
Payment Analysis with R at the SNB

Christoph Meyer

Presentation at adminR
Aarau, 31 May 2022

SCHWEIZERISCHE NATIONALBANK
BANQUE NATIONALE SUISSE
BANCA NAZIONALE SVIZZERA
BANCA NAZIUNALA SVIZRA
SWISS NATIONAL BANK



Disclaimer:

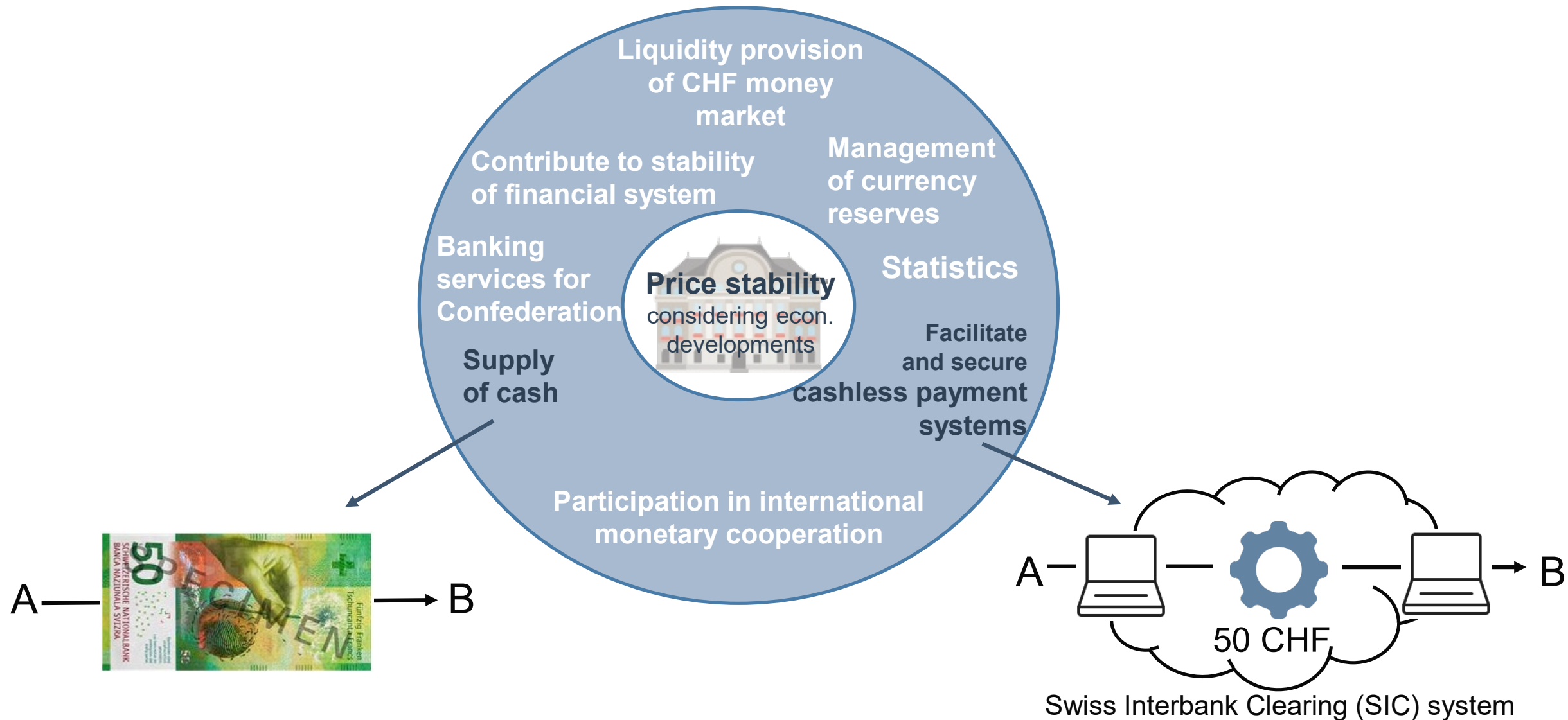
The views, opinions, findings and conclusions or recommendations expressed in this slide deck are solely those of the author. They do not necessarily reflect the views of the Swiss National Bank (SNB). The SNB accepts no responsibility for any errors or omissions or for the accuracy of the information contained in this slide deck.

