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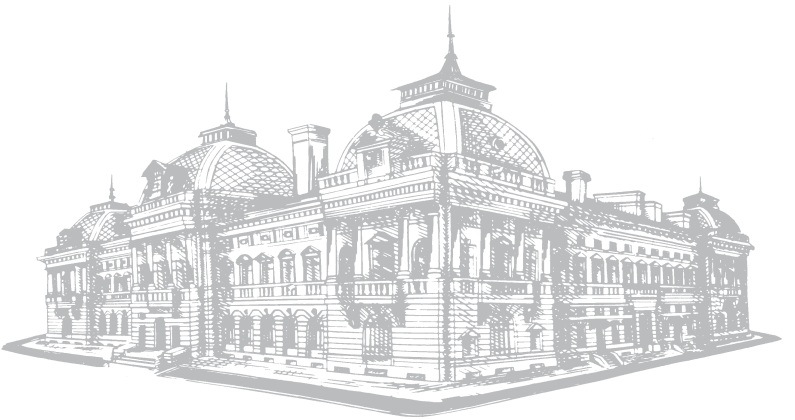
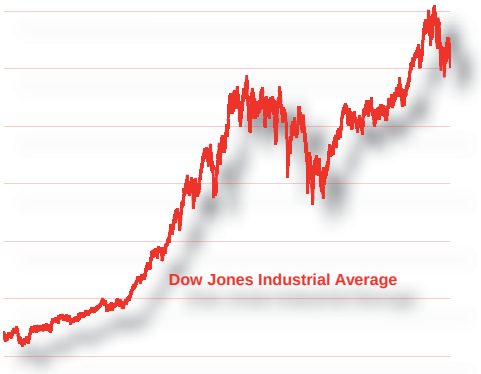
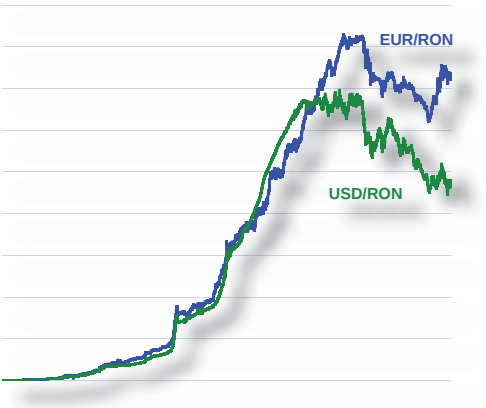


Regional Seminar on Financial Stability





Sinaia

October 13-14, 2011

National Bank of Romania

REGIONAL SEMINAR ON FINANCIAL STABILITY

CENTRAL BANK MACROPRUDENTIAL POLICIES

Sinaia

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Note

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OPENING REMARKS

Cristian Popa*

Let me first welcome all of you here. I know that some of you have been here before, but the welcome extends as warmly to everybody else, previous visitors or not. I will not hopefully use my fifteen minutes to the full extent of that time limit. Let me make several categories of remarks, the more substantive ones at the beginning. I think we are living through interesting times, to use a hackneyed phrase. For financial stability, supervision, regulation specialists it is an especially challenging time. I think we realize that the Chinese walls that we supposed were there are much more porous and thinner than we thought it was the case before. This will be highlighted [I am sure] by the speakers today, especially by Mauro Grande, living through a time where it is not just the sovereign debt crisis that is unfolding or the bank issue. It is actually an x and an intersection between bank exposure to sovereign debt, sovereign debt dynamics in themselves and how the markets evaluate them and liquidity counterparty risk and funding problems for banks, especially those banks that have any kind of recourse to funding outside of their home market, which becomes more complicated.

The second reflection is that risks, especially contagion and spillover risks, appear much more elevated now than they did, for example, at the previous incarnation of this seminar, and this is not anything I need to elaborate on, I think it is viewed by everyone on a daily basis. We have seen the situation getting more complicated to manage in the periphery eurozone countries, but the going is not necessarily easier for anybody else because of those spillovers. And I think that the idea of having a regional discussion about this problem is very appropriate. It is very appropriate because there is a certain similarity between banking systems in the region notwithstanding national differences. It's also due to the fact you have common lender problems here, most of the banks active in one of the countries of the region have some kind of activity or exposure on the other countries and therefore everybody, I think, cares about how these banks are doing. Thirdly, it's because we are not that far away from the epicenter of the sovereign debt crisis, although that has borne a lot of seedlings of its own elsewhere. We are still talking mainly about Greece in this perspective and whether there could be a more or less orderly exit out of the problems right there, again with a definite

* Deputy Governor, National Bank of Romania

need for further reform efforts and fiscal consolidation on the background of difficult growth performance and structural reforms only starting to pay off in the medium to longer term. No immediate effect from those measures that can be pointed to towards solving the growth debt problem and the sustainability problem therefore.

We will be devoting some time, especially at the beginning, to talking about macroprudential policies. That is quite interesting because, if you look around (and I am pretty sure Romania is not the only case), you will see that quite substantial elements of these policies were present in central bank actions and agendas way before the crisis hit. Romania, for example, had a fairly well-articulated, although not called macroprudential, approach to the rapid growth in the foreign exchange lending that happened during the boom period and that had not only financial stability risk issues it was adding to, but also macroeconomic demand management issues it was complicating. But again, that would be very good to hear from different speakers.

Now, with that, let me move towards two categories of remarks that have more to do with administration and housekeeping: one is that I ask everybody to keep as closely as possible to allotted time spans, because we are running a fairly tight schedule and we want to take you on a visit outside to Peleş Castle and that it's sort of a custom-made visit, we are seeing rooms that I am told we don't get to see usually, therefore we need to make the time. The second is that we've organized here and there two speaker chairs … if you have slides, then the laptop will be moveable and you can either choose to speak from the corner there or from here. If you don't, please feel free to keep your seats and to speak from wherever you are sitting. In case you want to ask a question (I hope that would be a frequent case), please raise your flag so that whoever's chairing can have a good view and can take the name down because we are hoping for brisk discussions. The second remark is the fact that we operate in the spirit of Chatham House here and of frankness. However, let's say that the desire to have a meaningful discussion means that we need to keep confidential whatever is confidential, so I am not asking people to take this to extremes, I am asking you to exercise judgment and keep confidentiality for those issues that are more sensitive and can actually create some problems in markets where they are to be talked about. What is talked about here stays in here, of course with a need for everybody to go back and brief their colleagues and their superiors. Well, thank you for your attention and I will ask Mr. Joseph Crowley from the IFM to take the floor.

OPENING REMARKS

Joseph Crowley*

Thank you very much Mr. Popa. I am impressed that you were able to give such a well-structured talk without any notes, just off the top of your head. I am not quite as confident as you are, so I will be reading some prepared remarks.

Hello everyone! Welcome to Sinaia and the conference on financial stability issues. I am pleased and excited to be welcomed here again for the third year in a row and for those of you who are not regulars, I am Joe Crowley, I am a senior economist in the Monetary and Capital Markets Department at the IMF. And I am joined by several colleagues of mine at the IMF (rising young stars): we have Heiko Hesse, from my department, Ferhan Salman from our Strategy, Policy and Review Department, and also Mr. Christian Schmieder, who will be joining us.

