

EXPLORING LEADING INDICATORS OF BANKING CRISIS IN CASE OF ALBANIA

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Introduction

- ❑ The financial crisis (2007-2008), highlighted the need for an effective set of policy tools to mitigate systemic risk and prevent future crises;
- ❑ Central banks/other institutions have engaged in building macroprudential policies to discourage the build-up of macro-financial vulnerabilities;
- ❑ The activation of macroprudential tools takes time, so policymakers need to be aware of the risks and vulnerabilities at early stage.

Motivation

The need for some *reliable leading indicators* of systemic banking crisis in case of Albania:

- signaling in advance the accumulation of vulnerabilities in banking sector
- completing the macroprudential framework;
- providing guidance for future activation of macroprudential instruments.

Literature:

- Alessi & Detken (2013)
- Bell J, & D.Pain (2000)
- Borio C, & P. Lowe (2002a,b):
- Borio C, & M.Drehmann (2009)
- Lainà P & Nyholm J & Sarlin P (2014)
- Kaminsky G, & C. Reinhart, (1999)

Methodology

□ Univariate signal extraction approach (Kaminsky & Reinhart, 1999)

- non-parametric method
- based on the view that crises are preceded by accumulation of imbalances and that the movements of some macro-financial indicators beyond certain critical levels, can help to detect them ahead in time.

Steps:

- *Definition of past stress event/crisis events and their starting and ending date (indexes, past literature, reports);*
- *Binary definition of past stress/crisis (1-crisis, 0-no crisis);*
- *Selection of potential leading indicators of banking stress/banking crisis;*
- *Setting the thresholds V_c for each indicator V_t ; setting the predicting time horizon H*
- *Classification of observations for each variable V_t according to Confusion Matrix , for a given threshold V_c :*

	Crisis	No crisis	Type I errors	Type II errors	Predicted crisis (%)
Crisis Signal ($V_t > V_c$)	A	B	C/(A+C)	B/(B+D)	A/(A+C)
No crisis signal ($V_t < V_c$)	C	D			

Two measures:

1. Minimization of Noise-to-Signal ratio = $\min \left(\frac{\text{Type II errors (\%)}}{1 - \text{Type I errors (\%)}} \right)$
2. Minimization of policymakers loss function
 $= L = \theta \frac{C}{(A+C)} + (1 - \theta)$, so $\min(\theta; 1 - \theta)$

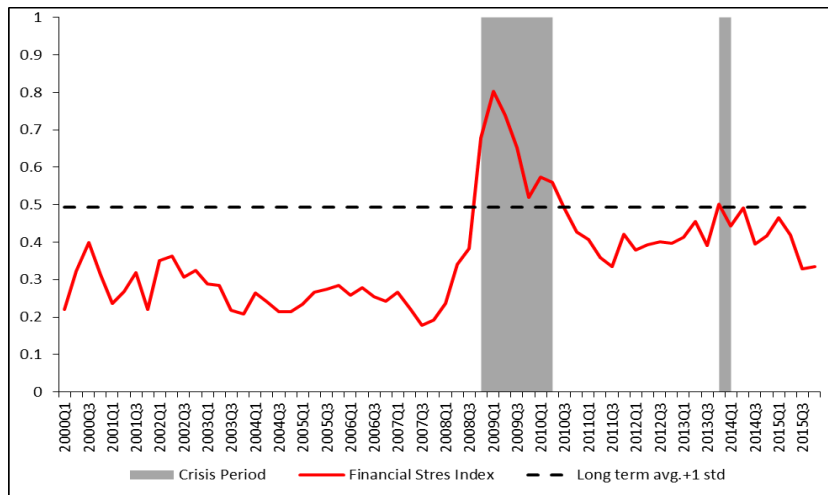
Condition:

Indicator should predict > 50% of crisis episodes.

Stress events- the case of Albania

- Albanian banking sector never experienced a banking crisis according to common definitions in literature;
- Over the past 20 years some episodes of severe financial distress have occurred, similar to crisis events.
- Stress events are defined through Financial Systemic Stress Index (FSSI)

FSSI and the episodes of systemic banking stress.



Sources: Kota and Sage (2013), Bank of Albania

Note: The grey shaded area represents the identified periods of financial distress.

