7th ECB STATISTICS CONFERENCE

Towards the banking union: opportunities and challenges for statistics

Session 3 – The macro and micro dimension of the banking union

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Macro and micro data consistency for efficient Decision Support Systems

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CONTENTS

1. **The Basic of Conceptual Framework** for effective DSS as an answer to the challenges (consistency, comprehensiveness).

2. **Examples**: Case of Slovenia - Double deep recession 2009 – 2014; Decisions on micro and macro level at different areas (building blocks of statistics) and for the economy as whole.

3. **Further Challenges and Conclusions**; credit register for supervision, financial stability and monetary policy.
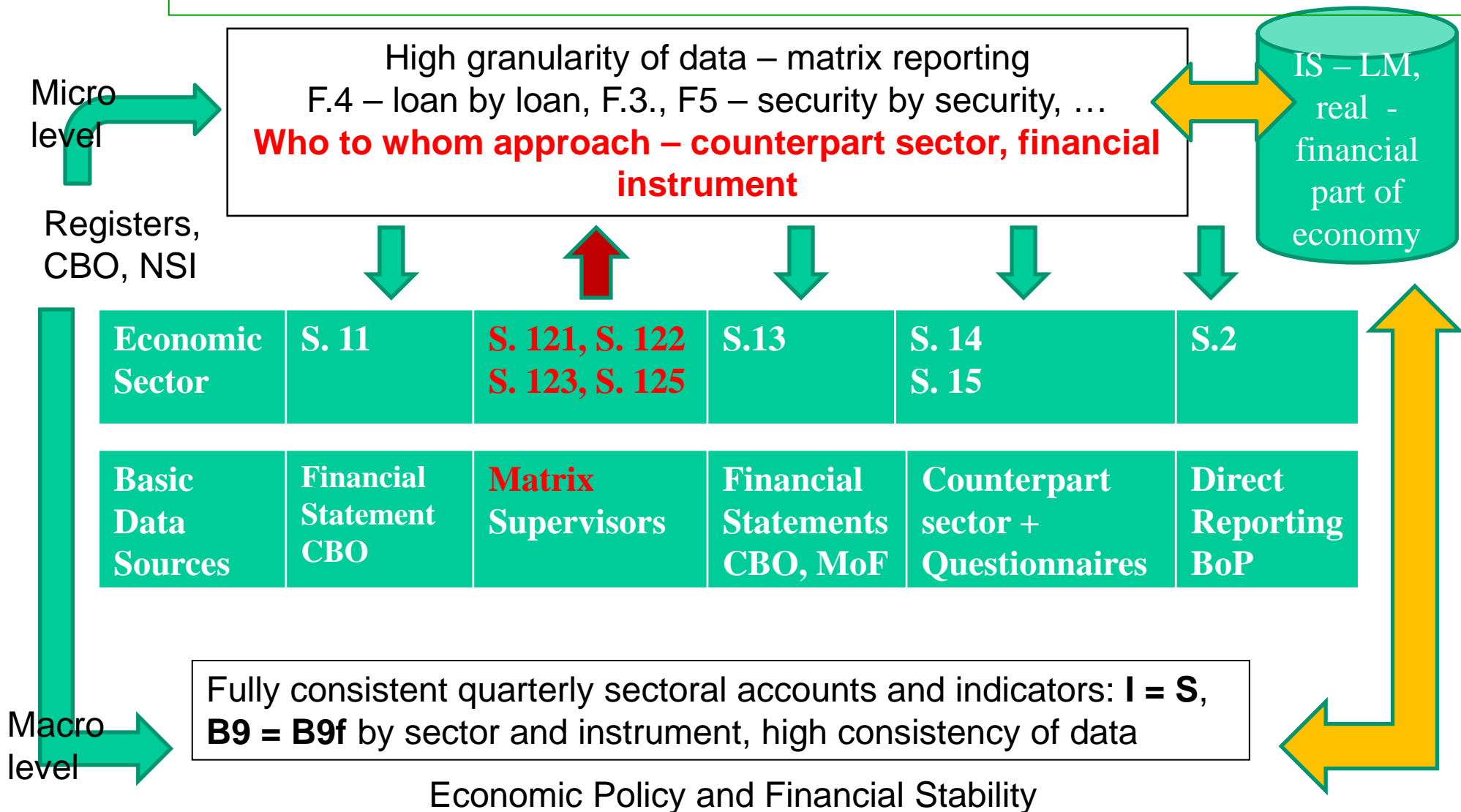
MAIN CHARACTERISTICS OF THE SYSTEM

- **Consistency between the data on macro (aggregate) and micro (individual) levels**
  - As a big data warehouse with many data marts (building blocks – sector's data)
  - Focus in contractual relationship (Bank vs. Client) with to basic dimensions (sector, instrument)
  - Other dimensions deployed by: i) policy makers (need to set up all other system's dimensions), ii) financial intermediaries (risks, competitiveness)
  - Financial intermediaries should be placed into the centre of the conceptual framework
  - By colleting the data only ones for many purposes (reporting burden)
  - Need to harmonize different methodological concepts or further granulized data (closed cooperation in between policy makers and reporters

- **Comprehensiveness of the information system**
  - Centralisation in data collective function (statistical system)
  - Financial intermediaries have to include defined dimensionality into their integrated accounting information system
  - All parties in contractual relationship belong to one single sector of the economy
  - Consistent mirror bookkeeping (accurate sectoral relationships (national economy, among them)
  - Full set of sectoral accounts should be developed at a national level
  - Better risk control and allocation of fund to the real economy is fully in line with the broader banking union goal