Last year when I was here there was a great deal of uneasiness about the global financial crisis, but amidst the anxiety there were also some positive signs that for some countries the worst could be over. Now the outlook is gloomier, as the sovereign debt crisis has emerged, growth projections for coming years have been revised downwards and there is concern about a possible second dip or even worse. It is now three years since the fall of Lehman and we are looking back and examining what happened, to see how we can be better prepared next time. But at the same time we are looking forward and wondering if the next time might not be sooner than we would hope. We are looking at policies to strengthen prudential controls in case the worst is in fact over and the world economy starts to recover, but we are also preparing for a possible second shock. The crisis showed us that conventional macroeconomic tools were insufficient to address the vulnerabilities that grew during the early and mid-2000s. The crisis has not overturned the widely-accepted view that monetary policy should continue to focus on price stability as its primary objective. And there are even concerns that adding an explicit financial stability objective to the monetary policy mandate could undermine central banks' credibility and accountability. Nevertheless there is a growing consensus that monetary policy needs to do more to address financial developments and risks, and that macroprudential policies can support monetary policy by addressing specific financial sector vulnerabilities including

* Senior economist, International Monetary Fund

large capital inflows, rapid credit growth, and rapidly rising real estate prices. So there is a need to strengthen financial sector monitoring to develop clear frameworks for financial stability and to specify how these should be integrated into central banks' decision-making and accountability with respect to monetary policy. Policymakers need to specify clear objectives of monetary operations as well as the related range of instruments and institutional and legal arrangements. They need to take into account both the lessons of the crisis and the rapid pace of financial sector innovation, especially the growing systemic importance of the nonbank sector. And they will need to promote stronger international cooperation between central banks. The appropriate relationship between financial stability and monetary policies is not obvious. The issues involved are currently high priority topics of research for central banks as well as the IMF. Views on the issues addressed in this seminar are likely to be revised over time and in line with the outcome of research on various key issues. Meanwhile macroprudential policies have already been implemented in most countries for several years, so we are in a process of learning from doing as well as researching and, hopefully, we will find that our current solutions are good ones and, to the extent that we don't, we will need to react and improve our frameworks. It's heartening to see a wide variety of countries being represented here in spite of the burdens that central banks are facing nowadays. We understand that your workloads back home must be great and that it is not easy for you to be here, so we will do our best to make this trip worth your sacrifice. Thank you.

SESSION 1

CENTRAL BANK MACROPRUDENTIAL MANDATE

MACROPRUDENTIAL SUPERVISION: A NEW OR OLD MANDATE FOR CENTRAL BANKS ?

Mauro Grande*

Main elements of macroprudential supervision

- A commonly accepted definition (including objectives and instruments) is yet to emerge
- Consensus that macroprudential supervision aims at detecting and addressing system-wide (systemic) financial risk. It should primarily address risks arising in the financial system and risks amplified by the financial system:
  - ⇨ Time dimension (building up of imbalances)
  - ⇨ Cross-sectional dimension (common exposures and contagion).
- Complex interplay between the two dimensions:
  - ⇨ Excessive credit growth creates incentives for risk-taking and complex financial innovation, leading to overall excessive leverage and more complex interconnectedness.
- Much progress in the development of analytical tools to monitor and assess systemic risk, but still work to do
- Two schools of thought regarding the policy dimension:
  - ⇨ A new public policy area
  - ⇨ A new perspective within existing public policies.
- True macroprudential policy tools yet to be developed
  - ⇨ Possible tools fall in other policy domains (mainly in the prudential but also in the central banking and fiscal fields).

* European Central Bank

- Macroprudential policies complement and do not replace macroeconomic (monetary and fiscal) policies
- Macroprudential policies complement other public policies aiming at reducing the likelihood of financial crisis
  ⇨ Contribution to macroprudential components of financial regulation.
- No precise role in crisis management.

Challenge: complexity of systemic risk

- **IMF-FSB-BIS**: a risk of disruption to financial services that is caused by an impairment of all or parts of the financial system and has the potential to have serious negative consequences for the real economy (2009)
- **ECB**: risk that financial instability becomes so widespread that it impairs the functioning of the financial system to the point where economic growth and welfare suffer materially (2009)
- **EU ESRB**: systemic risk means a risk of disruption in the financial system with the potential to have serious negative consequences for the internal market and the real economy (EU Regulation, 2010)
- **US FSOC**: serious adverse effects on financial stability in the United States (Dodd-Frank, 2010)
- **UK FPC**: risks to the stability of the whole or a large part of the financial sector (HM Treasury, 2011).

Challenge: analytical tools and methodologies to be fully developed yet

- Consistent ranking of systemic risks
- Modelling of endogenous adjustments by financial institutions
- Analysis of linkages between the financial sector and the real economy
- Relatively early stage of network analysis
- Assessment of the impact of macroprudential policies in terms of mitigating systemic risks
- Coverage of financial institutions other than banks and insurance companies
- Consistency and availability of data.

Challenge: no stand-alone macroprudential policy tool

- Issues relating to the use of microprudential tools for two purposes:
  - ⇨ Mandates of supervisors need to be aligned
  - ⇨ Use of Pillar I versus Pillar II type of tools
  - ⇨ Potential conflicts of interest between macro and microprudential objectives need to be properly managed
  - ⇨ Margins should be left to macroprudential supervisors to use microprudential tools
  - ⇨ Need for effective cross-border coordination.
- Overall difficulty in measuring the success and failure of macroprudential policies and related accountability:
  - ⇨ Relevance of other public policies for financial stability
  - ⇨ Transmission mechanism still to be understood.

Rethinking the institutional design

- The reflections about macroprudential supervision are triggering changes in the institutional architecture for the pursuit of financial stability in many countries
- A good institutional design is essential for ensuring efficacy and efficiency in the implementation of the macroprudential function
- Part of these reflections relate to the possible role of central banks in macroprudential supervision given their traditional financial stability mandate
- This is an element of wider reflections within central banks about lessons from the crisis experience for their main functions.

Different institutional models for the organisation of the macroprudential function may be envisaged (Ingves Report):

1. Shared responsibility (establishing a coordinating committee)

- Benefits: representation of all relevant perspectives (central banking, financial supervision, government functions) and pooling of expertise
- Challenges: lack of binding powers, unclear allocation of responsibilities
- Examples: EU (ESRB), France, Belgium and US.

2. A new ad-hoc agency responsible for macroprudential supervision only (separate from the central bank)

- Benefits: clear allocation of responsibilities
- Challenges: need for implicit or explicit coordination with existing supervisory authorities and central bank; need for building up reputation
- Examples? Not yet!

3. Macroprudential supervision as a new responsibility of the central bank

- Benefits: clear allocation of responsibilities; full use of central bank's expertise and synergies with existing financial stability tasks
- Challenges: potential dilution of monetary policy mandate
- Examples: not yet!

So far, the committee structure (model 1) has prevailed due to various reasons:

- Different schools of thought on macroprudential supervision
- Lack of sufficient experience with implementing macroprudential policy tools
- Differences in financial structures in countries
- More broadly, one size does not fit all.

A clearer allocation with more binding powers can be expected in the future with more concrete experience and when true macroprudential policy tools are developed.

