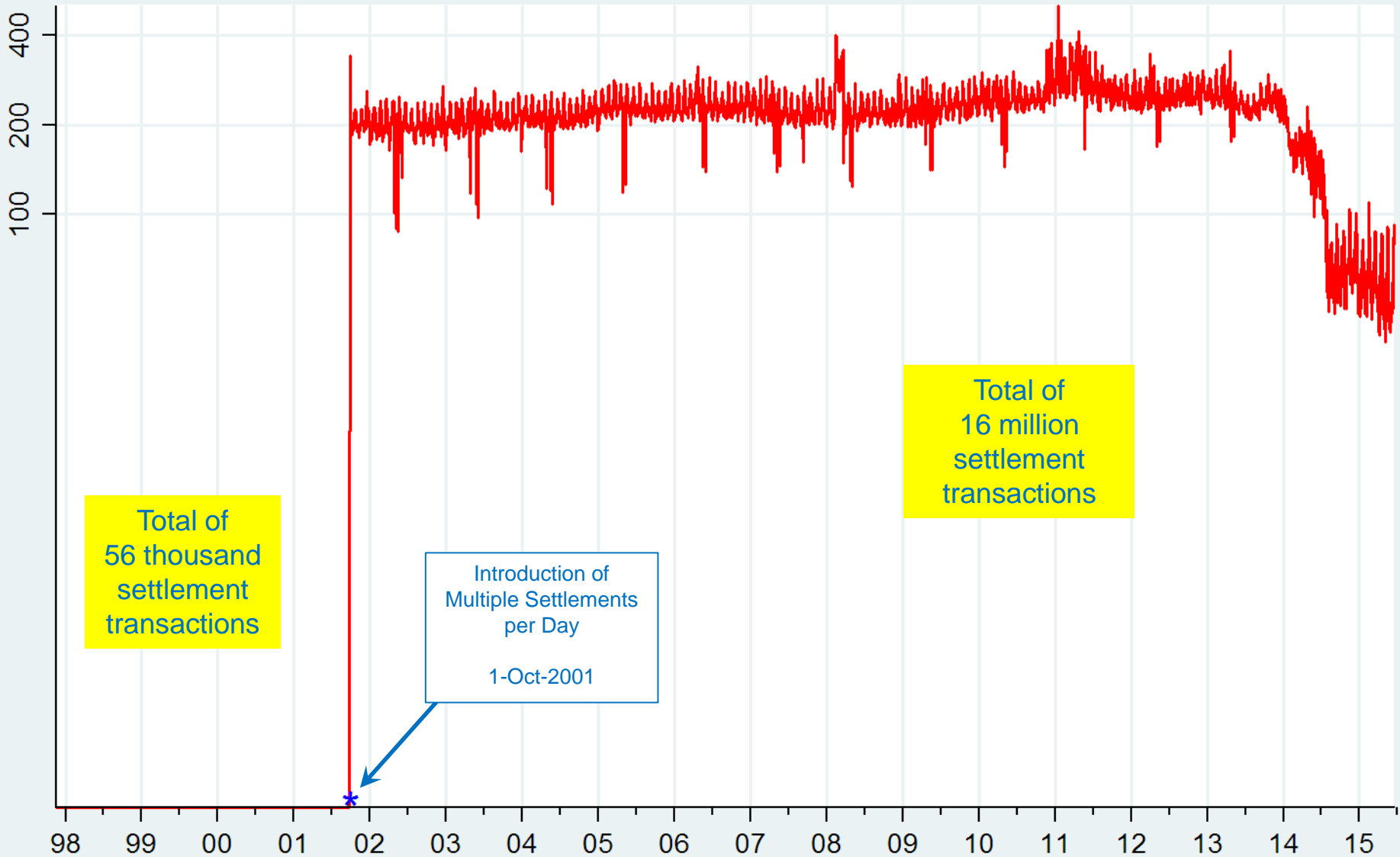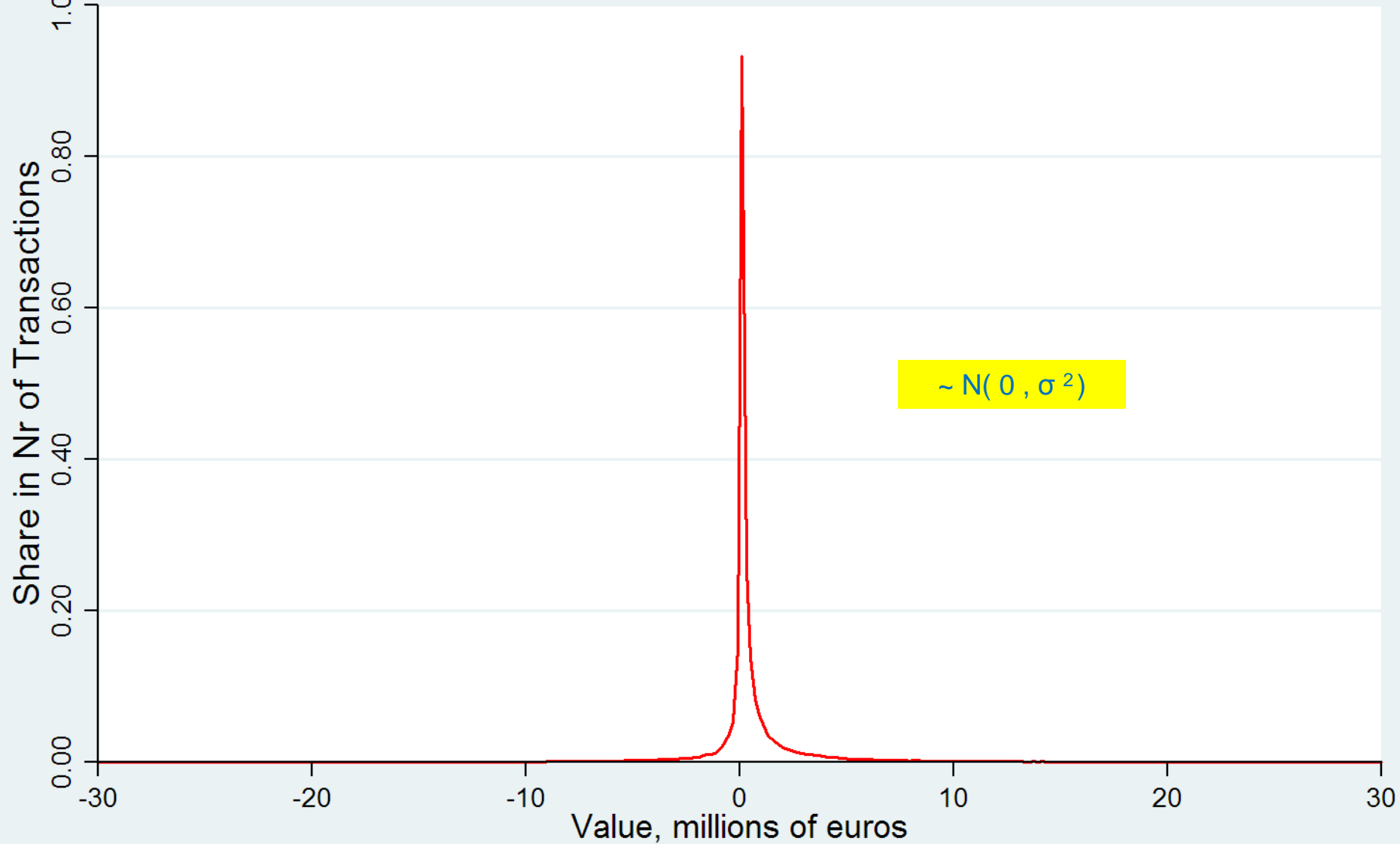
Distribution of all positions within batches - Single

