CROATIAN NATIONAL BANK

Measuring financial stability – systemic risk accumulation and materialization vs. financial system resilience

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Why FS and MPP have became "*hot topics*"?

- Increased number of financial crisis in the past few decades
- Recent crisis - enormous costs - still materialising
- policymakers, academics, analysts, market participants – understood the importance of:
  - macroprudential approach
  - improving methodology for timely identification and measurement of systemic risks,
  - creating buffers,
  - countercyclical approach,
  - coordination among policymakers,
  - communication.....

What exactly is “FS”?

- Lack of financial instability ☺
- Smooth and effective functioning of all financial system segments (institutions, markets, infrastructure) in resource allocation, risk assessment and management, payments execution......
- Increasing resilience of the system to sudden shocks
- Contributing to sustainable economic growth

Measuring FS – a“moving target”

- For successful MPP and preserving FS – necessary to capture all sources of systemic risks
- Definition of FS – discovers a range of relevant factors that may affect it – specific for each country
- Apart from that – liberalization, global integration, technology, sophisticated new instruments, increasingly complex relations among FIs and financial markets, risks arising from domestic and international macroeconomic developments....
- The selection of proper indicators - one of the biggest challenges of macroprudential policy.

Measuring FS in literature

- *CBRT(2006)* - financial strength index
- *Geršl and Hermanek (2006)* banking sector stability index
- *Albulescu (2010)* - aggregate indicator of financial stability
- *Cheang and Choy (2011)* - aggregate index of financial stability
- *Petrovska and Mucheva (2013)* - indicator of stability of the overall banking sector, financial conditions index

Systemic risks vs. resilience

- In this paper - FS observed through the:
  - processes of accumulation and materialisation of systemic risks and
  - degree of resilience of the financial system to potential systemic risks.

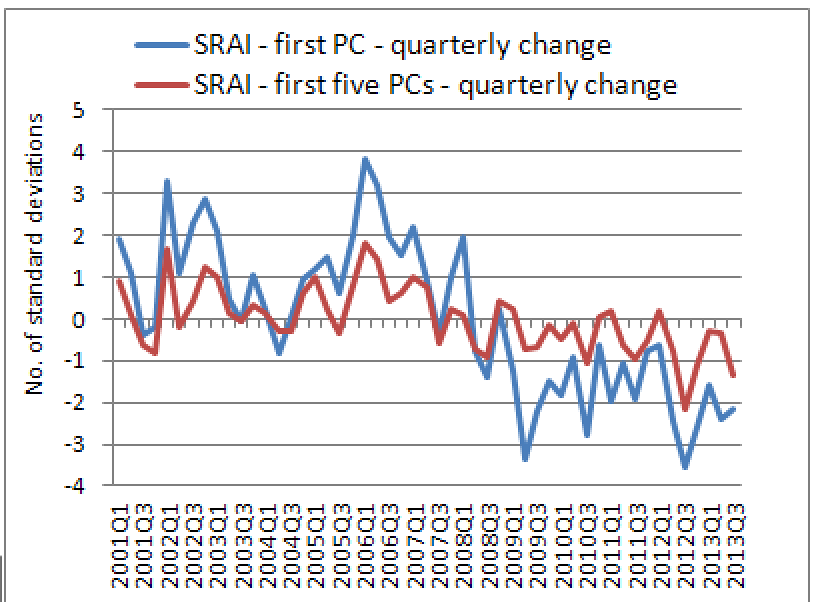
- Special focus - risks faced by small open highly euroized economies dependent on foreign capital inflows and with foreign owned banking sectors
  - mainly neglected in the literature dealing with developed countries