Central banks and macroprudential supervision

Central banks are natural candidates to be assigned a formal macroprudential mandate:

- Potential synergies with traditional functions relating to promoting financial stability in their jurisdiction:
  - ⇨ Financial stability monitoring and assessment as reflected in Financial Stability Reviews/Reports
  - ⇨ Oversight of market infrastructures (payment systems and post-trading structures)
  - ⇨ Prudential supervision mainly of banks in many cases.
- Independence – which is an essential element in central banking – is also a necessary precondition for macroprudential supervision.

Yet, the macroprudential mandate for central banks requires new elements:

- The focus on policy action following up on the financial stability assessment is new for central banks
- The comprehensive risk analysis of the whole financial sector goes beyond the traditional focus of central banks on the banking sector
- Appropriate safeguards should ensure that the new macroprudential mandate would not affect the smooth conduct of monetary policy (e.g. separate committees)
- Central banks should have the necessary powers and resources for macroprudential supervision to avoid reputational risk with negative repercussions on their main function.

Some possible practical implications for central banks:

- The attribution of the macroprudential mandate would entail the central bank having a new macroprudential toolbox including e.g. the countercyclical capital buffer and other tools
- The implementation of this new policy toolbox would require access of the central bank to bank-specific data, for it to be able to effectively calibrate the macroprudential instruments
- It would also require that the mandate be accompanied by enhanced transparency and accountability (e.g. restraining banking activities in good times may be difficult to explain)
- It would also induce the central bank to focus on the possible impact of the application of macroprudential tools on its monetary policy action.

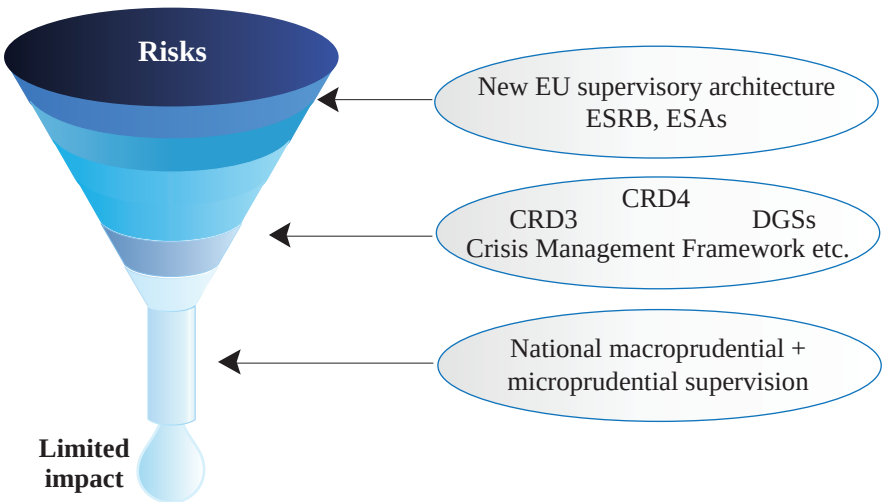
Conclusion

- The definition and development of a comprehensive framework for macroprudential supervision are under way
- Current work focuses on both the conceptual side (IMF, FSB, BIS) and the practical development and implementation (ESRB, FSOC, FPC, etc.)
- Main institutional elements of the framework under development include:
  - ⇨ New macroprudential mandate needs to be clearly stated
  - ⇨ Macroprudential function is to be set up in a way that safeguards the independence of the macroprudential authority
  - ⇨ Enhanced transparency and accountability provisions need to be in place.
- Although no single structure would work best in all countries, the central bank could play a key role in macroprudential supervision.

CHALLENGES IN IMPLEMENTING A MACROPRUDENTIAL MANDATE IN AUSTRIA

Michaela Posch*

Multiple approaches towards a robust financial system



Multilayered initiatives to reduce probability of occurrence of crises, their impact and cost

Financial stability mandate in Austria

- In Austria the legal mandate for macroprudential policy is still relatively vague and does not contain any explicit statutory authorization to use macroprudential instruments
  - ⇨ The OeNB is obligated to monitor financial stability (Article 44b Nationalbank Act)
  - ⇨ The FMA must consider financial stability in its activities (Article 3 Financial Market Supervision Act)

* Financial Markets Analysis and Surveillance Division, Oesterreichische Nationalbank

- ⇨ The Financial Market Committee serves as a platform for institutions which are jointly responsible for financial stability – OeNB, FMA, Ministry of Finance (Article 13 Financial Market Supervision Act).

Concretization of the legal mandate for macroprudential policy necessary to increase supervisory authorities' scope for action!

Objective of a macroprudential policy mandate

- Broad
- Clear-cut
- The general objective to maintain systemic stability should encompass the following elements:
  a) at national level, decrease systemic risks and increase risk-bearing capacities of a system, thereby ensuring a sustainable contribution of the financial sector to the growth of the economy
  b) allow for adequate follow-up to ESRB risk warnings and recommendations.
- Secondary/operational objective(s) could be identified at policy level, ensuring operational independence of the macroprudential authority.

However, limits of macroprudential policy – no substitute for sound microprudential and macroeconomic policies!

Macroprudential authority – institutional arrangements

1. Single institution or
2. Board composed of several institutions
   - ⇨ Central bank should play a leading role
   - ⇨ MoF with limited voice or an observer status only.

Current national body:

- FMC with a legal mandate to "promote cooperation and the exchange of views […] between institutions with joint responsibility for financial stability" (Austrian Federal Ministry of Finance, FMA, OeNB).

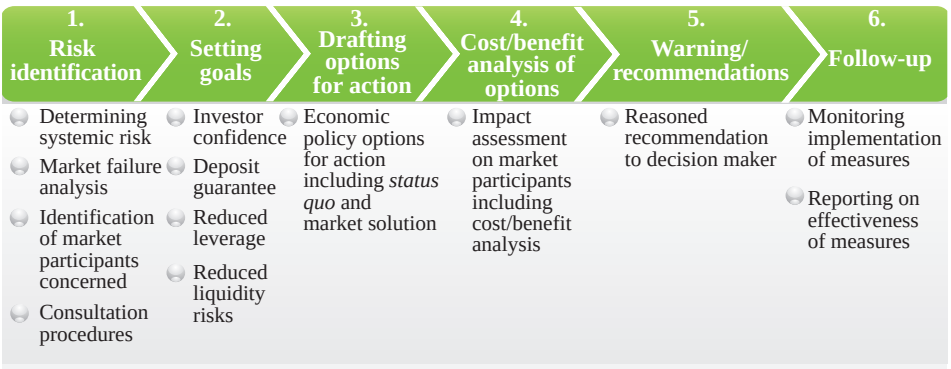
The Institution/body could give warnings or recommendations; central bank responsibility for the analysis, the resulting options for action and their impact analysis.

National institutional setting

- OeNB has a long expertise in financial stability matters and is a member of the ESRB and its substructures
- Quarterly OeNB and FMA Risk Workshops suitable for identifying risks at an early stage
- FMA and OeNB coordination Forum (KOFO) of micro- and macroprudential head of divisions for discussing potential instruments
- Financial Market Committee (FMC).

However, substantial adjustments in legal mandates are needed, especially when it comes to extended legal rights and responsibilities of a high-level macroprudential body!