CONCEPTUAL FRAMEWORK OF STATISTICAL INFORMATION SYSTEM

Micro level →

High granularity of data – matrix reporting
F.4 – loan by loan, F.3., F5 – security by security, …
Who to whom approach – counterpart sector, financial instrument

IS – LM, real - financial part of economy

Registers, CBO, NSI

Economic Sector	S. 11	S. 121, S. 122 S. 123, S. 125	S.13	S. 14 S. 15	S.2
Basic Data Sources	Financial Statement CBO	Matrix Supervisors	Financial Statements CBO, MoF	Counterpart sector + Questionnaires	Direct Reporting BoP

Macro level →

Fully consistent quarterly sectoral accounts and indicators: **I = S**, **B9 = B9f** by sector and instrument, high consistency of data
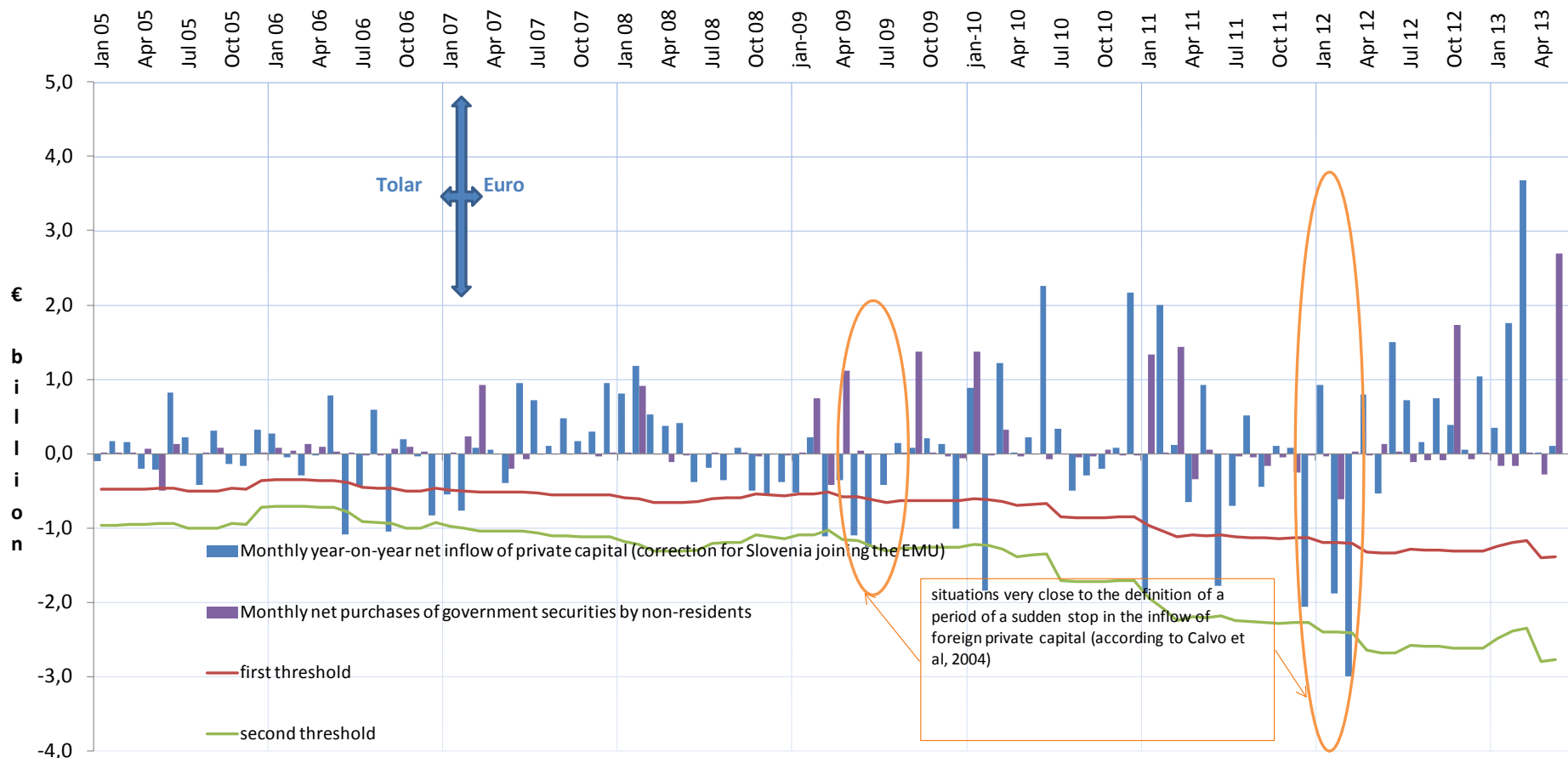
Economic Policy and Financial Stability

Source: Fabijan, J. (2013). Conceptual Framework of Financial Accounts - the Case of Slovenia. A Flow of Funds Perspective on the Financial Crisis Volume II. Macroeconomic Imbalances and Risks to Financial Stability. Bernhard Winkler, Ad van Riet and Peter Bull (ed.). *Palgrave Macmillan*, November 2013.