Agenda

- 1 Why Payment Analysis (PA) at the SNB?
- 2 Changing payment landscape and consequences for PA
- 3 New PA infrastructure and the role of R
- 4 Examples of PA outputs
- 5 Conclusion

Why Payment Analysis (PA) at the SNB?

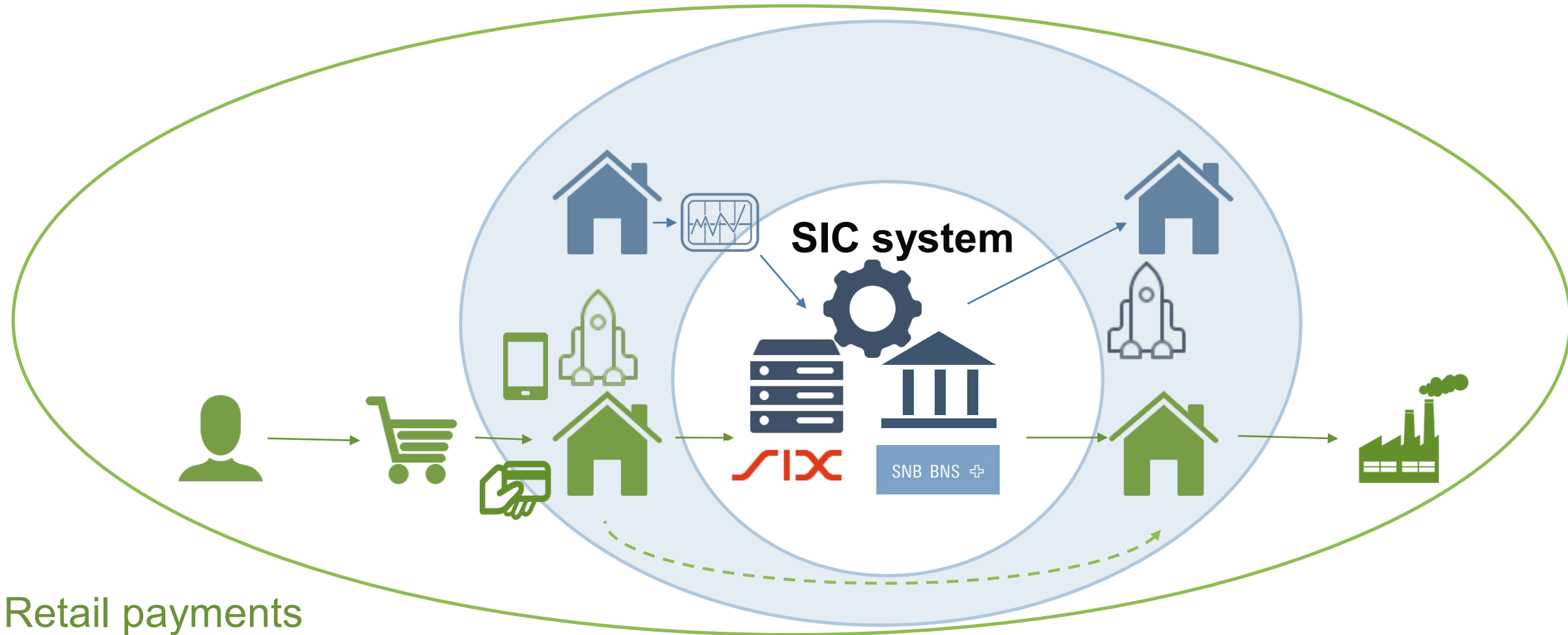
Statutory tasks of the SNB



Changing payment landscape: New role understanding and consequences for PA

The Swiss Interbank Clearing (SIC) system