Macroprudential regulation and supervision:
Impact assessment process

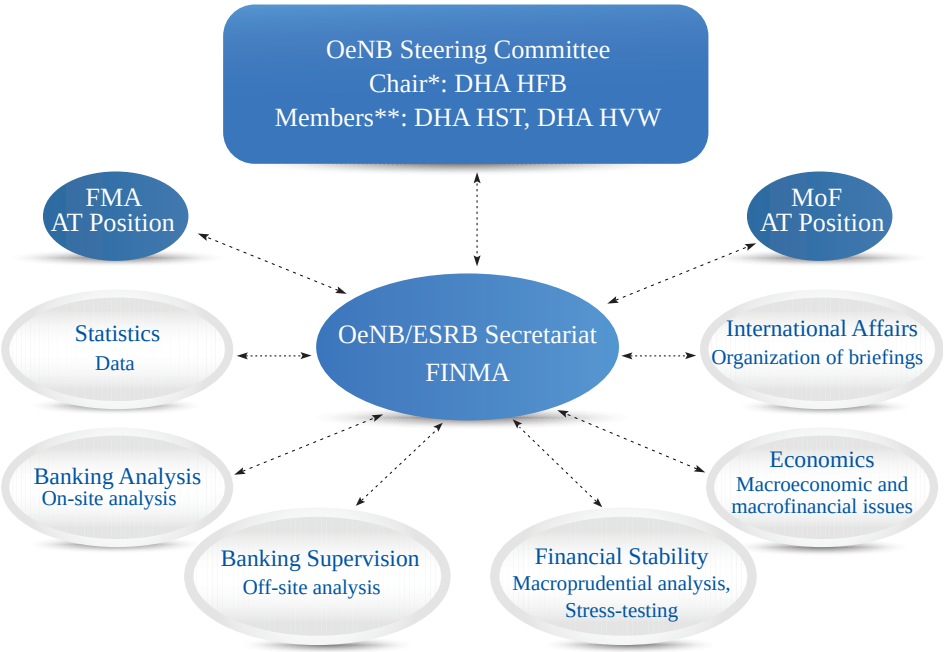


Modules for a macroprudential mandate in Austria

- Primary stage: monitoring of macroprudential indicators as major part of the Impact Assessment Process
- Definition of macroprudential policy
- Wide flexibility in the use of instruments: task and powers beyond CRD IV and Pillar II
- Operational independence (from political bodies and from the financial industry; responsibility only towards the Parliament)

- Cross-sectoral scope (also including non-regulated sectors)
- Coordination between authorities: consistency with the objectives of microprudential supervision and monetary policy
- Clear accountability (for achieving the objectives)
- Transparency: duty to make public and private statements commenting on systemic risk.

OeNB's internal ESRB production-network



* Chair: Director of the Financial Stability and Banking Inspections Department (DHA HFB)

** Members: Director of Statistics Department (DHA HST), Director of Economic Analysis and Research Department (DHA HVW)

MACROPRUDENTIAL FRAMEWORK IN TURKEY

Onur Yildirim*

Systemic risk

- Systemic risk: "A risk of disruption to financial services that is caused by an impairment of all or parts of the financial system and has the potential to have serious negative consequences for the real economy". (the IMF, FSB and BIS).

Need for macroprudential policy

- Problem: Under current economic conditions, it may not be possible to simultaneously ensure price stability and financial stability by means of policy rates alone
- Solution: Using macroprudential tools in coordination with other public authorities.

Macroprudential policy

Aim: to mitigate systemic risks and, in turn, to prevent systemic financial crises.

- Objective to be clearly defined
- NOT a substitute of monetary policy
- BUT a complement to monetary policy
- Cooperation and coordination
- Institutional design
- "One size does not fit all" approach.

* Banking and Financial Institutions Department, Central Bank of the Republic of Turkey

International arena

- G-20 (Turkey is a member)
- International Monetary Fund (IMF)
- World Bank
- Bank for International Settlements (BIS)
- Governors and Heads of Supervision (GHOS)
- Basel Committee on Banking Supervision (BCBS)
  ⇨ CBRT & BRSA
- Financial Stability Board (FSB)
  ⇨ CBRT
- Committee on Payment and Settlement System (CPSS)
  ⇨ CBRT.

Institutional framework models for macroprudential policy*

1. A specific institution (and its Board)
   - Given a macroprudential mandate
   - Often accompanied by a coordinating committee
   - Coordination for a requirement to consult.
2. A single institution
   - Carry out macroprudential policy
   - Decisions are taken by some attached policy committee
   - Sometimes plays the role of a coordinating committee.
3. An independent committee or council
   - Macroprudential authority
   - Usually plays a coordinating role
   - Multiple institutions contribute to the decision-making process.

* *Source: International Monetary Fund (IMF), Macroprudential Policy – An Organizing Framework, IMF Policy Paper, March 2011.*

Institutional responsibilities in Turkey

- Undersecretariat of Treasury
  - ⇨ Fiscal policy
  - ⇨ Regulation and supervision of the insurance sector.
- Central Bank of the Republic of Turkey (CBRT)
  - ⇨ Monetary and exchange rate policy
  - ⇨ Payment and settlement systems
- Banking Regulation and Supervision Agency (BRSA)
  - ⇨ Regulation and supervision of the banking sector
- Capital Markets Board (CMB)
  - ⇨ Capital markets and intermediary institutions
- Savings and Deposit Insurance Fund (SDIF)
  - ⇨ Resolution of the banks.

Financial Sector Commission

- Financial stability issues are discussed
- Briefs the Council of Ministers
- Convenes once every six months
  - ⇨ Members of the Commission:
    - ▸ Banking Regulation and Supervision Agency (BRSA-Secretariat)
    - ▸ Finance Ministry
    - ▸ Undersecretariat of Treasury
    - ▸ Central Bank of the Republic of Turkey (CBRT)
    - ▸ Capital Markets Board (CMB)
    - ▸ Savings and Deposit Insurance Fund (SDIF)
    - ▸ Competition Authority
    - ▸ Stock Exchanges
    - ▸ Banks Associations.

Systemic Risk Coordination Committee

- Established in 2009 by a MoU between:
  - ⇨ Banking Regulation and Supervision Agency (BRSA-Secretariat)
  - ⇨ Undersecretariat of Treasury
  - ⇨ Central Bank of the Republic of Turkey (CBRT)
  - ⇨ Savings and Deposit Insurance Fund (SDIF)
  - ⇨ Capital Markets Board (CMB) (became a member in 2011).

Aim: to identify and mitigate systemic risk

- Determination of the measures to be taken to rebuild financial stability in case of a serious threat to the financial system
- Coordination, cooperation and exchange of information
- Convenes at least twice a year.

Financial Stability Committee in Turkey

- Established in June 8, 2011 in accordance with the law
- Two main responsibilities:
  - ⇨ Monitor and prevent systemic risk
  - ⇨ Crisis management.
- Members of the Committee:
  - ⇨ Deputy Prime Minister (Chair)
  - ⇨ Undersecretariat of Treasury (Secretariat)
  - ⇨ Central Bank of the Republic of Turkey (CBRT)
  - ⇨ Banking Regulation and Supervision Agency (BRSA)
  - ⇨ Capital Markets Board (CMB)
  - ⇨ Savings and Deposit Insurance Fund (SDIF).

Financial Stability Committee

- Information sharing
- Coordination
- Cooperation
  - ⇨ Assessments of financial and macroeconomic developments
  - ⇨ Each institution has its own mandate and responsibility
  - ⇨ An important step in the institutional design of financial stability and macroprudential policy in Turkey
  - ⇨ Press release before and after the meeting
  - ⇨ 5 meetings held until now.