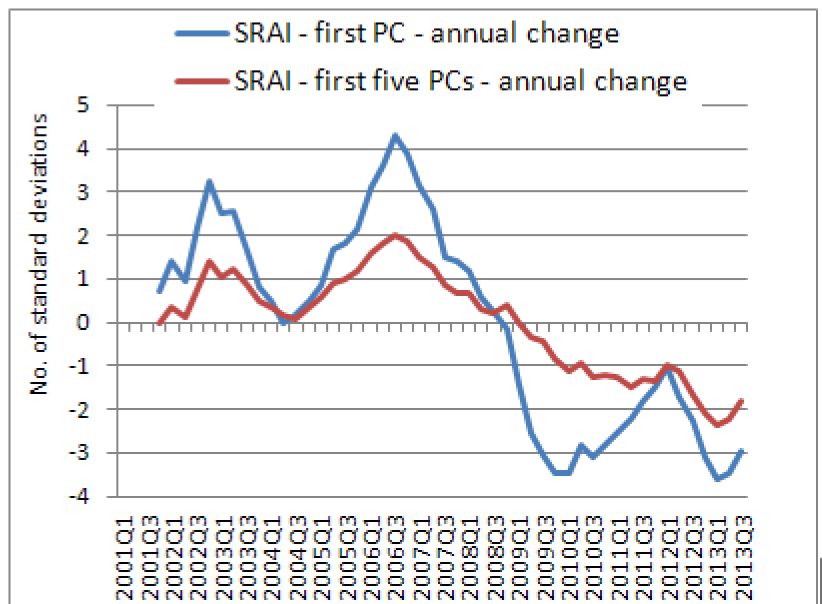
Composite indices – SRAI; SRMI; FSRI

- Problem of large number of variables that might affect FS - solved by constructing composite indices
- Method - Principal Component Analysis
- Indicators reflectiong systemic risk - banks' asset quality, liquidity risk, fx risk, IR risk, credit risk, market risk, macroeconomic risks and risks arising from individual economic sectors
- Indicators related to the resilience - various forms of reserves - in the banking sector, on the level of the whole financial system

Systemic risk accumulation index (SRAI)

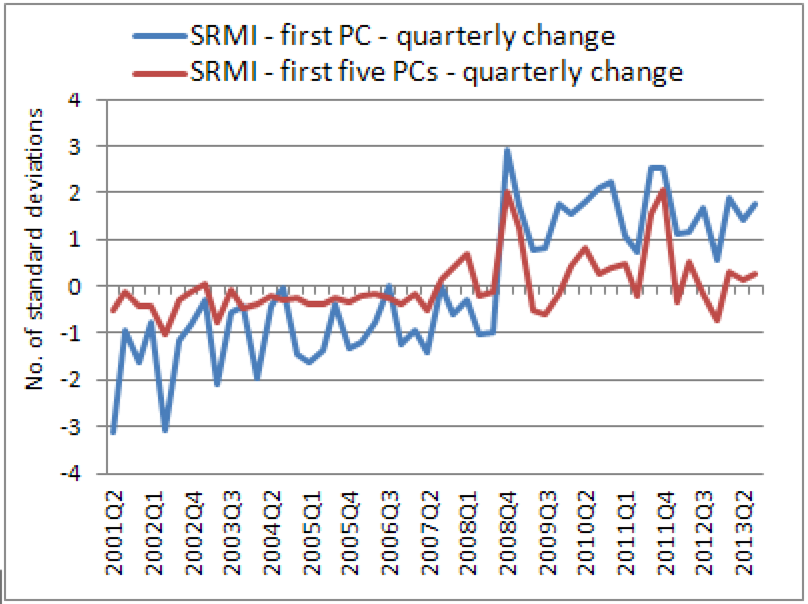
Sources of accumulation of systemic risk	Indicators	Loading parameters (annual change)	Loading parematers (quartery change)
Structure of bank assets and liabilities respect to interest rate variability	Loans by interest rate variable within 1 year/ total loans	0,14	0,07
	Loans indexed to foreign currency/total loans	-0,25	-0,27
	Foreign currency deposits/total deposits	-0,31	-0,30
	Total loans / (total deposits - deposits received from mother banks)	0,23	0,25
Corporates	Indebtedness of corporates/GDP	0,08	0,15
	Rate of change in corporate loans	0,35	0,39
Households	Indebtedness of households/GDP	0,36	0,40
	Rate of change in household loans	0,37	0,43
Government	Public debt / GDP	-0,31	-0,27
	Rate of change in government loans	0,04	0,06
External imbalances	External debt / GDP	0,08	0,09
	Current account balance/GDP	-0,31	-0,29
Asset prices	Hedonic real estate index	0,35	0,27
	CROBEX stock exchange index	0,22	0,13

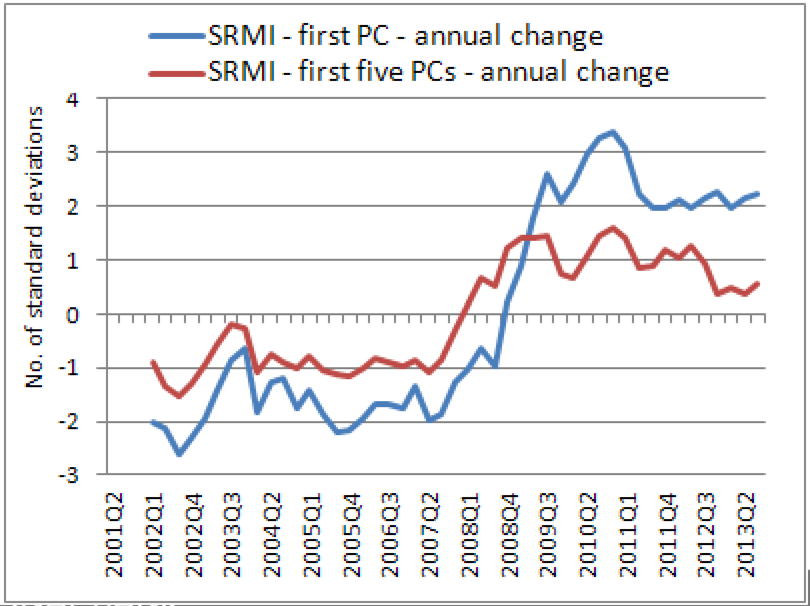




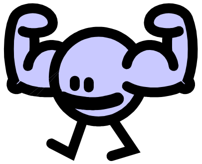
Systemic risk materialization index (SRMI)