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CBO – Central Balance Sheet Office, named AJPES in Slovenia, NSI – National Statistical Institute, MF – Ministry of Finance, BoP – Balance of Payments, S.11 – Non-financial corporations, S.12 – Financial Corporations, etc. (according to ESA 95 classification)

EXAMPLE 1: Periods of a sudden stop in the inflow of foreign private capital into Slovenia

Monthly year-on-year net inflow of private capital (correction for Slovenia joining the EMU)

Monthly net purchases of government securities by non-residents

first threshold

second threshold

Tolar   Euro

situations very close to the definition of a period of a sudden stop in the inflow of foreign private capital (according to Calvo et al, 2004)
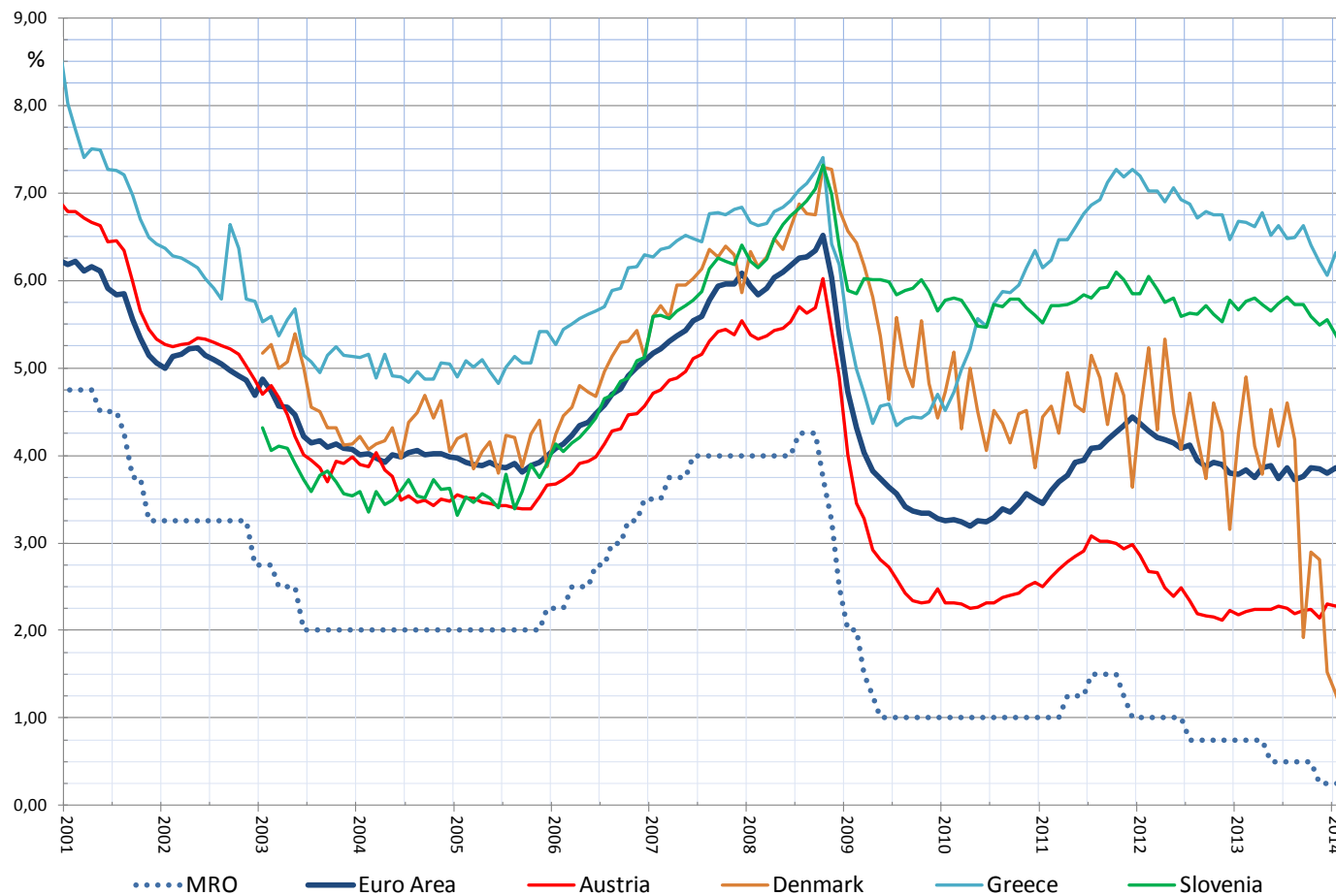
Source: Balance of payments, Bank of Slovenia; <u>First threshold</u>: a single negative standard deviation from the 24-month moving average of the monthly year-on-year net inflow of private capital. <u>Second threshold</u>: two negative standard deviations.

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EXAMPLE 2: Impairment of transmission mechanism

Source: Bank of Slovenia, SDW ECB; Interest rates on new loans to non-financial companies, less than 1 million Euro, with variable interest rates or one year fixation. Shown are weighted average interest rates and Main Refinancing interest rate.