Objectives and fundamental duties of the CBRT

- Objectives of the CBRT
  - ⇨ Primary objective → Price Stability
  - ⇨ Auxiliary objective → Financial Stability.
- Fundamental Duties of the CBRT (CBRT Law)
  - ⇨ 4-I-g) to take precautions for enhancing the stability in the financial system and take regulatory measures with respect to money and foreign exchange markets
  - ⇨ 4-I-h) to monitor financial markets.

The role of the CBRT

The role of the CBRT in terms of financial stability

- Analytical and macro-perspective to financial stability
- Monitoring financial markets
- Macroprudential tools
  - ⇨ Required reserve ratios
  - ⇨ Liquidity management.
- Lender of last resort
- Management and supervision of payment systems.

Communication tools of the CBRT

- Monetary and Exchange Rate Policy (annually)
- Inflation Report (main communication tool, quarterly)
- Financial Stability Report (semi-annually)
- MPC Meeting Decision (monthly)
- MPC Meeting Summary (monthly)
- Monthly Price Developments
- Meetings with the Bank Economists
- Presentations & Speeches.

Final remarks

- MP complements macroeconomic policies
- Strengthening the supervision and oversight
- Cooperation, coordination and information sharing
- Pro-active central banks
- "One size does not fit all!"
- But international consistency is important
- Significant progress still needed.

THE MACROPRUDENTIAL MANDATE OF THE NATIONAL BANK OF ROMANIA

Andra Pineta*

National institutional arrangements and the framework for financial stability/macroprudential policy

Financial stability/macroprudential mandate of the national supervisory authorities

- In Romania, the financial stability mandate is not exclusively assigned to the central bank; there are sectoral competent authorities having such responsibilities, as their relevant legislation mentions
- All four competent supervisory authorities – the NBR (www.bnr.ro), the NSC (www.cnvmr.ro), the ISC (www.csa-isc.ro) and the CSSPP (www. csspp.ro) – contribute to macroprudential policy aiming to ensure the transparency, stability and integrity of the whole system, compliance with the legal framework, as well as to strengthen the national financial stability framework
- In accordance with its statute, the NBR performs several tasks regarding financial stability, via prudential supervision over credit institutions, non-bank financial lenders and payment institutions; to monitor payment systems, to ensure immediate liquidity and to act as a lender of last resort for credit institutions
- The National Securities Commission (NSC), as the competent supervisory authority for capital markets, is responsible for protecting investors, ensuring stability, competitiveness and smooth functioning of markets, issuing regulations on prudential and capital adequacy requirements for a proper risk assessment

* Financial Stability Department, National Bank of Romania

- The competent authority for the insurance sector is the Insurance Supervisory Commission (ISC), which is an administrative and financially independent authority, self financed from own funds
- The Romanian Private Pension System Supervisory Commission (CSSPP), as the competent supervisory authority for the private pension sector is responsible for contributing to/strengthening financial stability.

Cooperation in the financial stability area

- The national financial system developments, which attest a growing inter-sectoral connection, called for cooperation among the competent authorities aiming to ensure the transparency, stability and integrity of the financial system, compliance with the legal framework, as well as to strengthen the national financial stability framework
- A Memorandum of Understanding for cooperation in the field of financial stability and financial crisis management (MoU) was signed by the Ministry of Finance (MoF), the National Bank of Romania (NBR), the National Securities Commission (NSC), the Insurance Supervisory Commission (ISC) and the Private Pension Supervisory Commission (PPSC) on 31 July 2007
- Under the MoU, the National Committee for Financial Stability (NCFS) was established
- The key responsibilities of the NCFS are to promote a steady and efficient information exchange between the sectoral financial supervisors and the Ministry of Finance, and to appraise, prevent and, where appropriate, manage financial crises at individual financial institution level, financial group level or the financial market as a whole
- The cooperation under the Memorandum is carried out without prejudice to the powers and responsibilities of the signatories, as arising from the legislation governing their activity.

EU institutional arrangements and the framework for financial stability/macroprudential policy

Macroprudential oversight in the EU

The reform of the European institutional framework

- The recent financial crisis highlighted the deficiencies (which jeopardise financial system stability) in terms of:
  - ⇨ Supervising the system in its entirety
  - ⇨ Impossibility of accurately identifying *ex ante* both systemic risks and the interlinkages between institutions and markets.
- Solution: to create a new European financial system supervisory architecture.

European System of Financial Supervision

- The new European System of Financial Supervision (ESFS) – operational since January 2011
- Its objective is to ensure supervision of the EU's financial system from two perspectives:
  - (i) macroprudential, via the European Systemic Risk Board (ESRB)
  - (ii) microprudential, via the European Supervisory Authorities (ESAs) consisting of:
    - ⇨ The European authorities tasked with the supervision of financial markets
      - ▸ European Banking Authority (EBA)
      - ▸ European Securities and Markets Authority (ESMA)
      - ▸ European Insurance and Occupational Pensions Authority (EIOPA).
    - ⇨ Joint Committee of the European Supervisory Authorities
    - ⇨ National supervisory authorities.

European Systemic Risk Board

- The European Systemic Risk Board (ESRB) is an independent EU body responsible for the macroprudential oversight of the financial system within the European Union
- The mandate of the ESRB is twofold:
  - ⇨ to prevent systemic risks to financial stability in the EU that arise from developments within the financial system and
  - ⇨ to mitigate them, should they occur.
- The scope of the ESRB's activity encompasses the single market, i.e. the entire EU, but should not exclude risks from outside the EU as well as vulnerabilities in single countries or regions that could spread (according to Jean-Claude Trichet, President of the ECB, ESRB Chair, at the Eurofi G20 High Level Seminar, 17 February 2011)
- Some of the key tasks to be carried out by the ESRB include:
  - ⇨ Determining and/or collecting and analysing all the relevant and necessary information
  - ⇨ Identifying, assessing and prioritising systemic risks.
- The major tools available to the ESRB consist of the possibility of:
  - ⇨ Issuing warnings where such systemic risks are deemed to be significant and
  - ⇨ Issuing recommendations for remedial action in response to the risks identified.
- The organisational structure of the ESRB comprises:
  - (i) a General Board (decision-making body)
  - (ii) a Steering Committee (which assists in the decision-making process of the ESRB by preparing the meetings of the General Board)
  - (iii) a Secretariat (responsible for the day-to-day business of the ESRB), and

(iv) two advisory committees:

- Advisory Technical Committee (ATC)

– provides advice and assistance on issues relevant to the work of the ESRB

– consists of representatives of: the ECB, national central banks and national supervisory authorities of the Member States, EBA, EIOPA, ESMA, the European Commission, the Economic and Financial Committee.

- Advisory Scientific Committee (ASC)

– analytical tasks (improving the methodologies to detect risks and assess potential impacts, designing and calibrating effective macroprudential policy tools)

– consultative tasks (reviewing macroprudential strategies in order to contribute to the ESRB policy framework).

The NBR involvement in macroprudential oversight at EU level consists in:

- The NBR is member of EBA
- The NBR participates in the ESRB structures – ATC – along with the other Romanian sectoral supervisory authorities: NSC, ISC and CSSPP
- The NBR is a signatory part of the Memorandum of Understanding on cooperation between the financial supervisory authorities, central banks and finance ministries of the European Union on cross-border financial stability since June 2008. The MoU seeks to strengthen the European-wide cooperation between supervisory authorities in order to consolidate the macroprudential supervision within EU.