Sources of materialisation of systemic risk	Indicators	Loading parameters (annual change)	Loading parematers (quartery change)
Corporates	NPL to total loans ratio – corporates	0,47	0,50
Households	NPL to total loans ratio – households	0,46	0,40
	Household interest/income	-0,35	-0,45
Macroeconomic trends	ILO unemployment rate	0,45	0,18
	Annual rate of change in consumer prices	-0,08	-0,19
	Weighted exchange rate according to the structure of the assets of commercial banks	0,37	0,42
Financial markets	Difference between interest rates on foreign currency deposits and foreign currency loans	0,29	0,25
	Risk premium for mother banks of largest domestic foreign owned banks	0,07	0,18
	Risk premium for Croatia – EMBI yield spreads	0,05	0,21

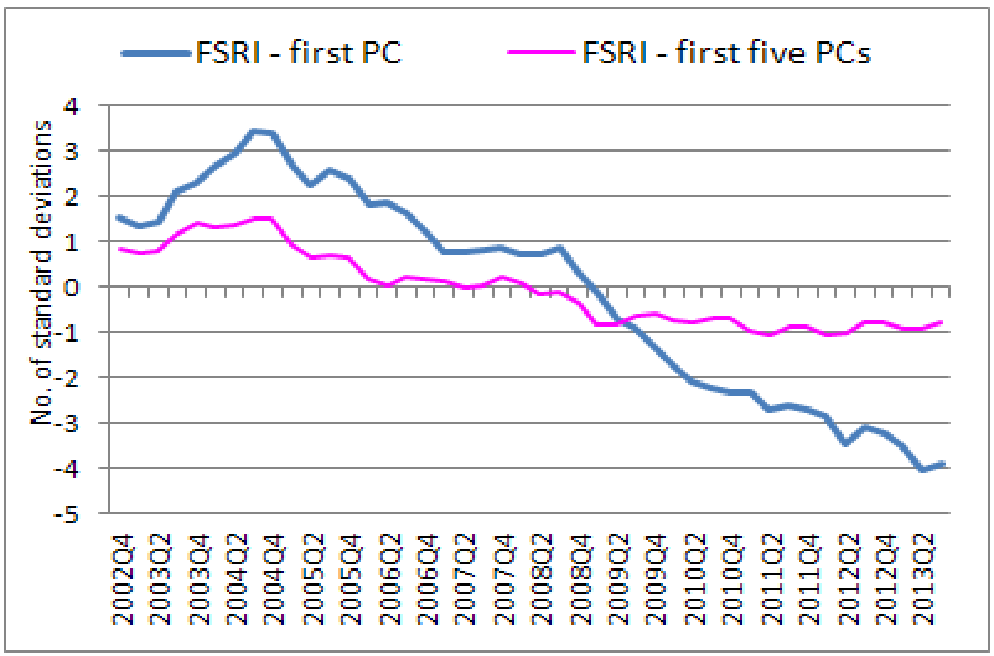




Financial system resilience index (FSRI)