Core of the changing Swiss payment landscape



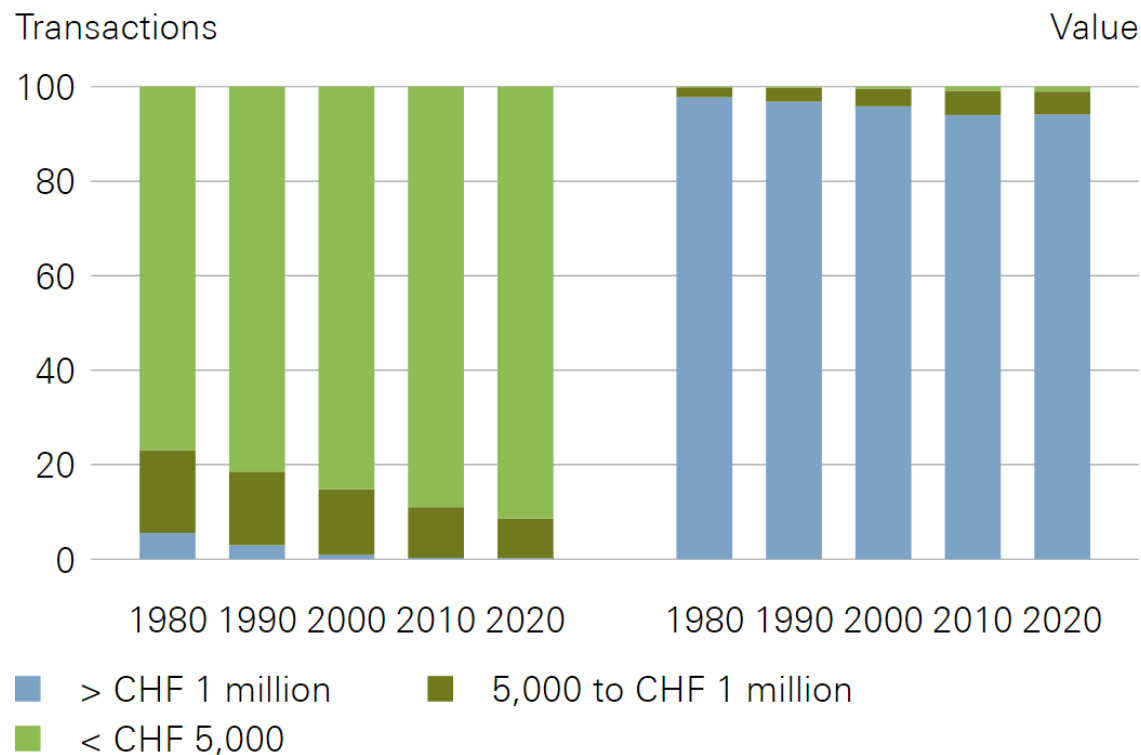
Retail payments

The SIC system settles interbank *and* retail payments

An international peculiarity

PROPORTION OF TRANSACTIONS AND VALUE

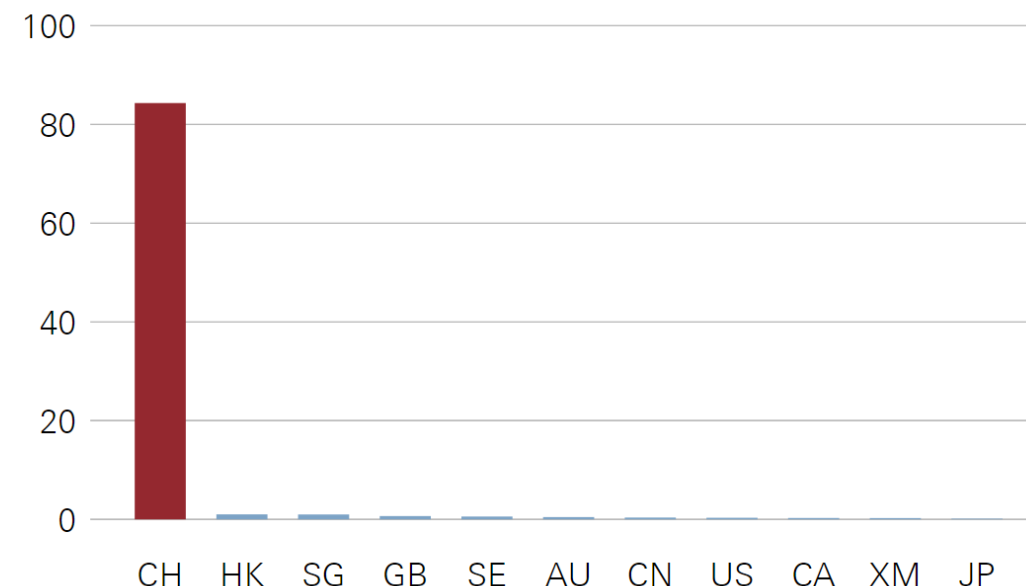
By payment size per decade (in percent)



Source: SNB

NUMBER OF TRANSACTIONS IN NATIONAL RTGS SYSTEM¹

Per inhabitant (2020)