The NBR’s financial stability/macroprudential mandate

The NBR's role in maintaining financial stability

- The NBR has an important role in financial stability given the dimension and complexity of the domestic banking system (credit institutions accounted for around 84.4 percent of net financial assets in Romania at end-2010)
- The NBR has specific responsibilities: acts as a prudential regulator and supervisor for the banking system, non-bank financial lenders and payment institutions, as well as an overseer of the payment system. These regulatory and supervisory activities are performed within different departments of the central bank.

The NBR's financial stability/macroprudential mandate framework

- There are explicit provisions with regard to ensuring financial stability both in the NBR’s Statute and other relevant national laws, as follows:
  - ⇨ Law No. 312/2004 on the Statute of the National Bank of Romania refers to financial stability functions in several provisions related to the main tasks of the central bank, cooperation with other authorities and protection against systemic risk
  - ⇨ Government Emergency Ordinance No. 99/2006 on credit institutions and capital adequacy establishes the NBR’s financial stability responsibilities deriving from its regulatory and supervisory function for credit institutions and payment systems
  - ⇨ Law No. 93/2009 on non-bank financial institutions lays down the minimum requirements to apply for a loan and the lending process/ business carried on in Romania by non-bank financial institutions, in order to ensure and maintain financial stability
  - ⇨ Government Emergency Ordinance No. 113/2009 on payment institutions establishes the NBR’s regulatory and supervisory powers over payment institutions, extending the NBR’s financial stability responsibilities.

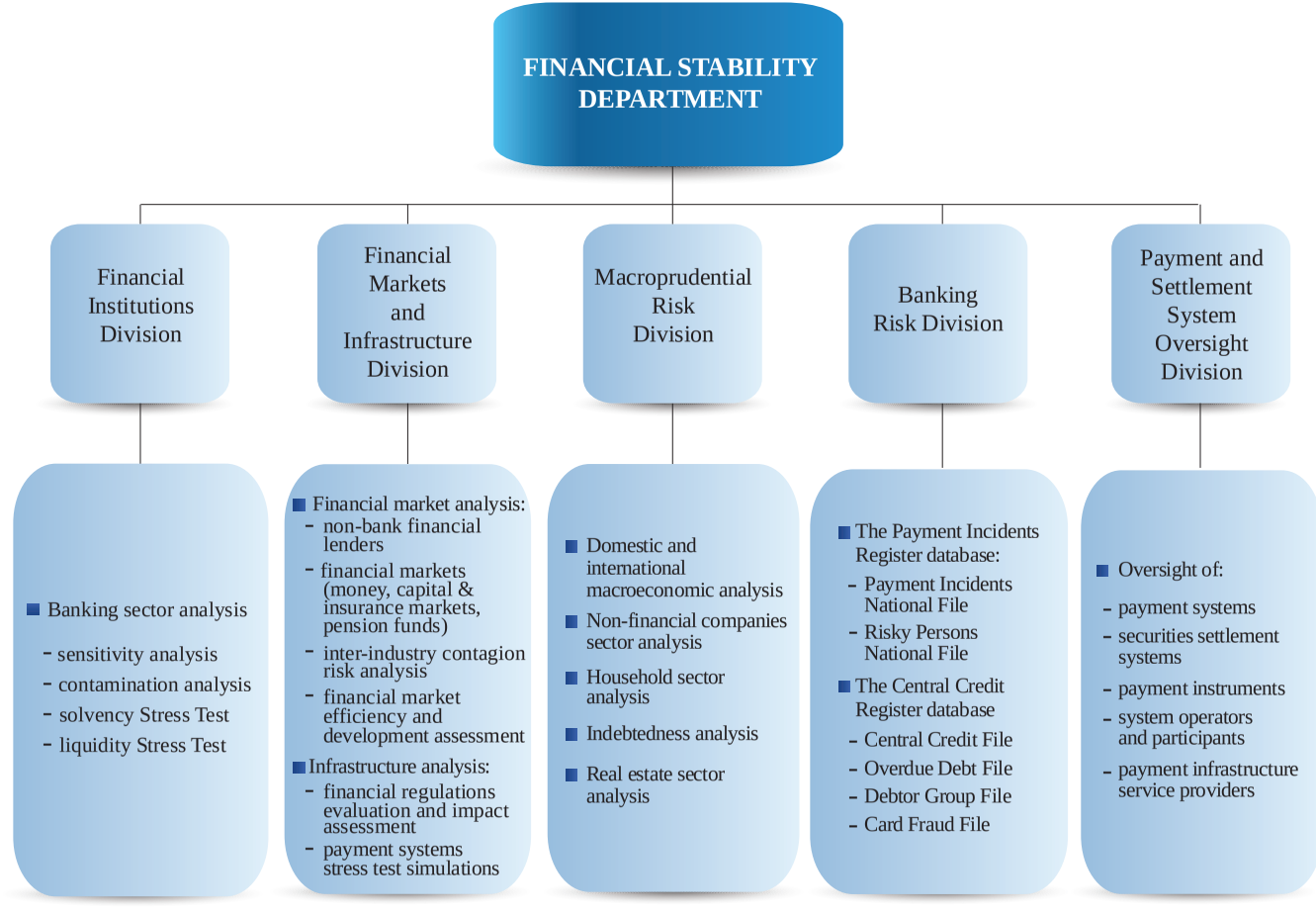
The Financial Stability Department (FSD) within the central bank

In 2004, the NBR's Board decided to establish the Financial Stability Department (FSD).

A. The FSD organisational structure:

The FSD comprises five divisions:

1. Financial Institutions Division
2. Financial Markets and Infrastructure Division
3. Macroprudential Risk Division
4. Banking Risk Division
5. Payment and Settlement System Oversight Division.


FINANCIAL STABILITY DEPARTMENT
Financial Institutions Division
Financial Markets and Infrastructure Division
Macroprudential Risk Division
Banking Risk Division
Payment and Settlement System Oversight Division
Banking sector analysis
- sensitivity analysis
- contamination analysis
- solvency Stress Test
- liquidity Stress Test
Financial market analysis:
- non-bank financial lenders
- financial markets (money, capital & insurance markets, pension funds)
- inter-industry contagion risk analysis
- financial market efficiency and development assessment
Infrastructure analysis:
- financial regulations evaluation and impact assessment
- payment systems stress test simulations
Domestic and international macroeconomic analysis
Non-financial companies sector analysis
Household sector analysis
Indebtedness analysis
Real estate sector analysis
The Payment Incidents Register database:
- Payment Incidents National File
- Risky Persons National File
The Central Credit Register database
- Central Credit File
- Overdue Debt File
- Debtor Group File
- Card Fraud File
Oversight of:
- payment systems
- securities settlement systems
- payment instruments
- system operators and participants
- payment infrastructure service providers

B. The FSD role in financial stability

- To identify and assess risks and vulnerabilities is an ongoing process for the financial system as a whole and its components, because the financial stability monitoring has a preventive purpose
- In order to achieve this purpose, analyses concerning the banking system, financial institutions and markets, payment and settlement systems, financial regulation, international markets, macroeconomic developments and real economy are regularly conducted
- The annual report on financial stability presents the soundness of the financial system (institutions, markets, and infrastructure) and the factors that might affect it, as a result of the system's relations with the real economy, the public sector, and the external environment.