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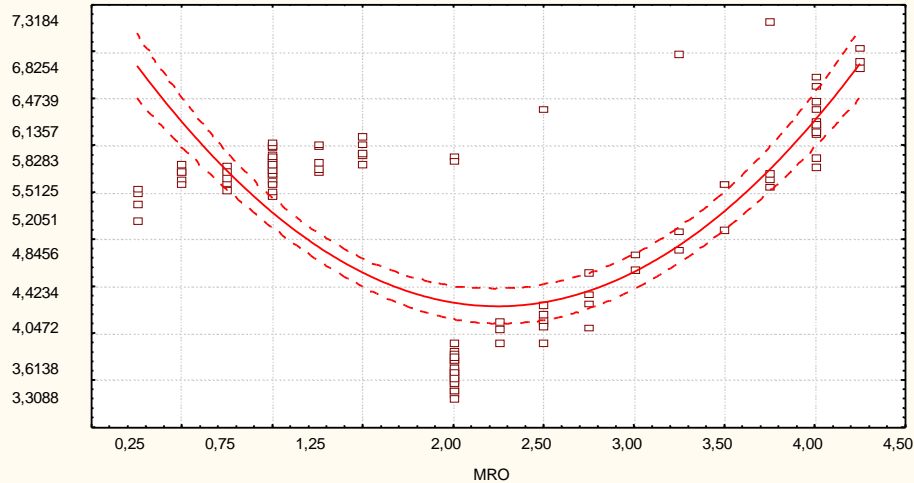BANK OF SLOVENIA

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EXAMPLE 2: (contd.)

Figure a: Linear regression; **Slovenia** – interest rates (% p.a.) for loans S.122 – S.11, to one year, less than 1 mill Euro : MRO (Jan. 2003 – Feb. 2014)

| Rehabilitation of Banking sector |

$H_0 : a = 5$

$H_1 : a > 5$

$\alpha = 0,05$
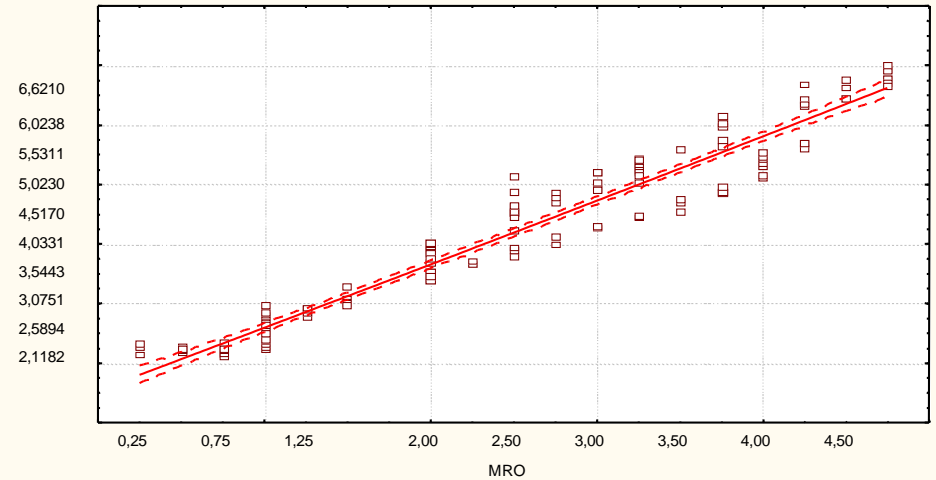
We reject the null hypothesis!

Figure b: Linear regression; **Austria** – interest rates (% p.a.) for loans S.122 – S.11, to one year, less than 1 mill Euro: MRO (Jan. 1999 – Feb. 2014)