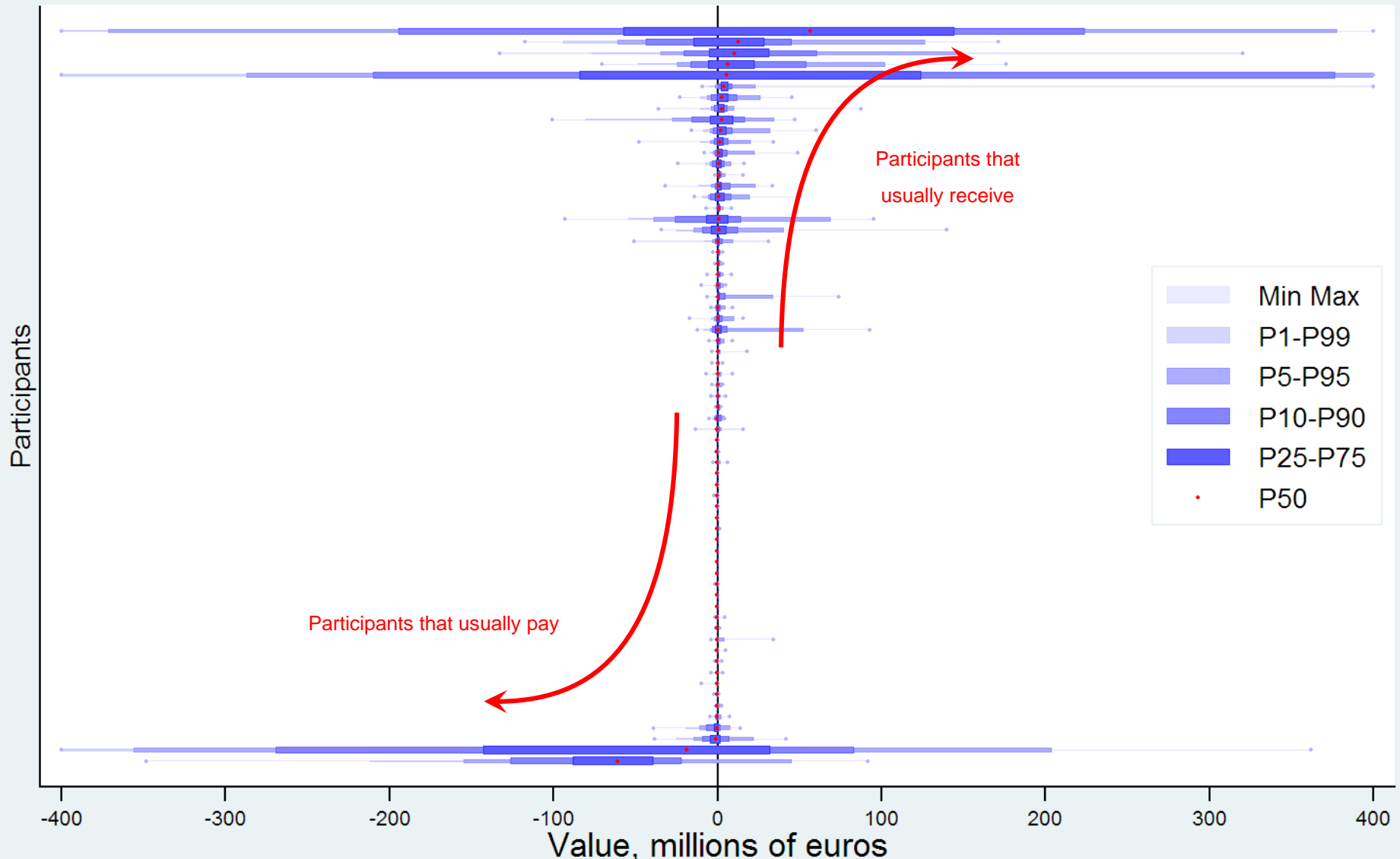Kernel Distribution of Positions - Single Settlement Batch per Day