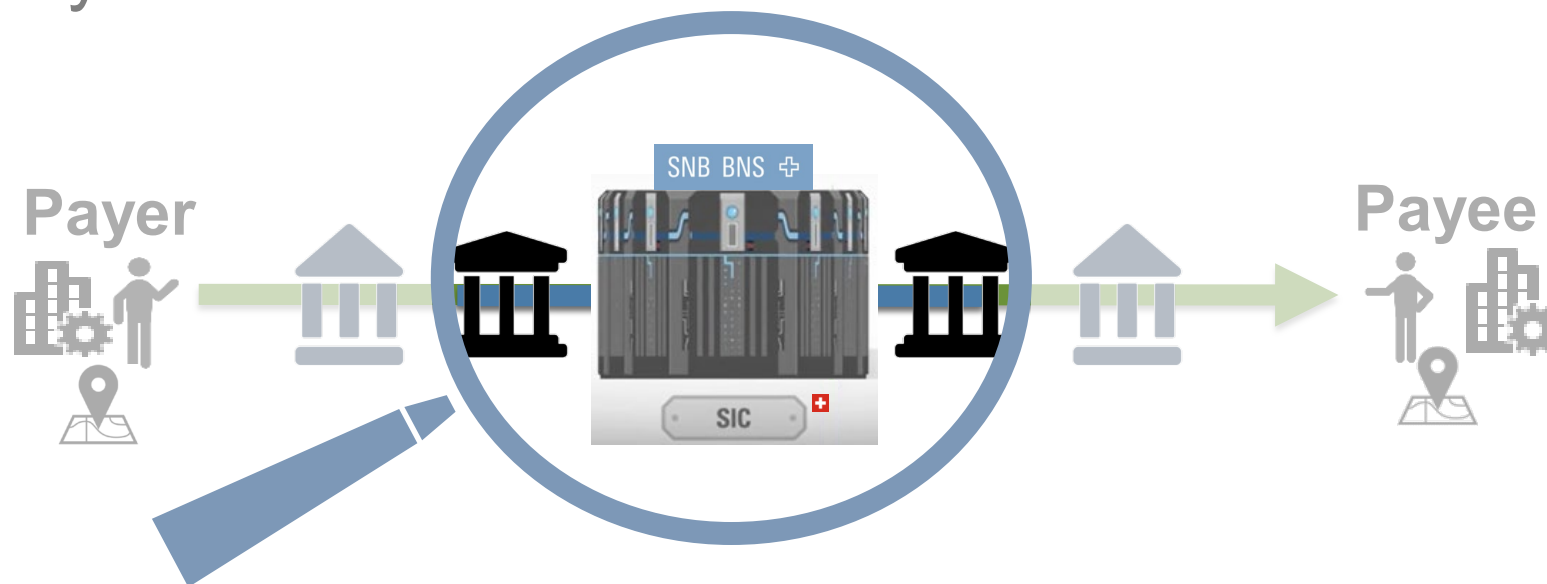
¹ Only the most important RTGS system is considered per country