$H_0 : b = 1$

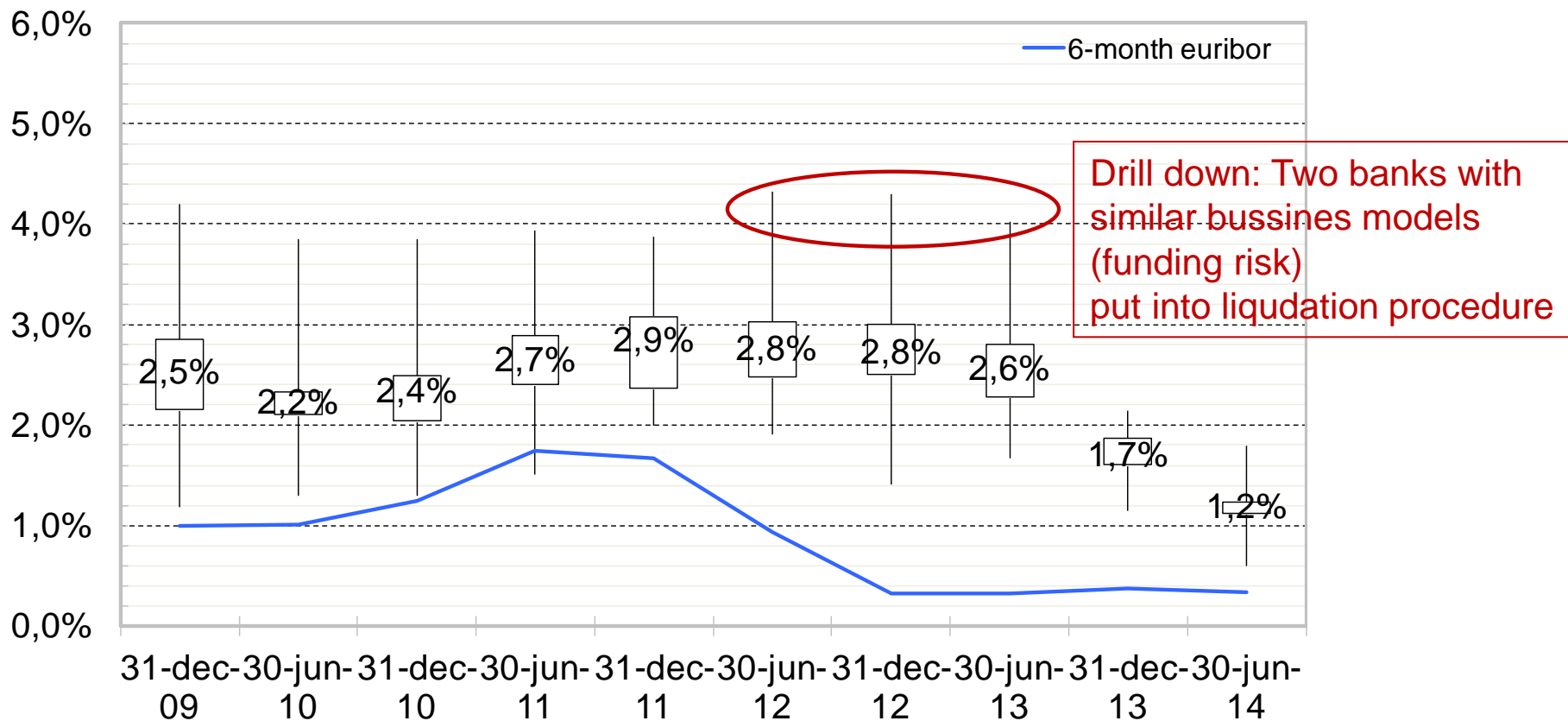$H_1 : b < 1$

$\alpha = 0,01$

We accept the null hypothesis!

Source: SDW - ECB

EXAMPLE 3: Micro level decisions from supevisory perspective

Drill down: Two banks with similar bussines models (funding risk) put into liqudation procedure

6-month euribor

2,5%   2,2%   2,4%   2,7%   2,9%   2,8%   2,8%   2,6%   1,7%   1,2%

31-dec-09 30-jun-10 31-dec-10 30-jun-11 31-dec-11 30-jun-12 31-dec-12 30-jun-13 31-dec-13 30-jun-14
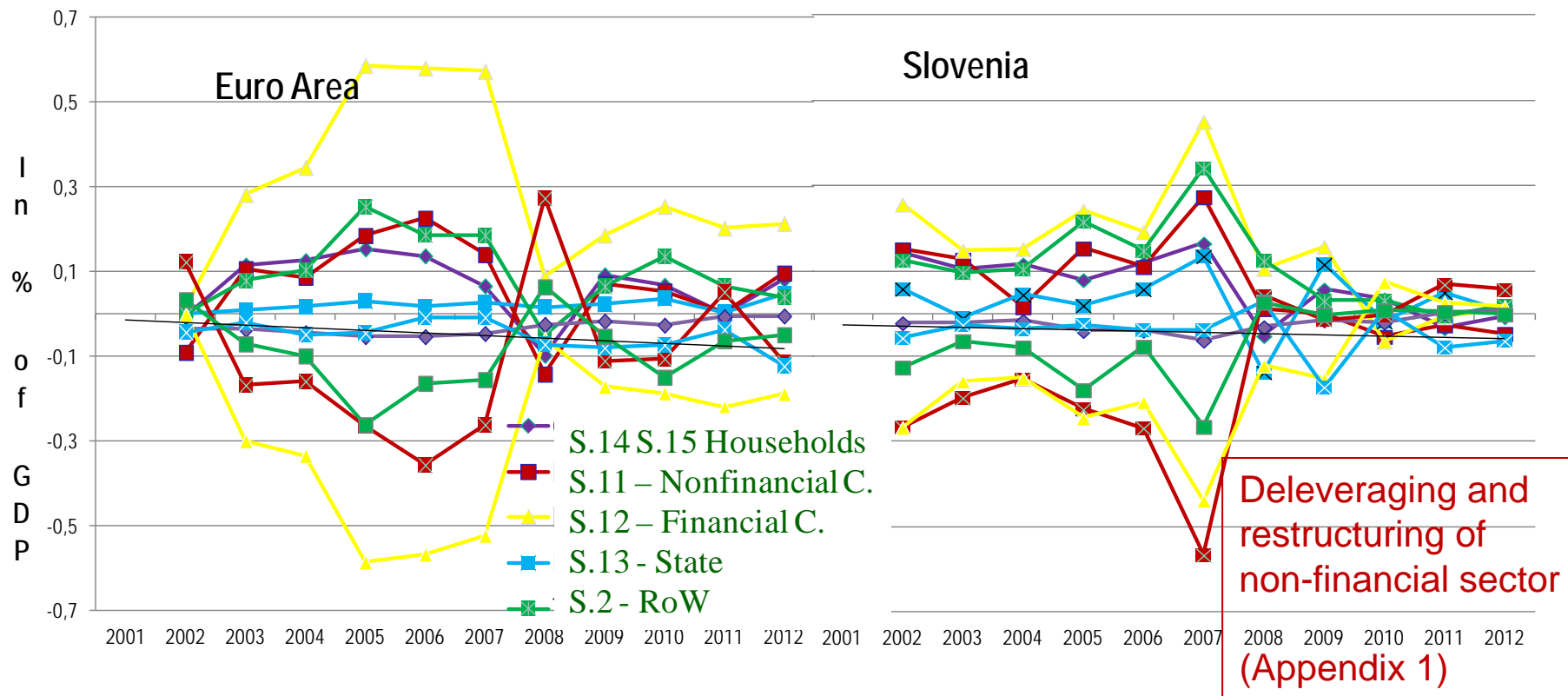
Source: Frequency distribution of MFI Deposit interest rates (3 month to 1 year maturity) for Households. Bank of Slovenia; min – max, IQR, weighted average.