$\sim N(0 , \sigma^2)$
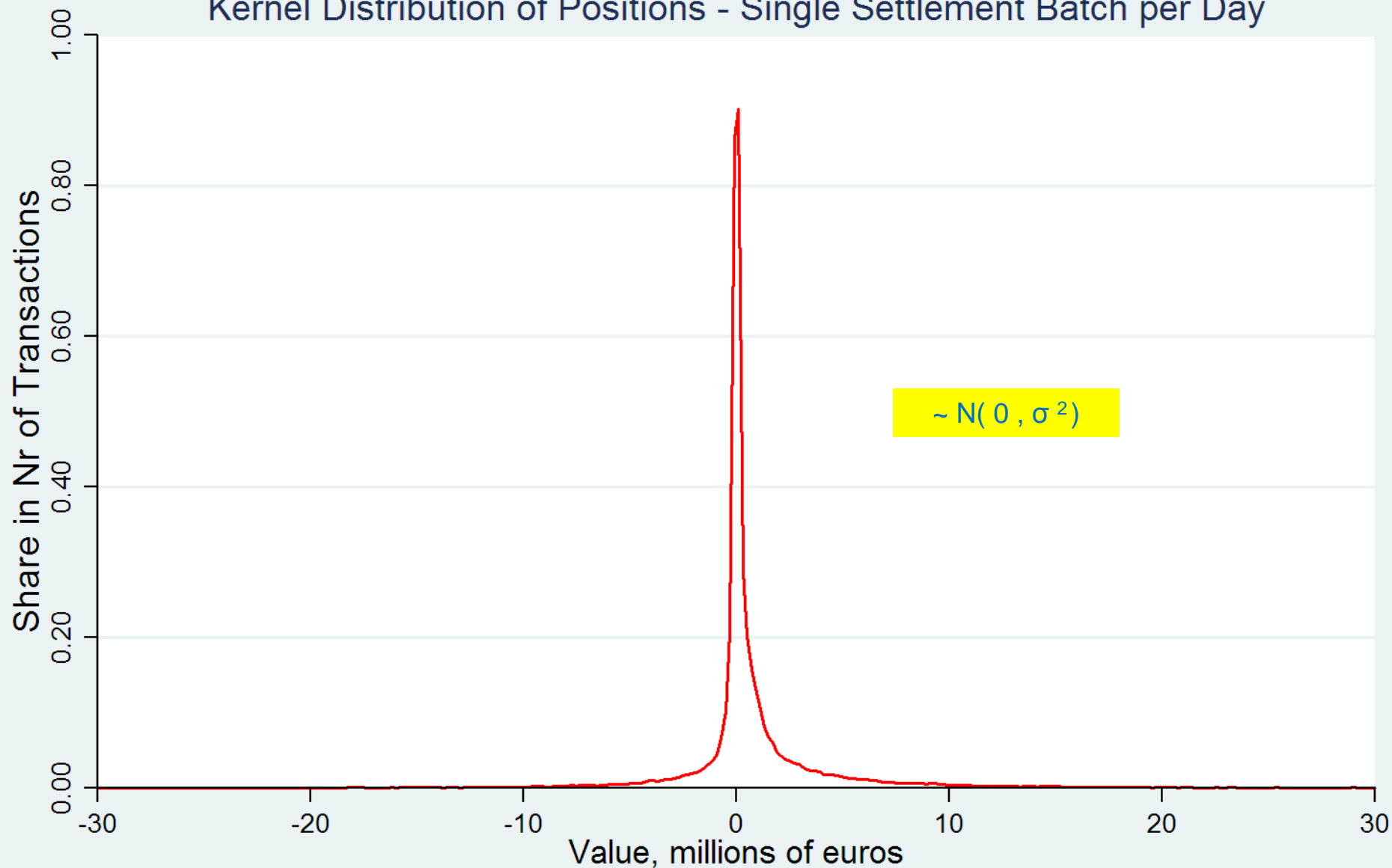
Distribution of all positions within batches - Multiple