Source: BIS Red Book

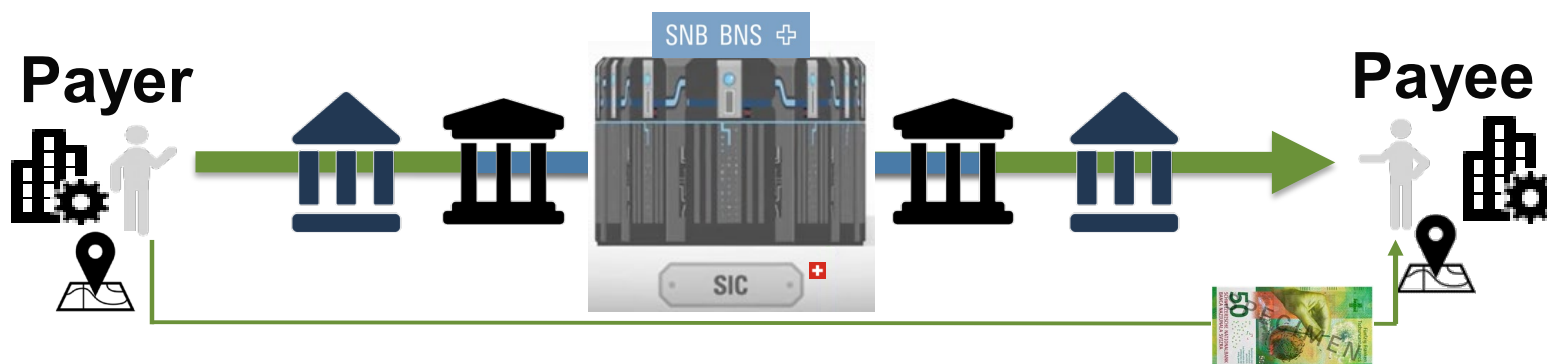
Change in SNB's role understanding

A broader analysis focus

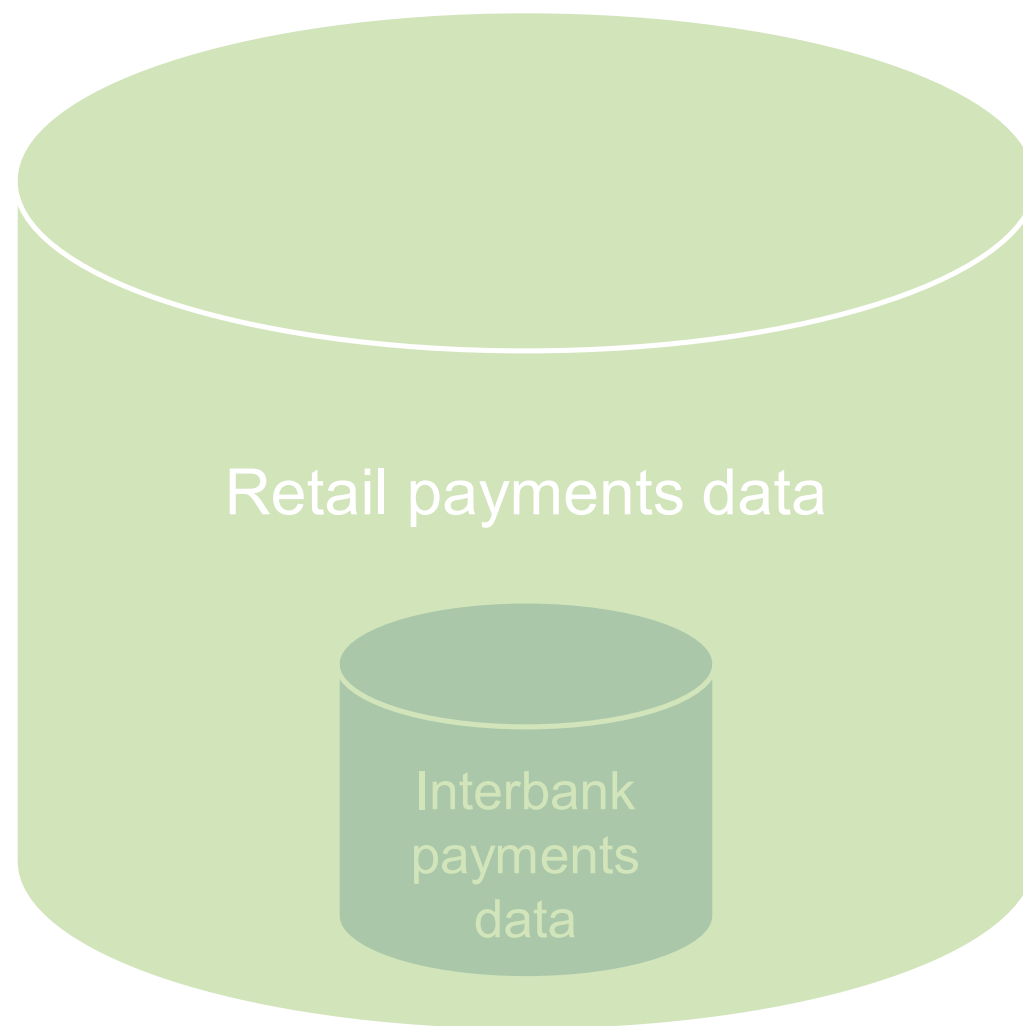
Previously



Now



Consequences of the broader focus: 20 times more SIC data for PA and ...