Financial stability definition

- The NBR's regulation framework does not provide a definition of financial stability
- The NBR's operational definition of financial stability – Financial Stability Report 2006:

  "Seen from the perspective of its functions, a stable financial system is efficiently allocating resources, both spatially and especially inter-temporally, managing financial risks through adequate calibration and through self-corrective mechanisms even when affected by external shocks. Therefore, a financial system, irrespective of its size or complexity, is considered to be stable whenever it may help enhance the economic performance and dissipate the imbalances that arise in the aftermath of significant adverse and unanticipated events".

The NBR's powers in maintaining financial stability

Examples of macroprudential objectives addressed by the NBR and the specific policy instruments used

Macroprudential objectives	Policy instruments
Size, complexity and interconnectedness	▶ Limits on interbank exposure
Procyclicality	▶ Restrictions on profit distribution
Credit growth	▶ Caps on loan-to-value (LTV) ratio & Caps on debt-to-income (DTI) ratio
Maturity mismatch and liquidity risk	▶ Limits on maturity mismatch
Exchange rate risk	▶ Limits on net open currency positions & Caps on foreign currency lending
Limiting the build-up of systemic risk	▶ Limits on foreign bank's total exposure & Bank capital increase & Restrictions on profit distribution (Vienna Initiative)

Macroprudential policy instruments

- The NBR, as a macroprudential policy-maker for the banking sector, is in control of macroprudential policy instruments (such as capital buffers, LTV ratios and liquidity regulation), their use and calibration
- In the near future, the NBR will transpose into the national regulatory framework the Basel III standards adopted in the EU legislation.

Macroprudential toolkit

The NBR has a macroprudential toolkit in order to monitor systemic risk which comprise:

1. Financial Indicators to Monitor Systemic Risk (for credit risk, systemic liquidity risk, capital adequacy, profitability and efficiency, foreign currency exposure risk, asset price risk, capital flows, systemically important banks within the payment system and systemically important non-financial companies within the real sector)

2. Quantitative Analytical Models of Systemic Risk (e.g. solvency and liquidity stress tests, sensitivity and contagion analyses, payment system simulation, probability of default for the corporate sector).

Data collection

- The NBR has the statutory power to collect information and data for the purpose of identifying, assessing and monitoring systemic risks, as well as calibrating the tools for the sectors and entities subject to its prudential supervision and oversight
- The NBR is authorized to collect raw statistical data and information, from public and private legal entities as well as individuals, needed to carry out its statutory tasks
- In order to fulfil its macroprudential mandate, the NBR identifies, analyses and monitors the risks stemming also from the real sector, and assesses the impact on the financial sector.

Communication tools

- The NBR has significantly improved the public communication in order to better fulfill the accountability and transparency requirements, as follows:
  - ⇨ The NBR publishes the Annual Report, and periodical reports on Romania's balance of payments and international investment position, Inflation Report, bulletins and press releases concerning money and credit developments, studies and other papers supplying information to the general public
  - ⇨ The Financial Stability Report – issued on an annual basis since 2006; the NBR presents to the general public the soundness of the financial system (institutions, markets, and infrastructure) and the factors that might affect it as a result of the system's connections with the real economy, the public sector, and the external environment
  - ⇨ Press conferences, seminars and workshops are often organized by the NBR to publicly debate important issues related to financial stability (including macroprudential analysis), bank supervisory functions and other related topics (FX lending, non-performing loans, etc.).

Instead of conclusion

Macroprudential oversight process

1. Potential sources of systemic risk ⇨ Risk identification
    a) Detection of vulnerabilities, potential triggers, likelihood of risk materializing
    b) Selected tools:
        – Set of financial stability indicators & early warning models
        – Market intelligence
        – Expert judgment.
2. Risk assessment
    a) Assessment of propagation channels, potential severity of risks identified and the system's ability to absorb shocks
    b) Selected tools
        – Assessing propagation channels (including contagion and spillover models).
3. Communication
    a) Financial Stability Report
    b) Other (Annual Report, Inflation Report, press conferences, seminars and workshops).
4. Policy response ⇨ Possible macroprudential policy action by the responsible authorities.

SESSION 2
MACROPRUDENTIAL ANALYSIS (I)

PRUDENTIAL REGULATION IN TURKEY

H. Yeşim Aydin*

Information about the regulation of financial markets in Turkey and Turkish banking system

Multiple regulator model

- BRSA for banks (since 1999), leasing, factoring and consumer finance companies (since 2006)
- CMB (Capital Markets Board) for capital market regulation & supervision & enforcement on investor protection, listing rules, listed companies' disclosure
- Treasury for regulating, supervising and sanctioning insurance companies
- Turkish Republic Central Bank (TRCB) for price stability and financial stability.

Turkish banking sector-highlighting numbers as of July, 2011

- Number of banks in operation: 48
- Top 5 banks hold 58.5 percent of total assets
- 3 of the 49 banks with a ratio of 29.4 percent of total assets are state-owned
- 23 banks are foreign-capitalized with a ratio of 14.6 percent of total assets (41.1 percent when publicly traded shares are also included)
- Total assets: 692.9 billion $
- Total assets/GDP: 96.5 percent
- Total net profit: 7.1 billion $
- 15.2 percent increase in assets, 19.4 percent increase in credits as compared to December 2010

* Banking Regulation and Supervision Agency

- 1.7 percent decrease in net profit as compared to July 2010
- Average CAR: 17 percent
- Average ROA: 1.9 percent
- Average ROE: 16.3 percent.

Micro versus macroprudential approach to financial regulation

- Microprudential approach: partial equilibrium approach → main purpose: to prevent the failure of individual financial institutions
- Macroprudential approach: general equilibrium approach → main purpose: safeguard the financial system as a whole
- Main tool of microprudential regulation: capital regulation
- Financial health of individual banks → Prompt corrective action → debt overhang problem of Myers, 1971 → asset shrinkage (Hanson, Kashyap and Stein, 2010)
- Two basic costs → credit crunch and fire sale effects, which are interconnected (Diamond and Rajan, 2009)
- Microprudential regulation alone is inadequate
- Need for incorporating endogenous risks and considering the systemic importance of individual institutions
- Macroprudential approach should be complemented by microprudential instruments (Moreno, 2011).

Tools

- Macro as well as microprudential tools also supported by Basel III proposals
  - ⇨ Forward-looking provisioning
  - ⇨ Countercyclical capital buffer
  - ⇨ Countercyclical liquidity buffer (LCR)
  - ⇨ Leverage ratio
  - ⇨ Net stable funding ratio
  - ⇨ Increasing the quality of capital
  - ⇨ Ensuring better risk recognition by banks.

Current situation in Turkey

- "Prudential" regulation and supervision
  - ⇨ Regulation on own-funds
  - ⇨ Regulation on credit operations
  - ⇨ Regulation on capital adequacy ratio (CAR)
  - ⇨ Regulation on liquidity
  - ⇨ FX regulation
  - ⇨ Regulation on classification and provisioning of loans and non-performing loans (NPLs)
  - ⇨ Regulation on the interest rate risk in the banking book
  - ⇨ Regulation on internal systems of banks.