Kernel Distribution of Positions - Multiple Settlement Batches per Day

$\sim N(\, 0 \, , \sigma^{\, 2})$

Average position of participants - Single batch per day

Distribution of Positions of Participants - Single Settlement Batches per Day

Participants that

usually receive

Participants that usually pay

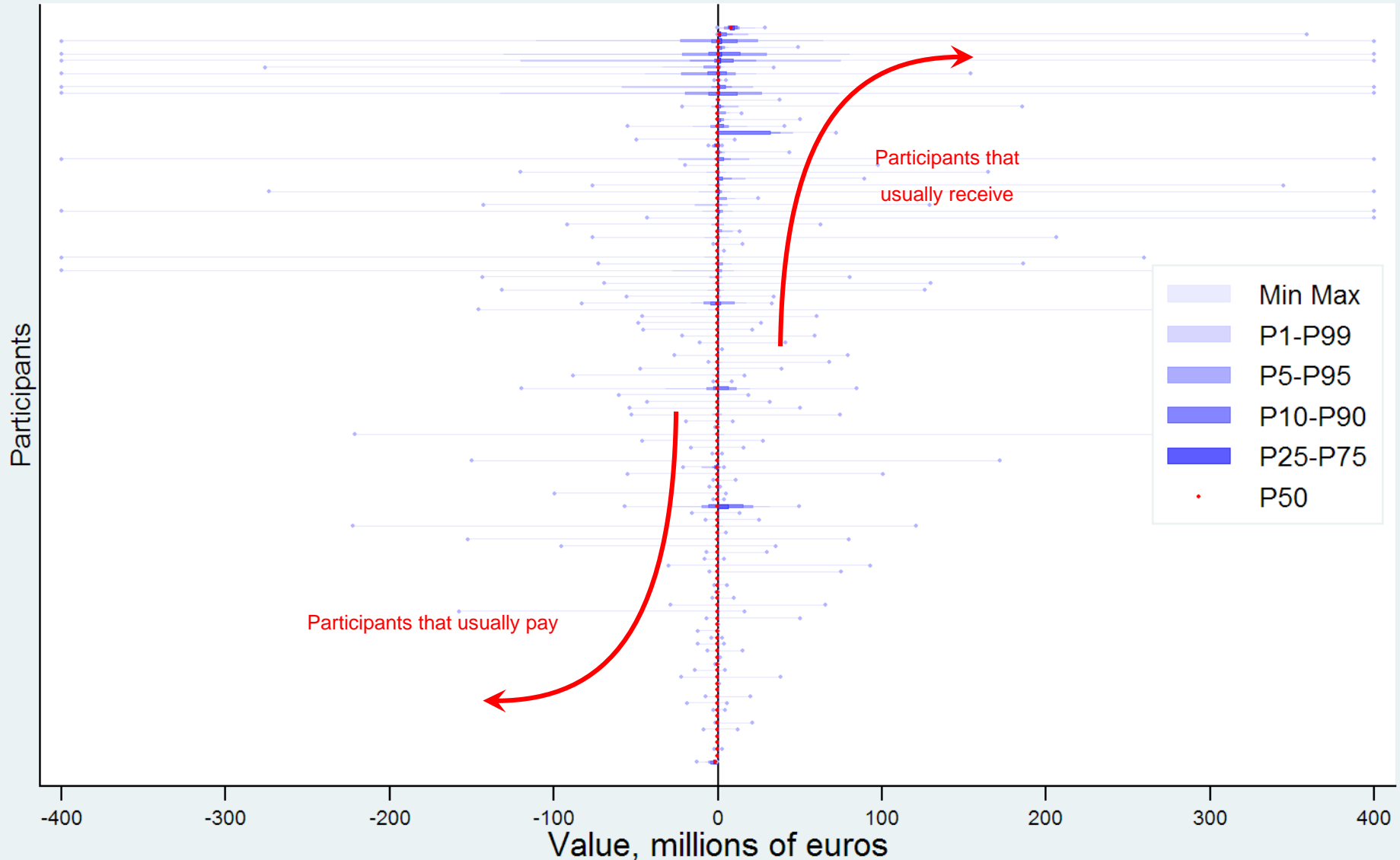| | Min Max |
	P1-P99
	P5-P95
	P10-P90
	P25-P75
·	P50

Participants

Value, millions of euros

Participants sorted according to average position within a batch.
Graph shows that there are structural receiving and paying participants per settlement batch.

# Average position of participants - Multiple batches per day

Distribution of Positions of Participants - Multiple Settlement Batches per Day

Participants that

usually receive

Min Max
P1-P99
P5-P95
P10-P90
P25-P75
• P50

Participants that usually pay

Participants

Value, millions of euros

Graph shows less spreads per settlement batch,
but it should taken into account that there are 200 batches per day.