... modernisation of the PA infrastructure

Previously



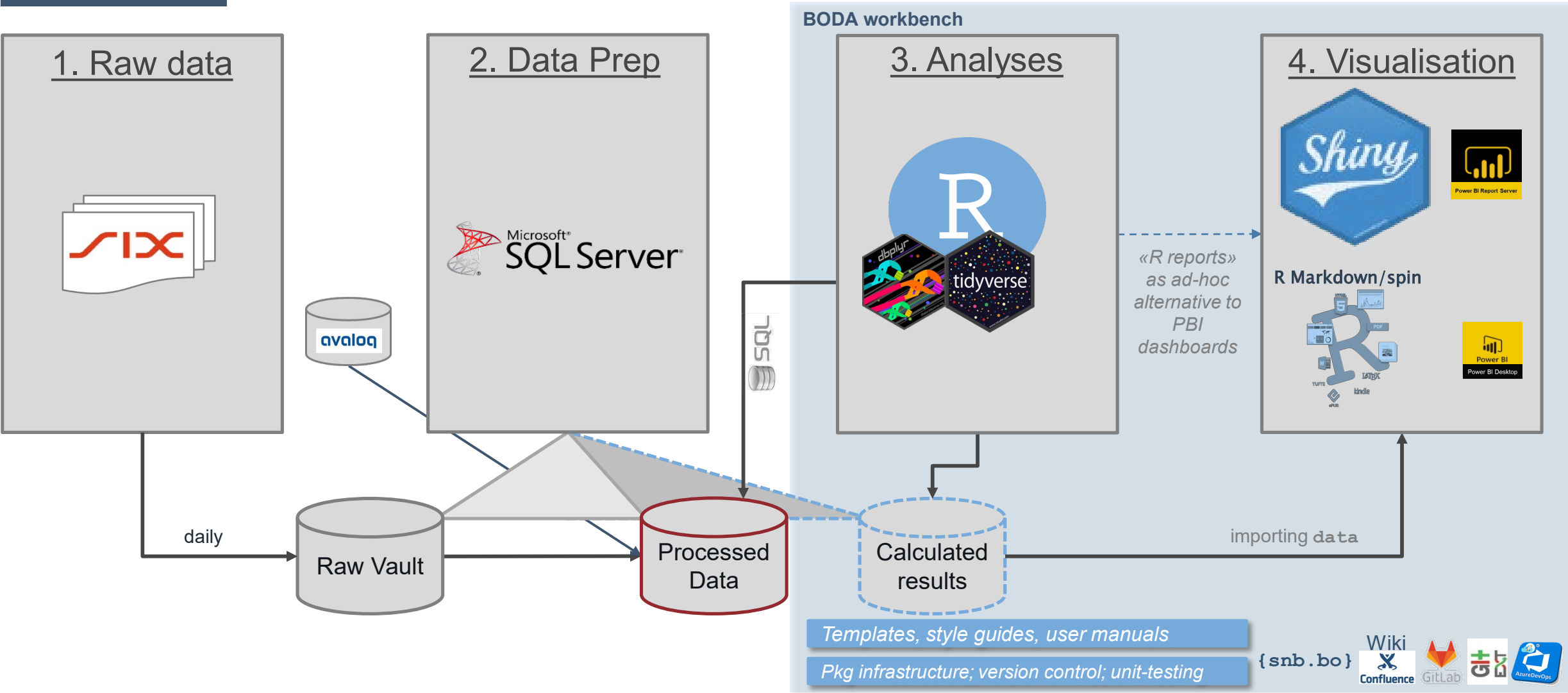
Now



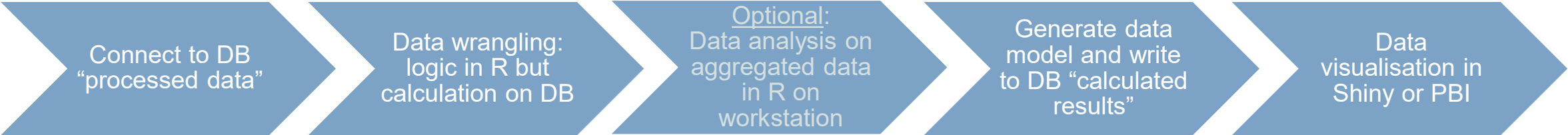
The (new) PA infrastructure and the role of *R*