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EXAMPLE 4: The problem lies also in indebtedness of non-financial sector

Euro Area

Slovenia

In % of GDP

Legend:
- S.14 S.15 Households
- S.11 – Nonfinancial C.
- S.12 – Financial C.
- S.13 - State
- S.2 - RoW

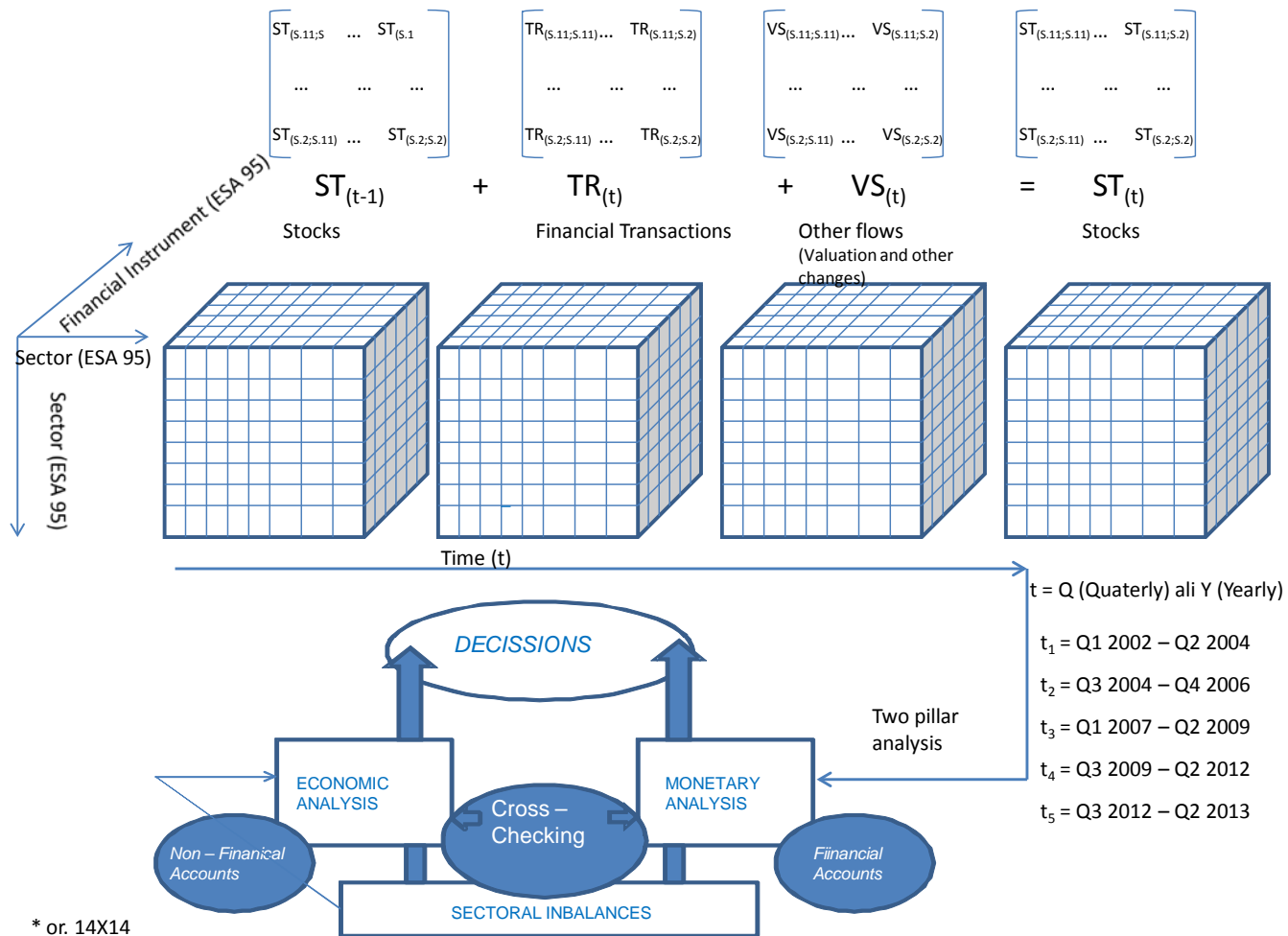Deleveraging and restructuring of non-financial sector (Appendix 1)

Source: SDW ECB, Financial Accounts; yearly relative changes of assets and liabilities, including transactions, valuation and other changes by each sector. Relative changes for assets are usually shown on positive side and relative changes of liabilities on negative side of abscise axis, otherwise valuations and other changes have prevailed over transactions in a certain year. (Bank of Slovenia, Financial Accounts 2007-2012, May 2013, p. 183).