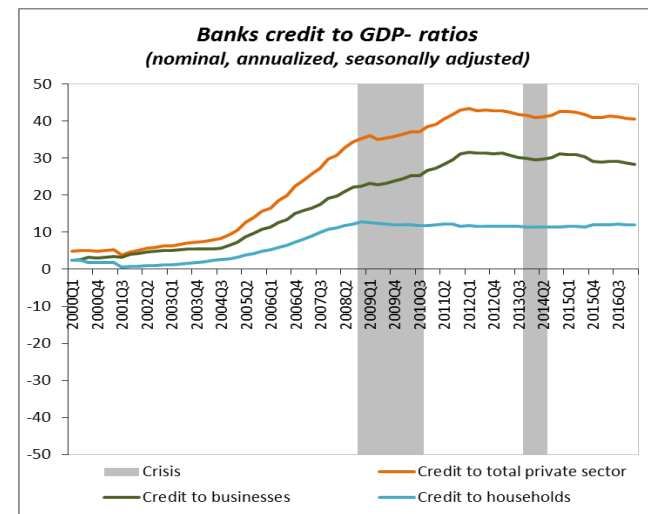
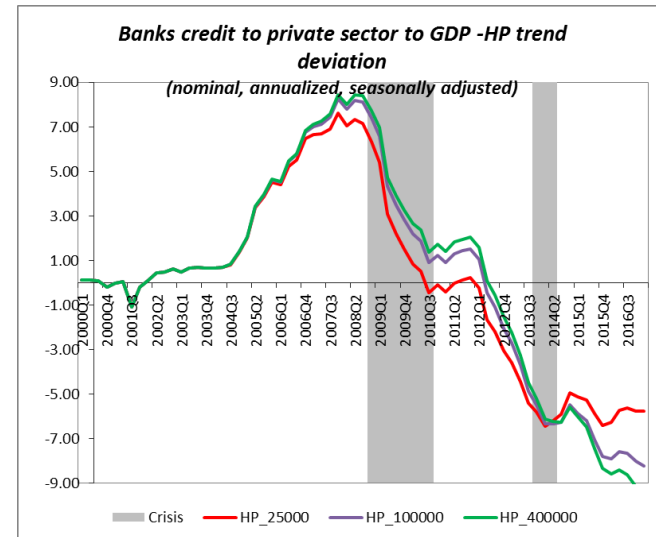
The first stress event: 'Q3 2008 to Q2 2010' can be divided in two parts:

- Q3 2008 to Q3 2009- the adverse effects of the global financial crisis
- Q4 2009 to Q2 2010- the adverse spillover effects of the Greek crisis

The second stress event: Q4 2013 - Q2 2014- a rapid increase in the banks NPLs and deteriorating profitability of banks

Indicators and Data

- ❑ Credit related indicators taken into analysis:
 - *Total credit (total private sector, corporates, households)*
 - *Bank credit (total private sector, corporates, households)*
 - *Credit to deposits*
- ❑ Series transformations:
 - *ratio to GDP (nominal, annualized, seasonally adjusted);*
 - *credit gaps from long term trend (one sided HP filter, $\lambda = 25.000, 100.000$ and 400.000),*
 - *annual growth rates.*
- ❑ Threshold choice:
 - *various thresholds for each indicator: arbitrary choice, based on literature, historical average.*
- ❑ Data:
 - *quarterly data, nominal values;*
- ❑ Leading horizon:
 - *6 quarters, 8 quarters, 10 quarters and 12 quarters, ahead of crisis, cumulative*



Results

- ✓ All credit indicators tend to react before the crisis, but the speed and the magnitude of this reaction differs substantially;
- ✓ Credit gap indicators show better leading indicator properties comparing to the other indicators;
- ✓ Only few indicators fulfill the methodology criteria of optimal leading indicators;
- ✓ Credit to total private sector (corporate+household) –to- GDP gap, seems to have good signaling properties while de-trended with one sided HP filter, with smoothing parameter $\lambda=100.000$ and $\lambda= 400.000$;
- ✓ The optimal thresholds can be 2 – signaling an “*increased risk*” and 3-signaling “*high risk*”;
- ✓ The indicator performs better with a leading horizon of 8-12 quarters ahead of the crisis.