High-level illustration of the new PA infrastructure

Modernisation of all four pillars/steps



The typical PA workflow



Live demo

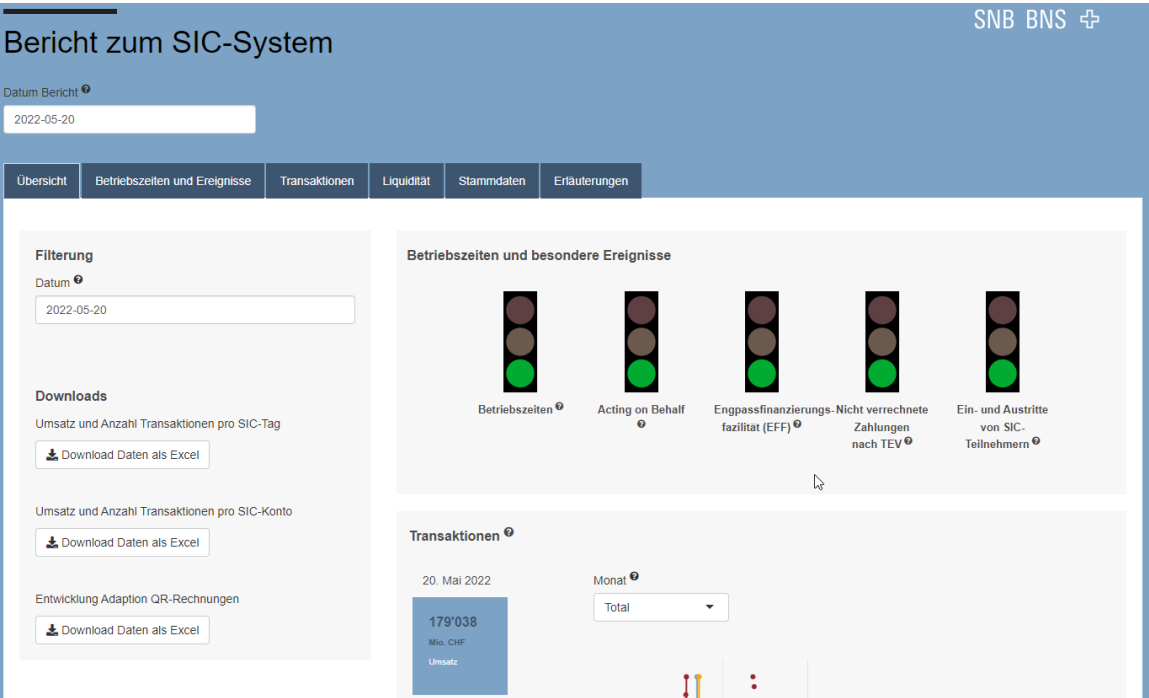


Examples of PA outputs

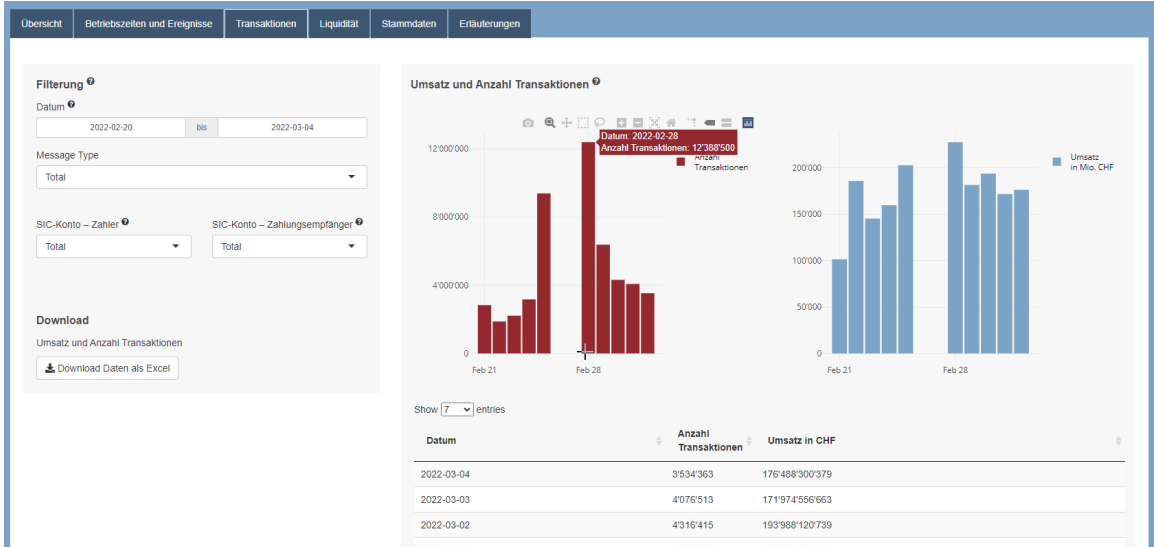
Some visualisations of PA results

The interactive daily report

RShiny App: «*Bericht zum SIC-System*»