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EXAMPLE 4: Using more dimensionality of DSS (financial instruments)

$$\begin{bmatrix} ST_{(S.11;S)} & \cdots & ST_{(S.1)} \\ \cdots & \cdots & \cdots \\ ST_{(S.2;S.11)} & \cdots & ST_{(S.2;S.2)} \end{bmatrix} + \begin{bmatrix} TR_{(S.11;S.11)} & \cdots & TR_{(S.11;S.2)} \\ \cdots & \cdots & \cdots \\ TR_{(S.2;S.11)} & \cdots & TR_{(S.2;S.2)} \end{bmatrix} + \begin{bmatrix} VS_{(S.11;S.11)} & \cdots & VS_{(S.11;S.2)} \\ \cdots & \cdots & \cdots \\ VS_{(S.2;S.11)} & \cdots & VS_{(S.2;S.2)} \end{bmatrix} = \begin{bmatrix} ST_{(S.11;S.11)} & \cdots & ST_{(S.11;S.2)} \\ \cdots & \cdots & \cdots \\ ST_{(S.2;S.11)} & \cdots & ST_{(S.2;S.2)} \end{bmatrix}$$

$ST_{(t-1)}$ + $TR_{(t)}$ + $VS_{(t)}$ = $ST_{(t)}$

Stocks   Financial Transactions   Other flows (Valuation and other changes)   Stocks

Financial Instrument (ESA 95)

Sector (ESA 95)

Sector (ESA 95)

Time (t)

t = Q (Quaterly) ali Y (Yearly)

t_1 = Q1 2002 – Q2 2004

t_2 = Q3 2004 – Q4 2006

t_3 = Q1 2007 – Q2 2009

t_4 = Q3 2009 – Q2 2012

t_5 = Q3 2012 – Q2 2013

Two pillar analysis

DECISSIONS

ECONOMIC ANALYSIS

MONETARY ANALYSIS

Cross – Checking

Non – Financial Accounts

Fiinancial Accounts

SECTORAL INBALANCES

* or. 14X14

[1] Source: Cross-Checking and the Flow of Funds. Papademos, L. D., Stark, J., (ed.). Enhancing Monetary Analysis (p. 355 – 380). Frankfurt am Main, European Central Bank.

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EXAMPLE 4: F.22 – Transferable deposits (contd.)

	S11	S121	S122	S123+24	S125	S13	S14+15	S2
2002	R	R	R	R	T	R	T	R
2003	R	R	R	R	T	R	T	R
2004	R	R	R	T	T	R	R	R
2005	T	T	R	R	R	T	T	R
2006	R	R	R	R	T	R	T	R
2007	T	T	R	T	T	R	R	T
2008	A	T	T	T	T	T	T	T
2009	A	R	R	R	T	T	T	R
2010	A	T	T	T	T	T	T	T
2011	A	R	R	R	T	T	T	R
2012	T	R	R	R	T	R	T	T
2013	A	R	R	T	T	R	T	R

Source: Characteristic of states in the Markov Chain probability distribution for 8x8 sectors of Slovenian economy flows on the level of transferable deposits F.22 Aggregated tables of Financial Accounts for Slovenia, Bank of Slovenia. ESA 95 – F.22 – including on net claims for transferable deposits. Net claim S.122 →S.11 represent the lack of liquidity for non-financial sector (S.11) and vice versa. A – Absorbing state, R – Recurrent state, T – Transient state. In years with states characteristic as A or R, the Marcov chain is closed, non-broken with non-period in transition. In years whereas also T states are presented, the Markov chain is closed and broken with non-period in transition. In both cases steady state probability distribution exists.

FURTHER DEVELOPMENTS AND CHALLANGES

Deleveraging

Recession

% real GDP growth

debt / GDP

McKinsey	10 years	1 – 2 years	2 – 3 years	4 – 5 years

| Slovenia | 2004 - 2008 | Q2   Q2
2009 – 2012 | Q3   Q3
2012 – 2013 | |
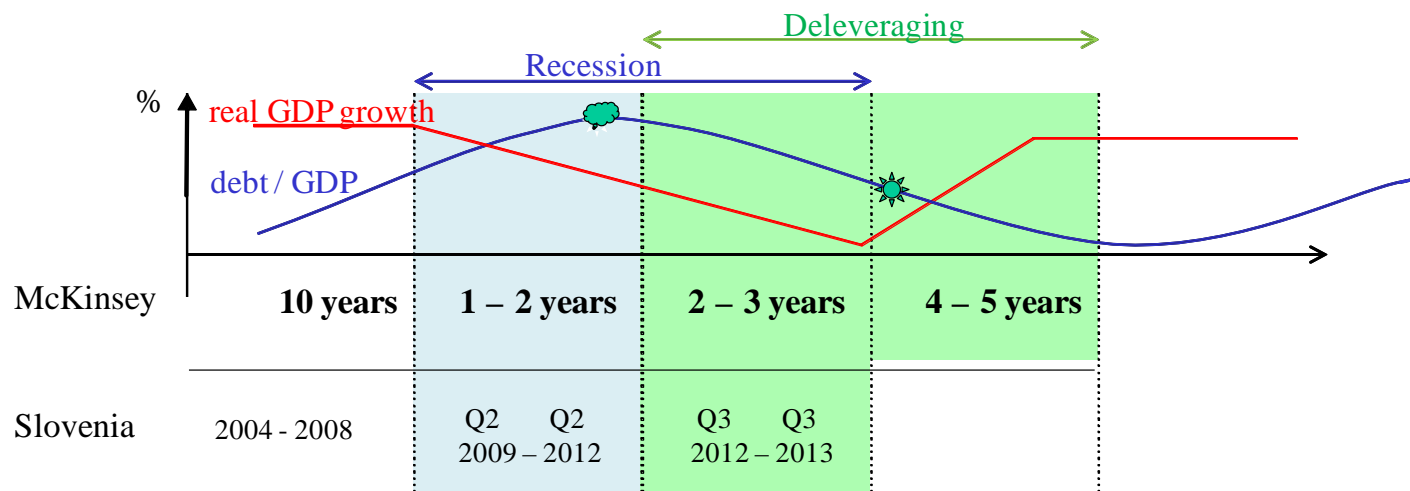
- Estimated Slovenian situation in the mid of 2012   - Estimated Slovenian situation at the end of 2013