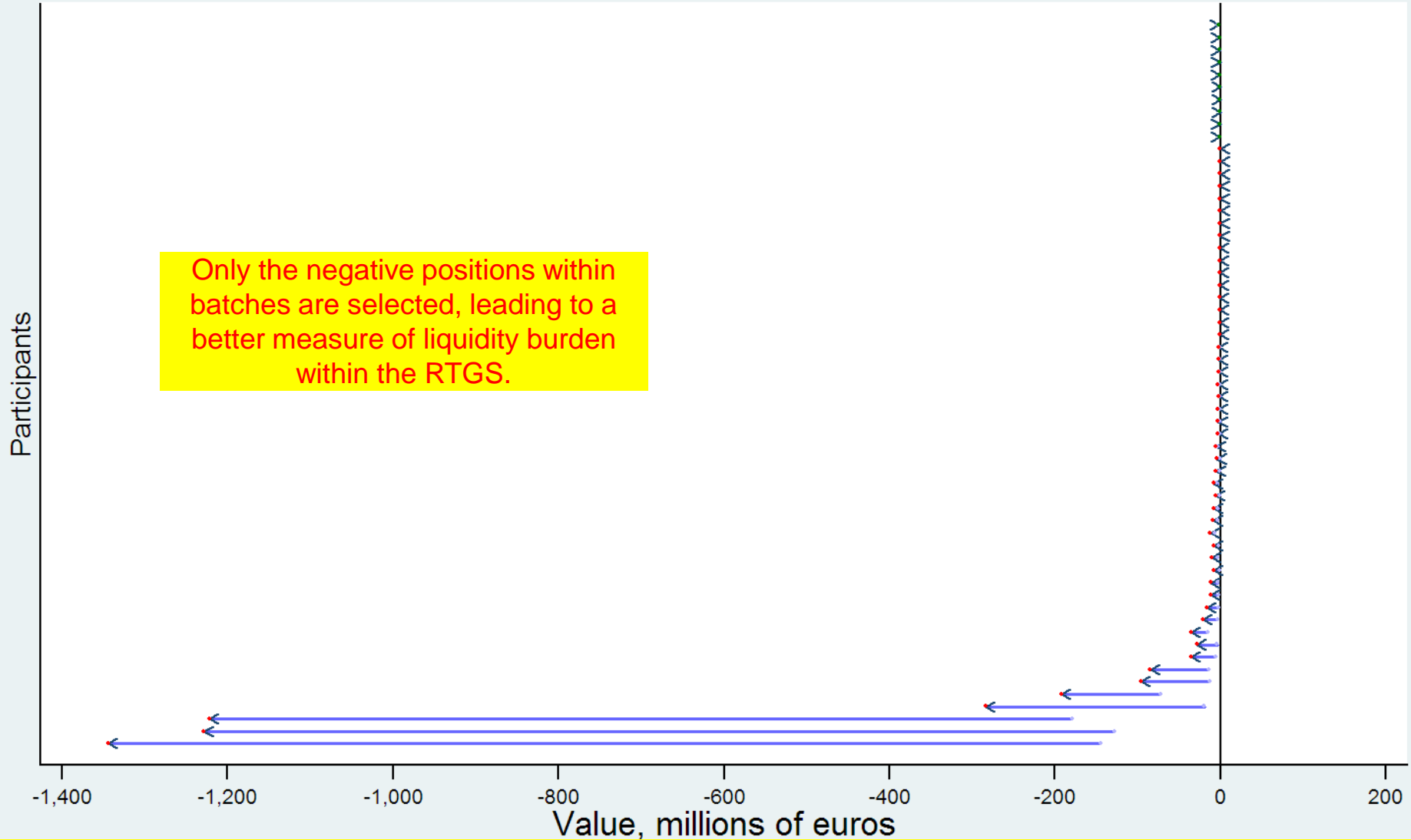# Difference between single and multiple batches at day level

Comparison of Net Liquidity Position Before and After introduction of Multiple Batches per Day
Both Positive and Negative Daily Positions are included