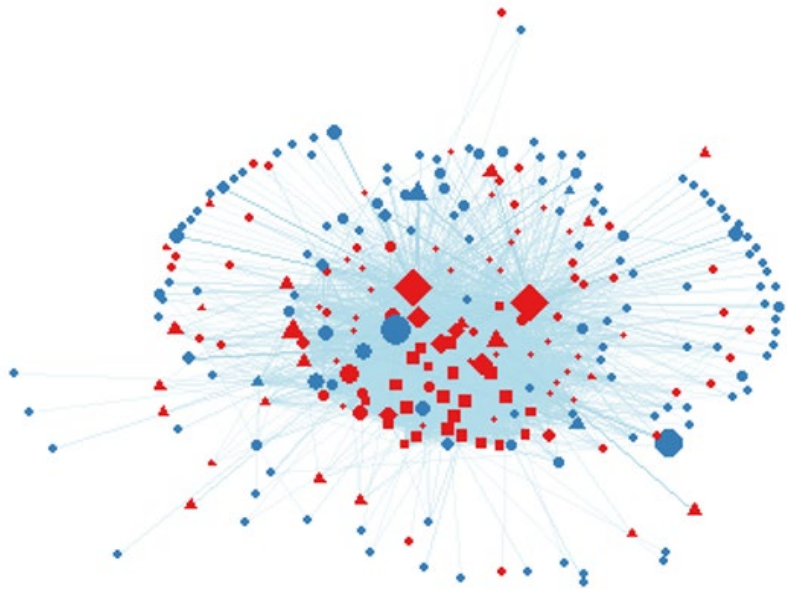
Tabs with interactive graphics and tables



Some visualisations of PA results II

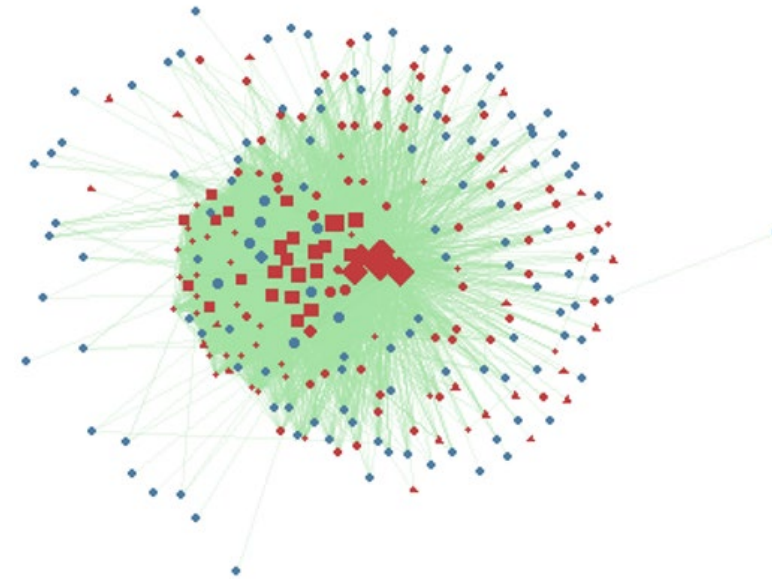
Payment networks in the SIC system

Interbank payments



• B • B_Ret • B_WWm • Dom • For
■ B_Pub • B_SIB ▲ NB

Retail payments



• B • B_Ret • B_WWm • Dom • For
■ B_Pub • B_SIB ▲ NB

Concluding thoughts

Summary

- Changes in the Swiss payments landscape have led to a new role understanding, a broader analysis focus and (much) more data.
- The Payment Analysis infrastructure (workbench and workflow) had to be modernised, with the R programming language playing a key role.
- The new infrastructure enables
 - i) the efficient analysis of payment data with over 3 million transactions/day (or over 3 GB/day) and
 - ii) the flexible application of analyses with varying degrees of complexity.

Thank you for your attention!

© Swiss National Bank

SCHWEIZERISCHE NATIONALBANK
BANQUE NATIONALE SUISSE
BANCA NAZIONALE SVIZZERA
BANCA NAZIUNALA SVIZRA
SWISS NATIONAL BANK