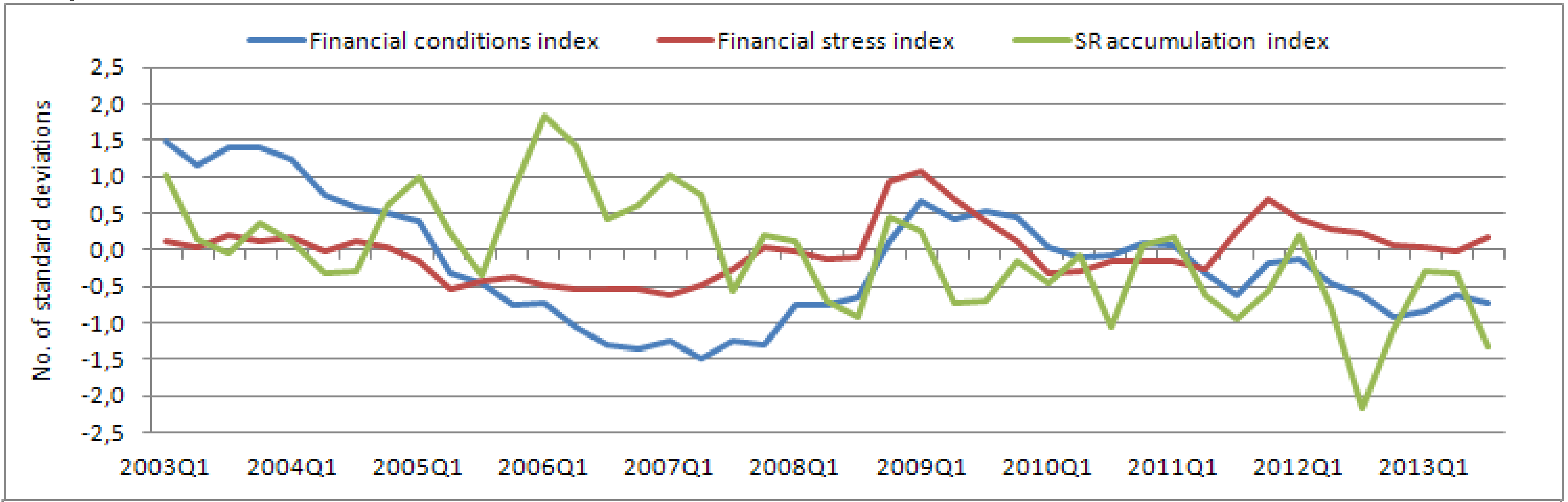


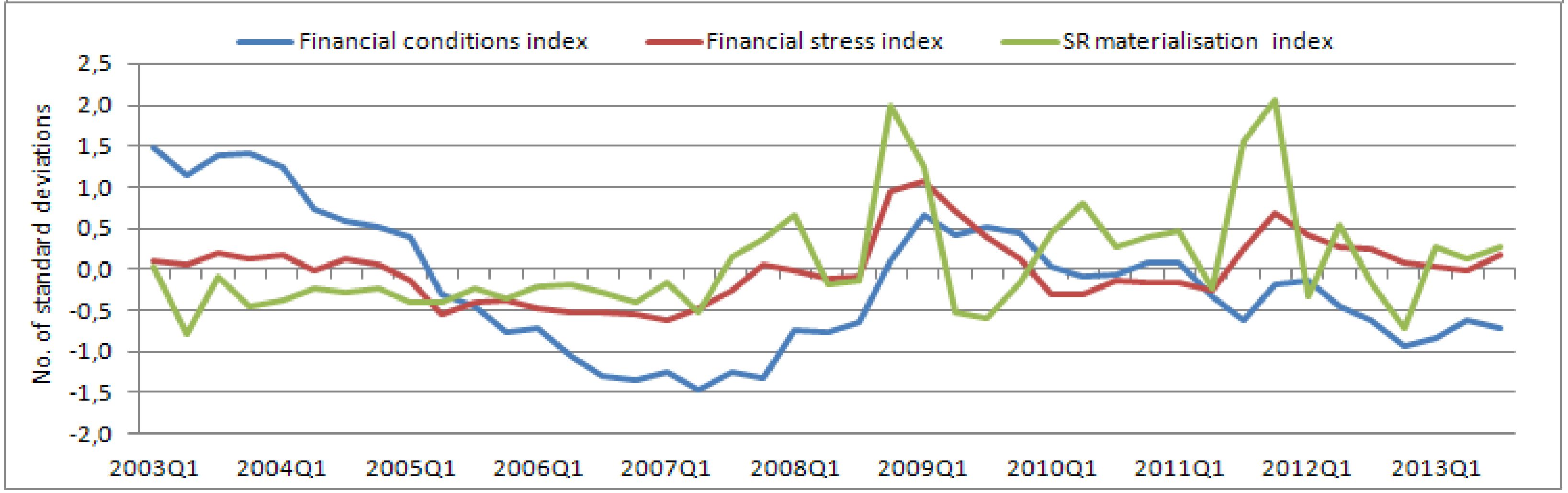
Sources of the system resilience	Indicators	Loading parameters
Capitalisation	capital adequacy ratio	-0,38
	capital / assets	-0,40
Reserves in the system	reserves of banks with CNB / assets of banks	0,24
	international reserves / GDP	0,40
	return on assets	0,38
Resilience to liquidity shocks	retail deposits / loans	0,23
	coverage of foreign currency liabilities	0,43
	liquid foreign assets / total assets	0,32



More indices – clearer picture

- Despite all the efforts - no single index will ever be able to tell us all we should know
- But combined together – they might shed some light on what is actually





How can these indices help us?

- Early observation of SR accumulation –
  - could be crucial for the prevention of a future crisis episode
  - provides policy makers and the financial sector enough time to act preventively

- Better communication with other policymakers, market participants, public....

- Combined with other indices (FCI; FSI) – should facilitate understanding of the countercyclicall processes behind activites related to MPP and FS
  - Particulary during the “tranquill” periods in financial markets – time for creating buffers

Thank you!