Source: McKinsey Global Institute, "Debt and deleveraging", January 2010

1. Sequence of sectoral deleveraging and restructuring is very important

2. Efficient incorporation of Credit register into the DSS (Appendix 2)

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CONCLUSIONS – RECOMMENDATIONS

- The comprehensive system enables the use of the same set of data for different purposes.
- Brings high consistency of data on macro and micro level among different statistics.
- Enables fast detection of unusual/extreme data and the reasons behind them. Help of modern technologies (data warehouses, (M)OLAP* tools).
- Consistency allows as to apply different methods (statistical, stohastical, data mining)
- Allows a pragmatic approch to decisons vs. model approach.
- Data are also useful for reporters to concentrate on risk management (Customer Relationship Management).
- The system might be suitable for banking union needs.

*MOLAP – Multidimensional On – Line Analytical Processing

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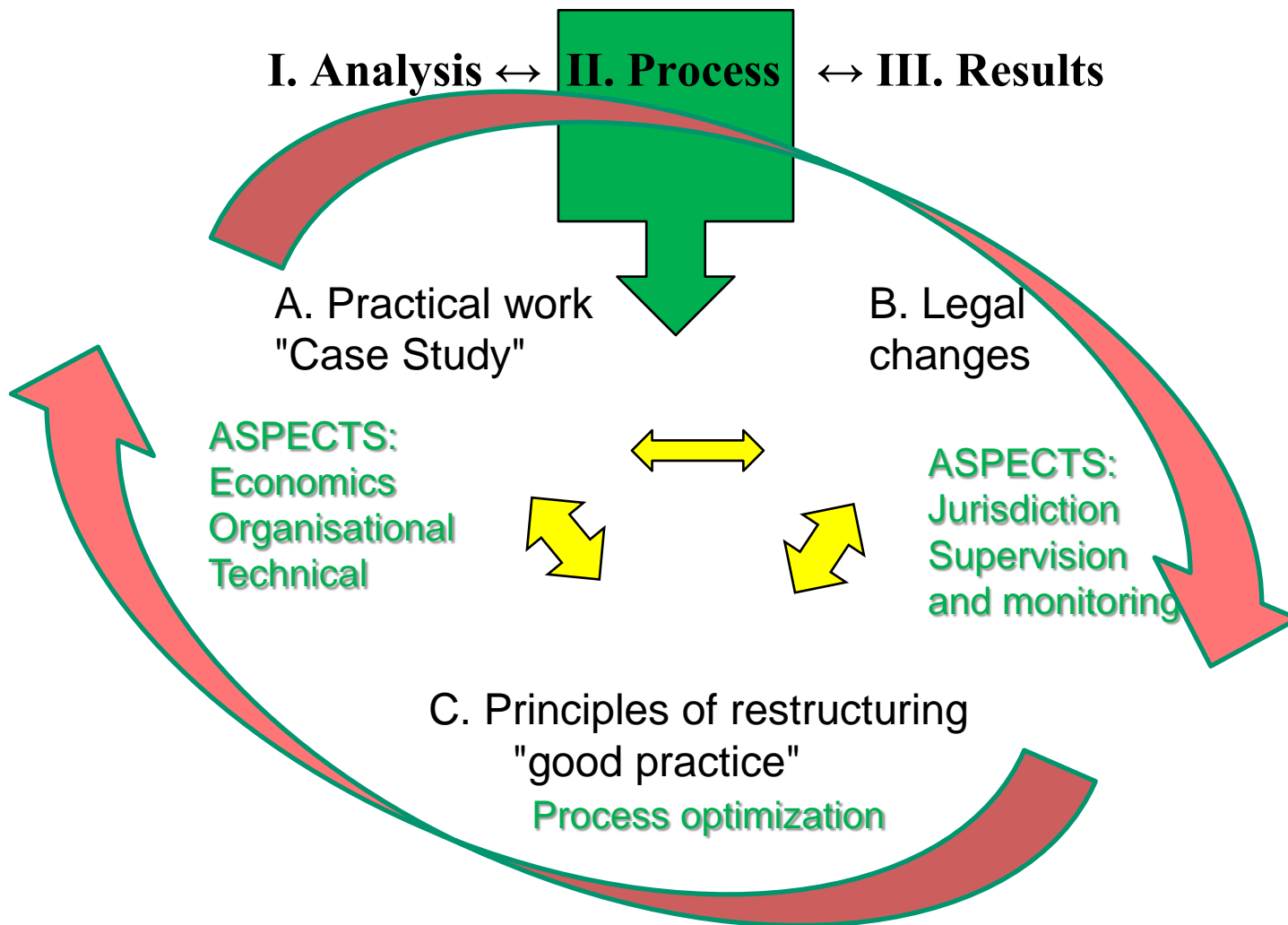
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THANK YOU
FOR YOUR ATTENTION!

Appendix 1: Project performing by BoS and Banking Association

I. Analysis ↔ **II. Process** ↔ **III. Results**

A. Practical work
"Case Study"

B. Legal
changes

ASPECTS:
Economics
Organisational
Technical

ASPECTS:
Jurisdiction
Supervision
and monitoring

C. Principles of restructuring
"good practice"

Process optimization

Appendix 2: Efficient incorporation of Credit register into the DSS