Participants

Value, millions of euros
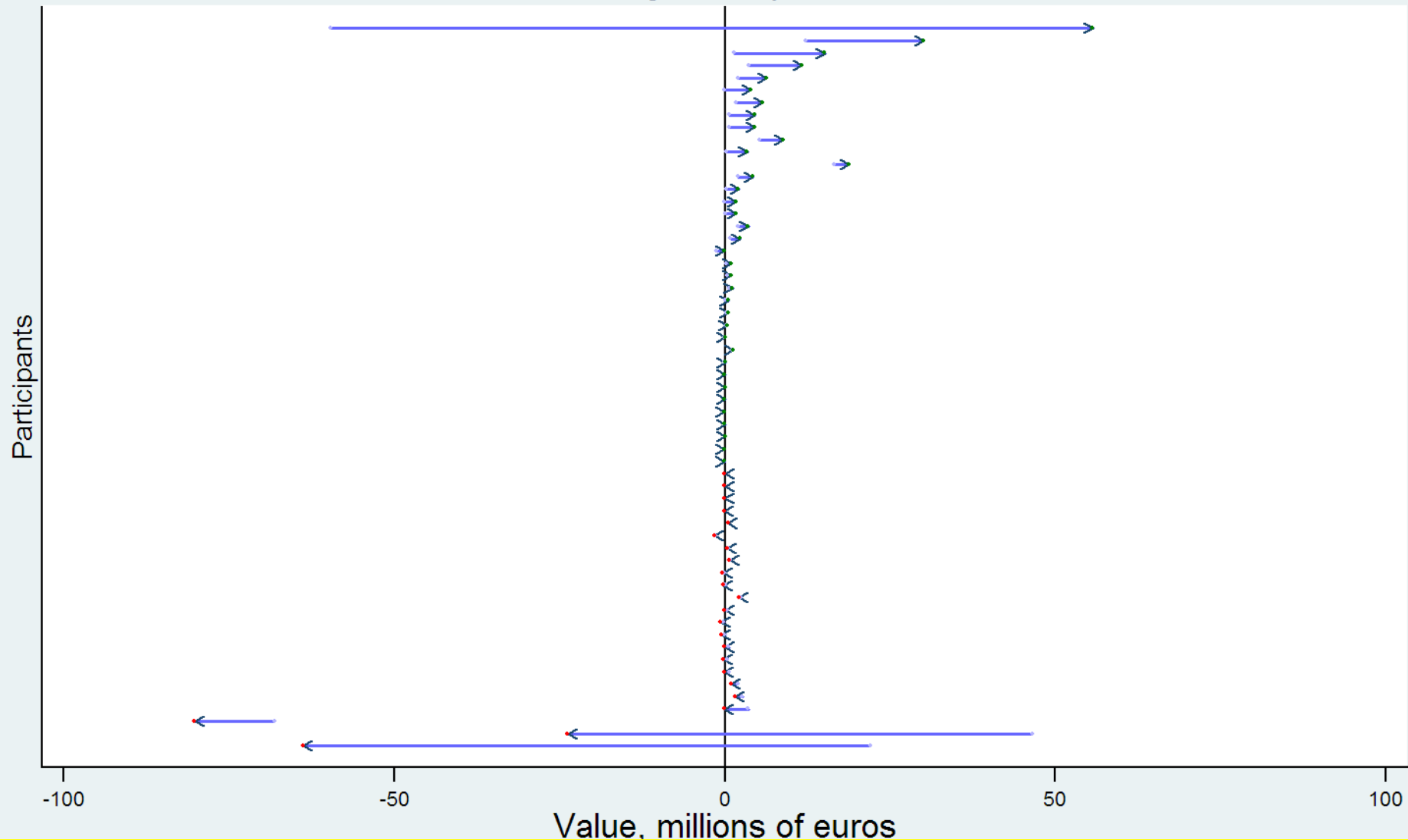
Participants sorted according to difference before and after introduction of multiple settlement batches per day.
Total increase of liquidity needs at system level = 9.3 million euros

Difference between single and multiple batches, only negative positions are included

Comparison of Liquidity Needs Before and After introduction of Multiple Batches per Day
Only Negative Daily Positions are included

Only the negative positions within batches are selected, leading to a better measure of liquidity burden within the RTGS.

Participants

Value, millions of euros

Total increase of liquidity needs at system level = 4.08 billion euros.
PM.   Total collateral deposited = 140 bio euros, avg amount Intraday Credit = 12 bio euros.

Discussion, conclusions, future research

- Liquidity impact of introduction of multiple batches
  - is small but cannot be neglected
  - is observed at only a small portion of participants
  - while others benefit from the new situation

- Analysis of AS settlements takes time
  (even in case of "home" situation)

- Huge differences observed in TARGET2
  therefore exploring Euro landscape will be time consuming

- Desire to generate payment data to create stochastic (perfect) data
  because the underlying retail transaction data is not available
  and/or outliers (or liquidity transactions) can disturb the outcome

Thanks for your attention

Kiitos huomiostanne

ja saunaan