Capital adequacy ratio

- Risks considered in calculation:
  - ⇨ Interest rate, credit, trading, market, commodity, equity, foreign exchange, operational, counterparty, specific, transaction risks
  - ⇨ Both on and off-balance sheet items taken into account in calculation
  - ⇨ Not only the solo, but also the consolidated financial statements are part of the equilibrium.
- Minimum CAR: 8 percent – both on solo and consolidated bases
- Target CAR: 12 percent – as announced by BRSA in 2006
- BRSA has the authority to differentiate and individualize specific ratios for specific institutions due to the adequacy of their internal control systems and level of safety and soundness
  - ⇨ Direct measures if CAR < 8 percent
  - ⇨ Indirect measures if 8 percent < CAR < 12 percent via deposit insurance premiums (higher premiums for lower CAR).

- Specific regulations on specific instruments:
  - ⇨ Credit derivatives – including CDS and other credit-backed securitizations
  - ⇨ Options – market risk emerging from options.

FX Regulation

- As a result of previous experiences – 2000 and 2001 crisis
- Ratio of net FX assets/liabilities to capital
- Net FX position/own funds ratio to have an average absolute value of 20 percent on a weekly basis
- Calculations based both on solo and consolidated bases
- Also the off-balance sheet derivatives based on FX money transactions such as futures, swap, options are considered in the equilibrium.

Regulations – Provisioning

- Credit provisioning
- General provisions
- Specific provisions for non-performing loans (NPLs)
- Classification of credits – important both for accounting valuation and probable losses that could emerge from credit risk
- Different types of collateral taken into account in different levels according to their liquidity.

Liquidity Regulation

- Based on total and FX liquidity calculations
- Two-tier basis
- Tier 1: 0 - 7 days to maturity
- Tier 2: 0 - 31 days to maturity
- Time to maturity

- Calculation for total and FX values
  - ⇨ Tier 1: 0 to 7 days
  - ⇨ Tier 2: 0 to 31 days.
- Minimum liquidity requirement
  - ⇨ 100 percent for Tier 1 and Tier 2 total values
  - ⇨ 80 percent for Tier 1 and Tier 2 FX values
  - ⇨ Ignoring their maturity, liquidity ratio for cash, and cash like items calculated from daily numbers on a weekly basis not to be less than 7 percent.
- Authority to tailor any of these ratios according to banks or peer groups.

Interest rate risk in the banking book

- Newly adopted regulation
- Negative and positive shocks implemented on the NPV of cash flow positions in the banking book
- Differences in the NPV of cash flow positions in the banking book with and without the implementation of (+) and (-) shocks
- The ratio of the greater difference to total equity should not exceed 20 percent
- To be implemented starting from 01.07.2012.

Current approach to regulation and the case in Turkey

- The liquidity ratio (0 - 31 days) parallel to LCR in Basel III framework
- Currently no liquidity regulation ratio parallel to NSFR
  - ⇨ Emphasis on mitigating the over-reliance on very short term funding and on the importance of deposits as the main source of funding
  - ⇨ Convenient to implement given the current structure of bank balance sheets.
- No difficulty in calibrating the leverage ratio in Turkish banking system

- Counter-cyclical regulatory measures and increasing the quality of banks' capital
- Policies implemented by the BRSA before and during the financial turmoil
  - ⇨ Amendments in regulations on loan loss provisions supporting the macroprudential framework followed by the CBRT (e.g., limits on the collateral for mortgage credits)
  - ⇨ Liquidity and business contingency plans to be developed by banks
  - ⇨ 12 percent target capital adequacy ratio
    - ◗ Banks are not allowed to open new branches unless the CAR ≥ 12 percent.
  - ⇨ Permissions for dividend payouts.
- Restrictions on dividend payouts

	CAR > 18%	16% < CAR < 18%	13% < CAR < 16%
Max. distribution	20%	15%	10%
Max. allowable fall in CAR after distribution	100 bp	70 bp	40 bp

- Relationships between relavant authorities:
  - ⇨ Financial sector commission
  - ⇨ Systemic Risk Committee.
- Systemic Risk Committee
  - ⇨ Banking Law, Article 72
  - ⇨ Members: BRSA, CBRT, Treasury, Savings and Deposit Insurance Fund
  - ⇨ Under the coordination of the BRSA.

Current approach to regulation and the case in Turkey: Stress tests

- Macro stress tests
- Scenarios
  - ⇨ Unexpected fund outflow from Turkey followed by increases in the rates of interest, depreciation of TL, increases in spreads, fall in GDP.
- Sensitivity analyses
  - ⇨ Sensitivity of bank balance sheets and P&Ls to unexpected changes in certain parameters like interest rates, exchange rates, etc.

Macroprudential analysis of the BRSA

- Risk focused supervision
- Macro reporting team; macro oversight
- To watch the trends and to estimate where the numbers are going, ex-ante consideration with ex-post numbers
- Taking into account not only the banking numbers, but also macroeconomic indices
- Estimates in a forward-looking manner to foresee the disaster and take any measure either to prevent or to mitigate its negative effects
- Periodical and specific reporting to BRSA staff and high level management
- Publicly announced reports
- Reports based on the standardized data regularly collected from financial institutions in our database
- Even most important balance sheet (B/S) items collected from banks on a daily basis
- Periodical reports on the most important assets and liabilities
  - ⇨ Loans portfolio, NPLs, potential bad loans, deposits, FX positions, liquidity, consumer loans, derivative transactions, securities portfolio, profitability analysis, etc.

- Not only B/S and P/L items, but also reports on foreign investments abroad by banks operating in Turkey, country risk reports, etc.
- Stress tests
- Other than these periodicals, also reports prepared due to the rising issues either determined by supervisors or requested by high level management.

Conclusions

- Macroprudential framework complemented by relevant microprudential tools
- The link between banking behavior and macroprudential tools
- Implementation of countercyclical measures where relevant
- Relationship between authorities is important.

MACROPRUDENTIAL ANALYSIS AT THE NATIONAL BANK OF THE REPUBLIC OF BELARUS

Kirill Demidov*

The NBRB's role in macroprudential analysis and financial stability analysis

1. The main objectives of the NBRB include developing and strengthening the banking system of Belarus. The NBRB is responsible for banking supervision
   – The Ministry of Finance supervises insurance companies
2. The NBRB has no legal responsibility for maintaining financial stability. However, the amendment to the Banking Code proposed by the NBRB defines the rights of the NBRB in financial stability monitoring

   So far, the NBRB contributes to financial stability by implementing banking supervision and payment system supervision, acting as a lender of last resort, publishing FSR, recording credit histories of borrowers.

Macroprudential supervision: definition

– Monitoring of banking sector risks, estimating the influence of monetary and economic factors on banking sector stability with intent to contribute to banking sector soundness, macroeconomic stability, and minimizing the probability of systemic banking crises.

* Macroprudential Supervision Department, Banking Supervision Directorate, National Bank of the Republic of Belarus

Macroprudential analysis at the NBRB: organizational structure

1. Banking Supervision Directorate (80 persons)
   – Macroprudential Supervision Department (10 persons)
2. Commission for Evaluation of Financial Soundness of the Banking System (representatives of Banking Supervision Directorate, Monetary Policy and Economic Analysis Directorate, Monetary Operations Directorate, International Operations Directorate, Statistics Directorate)
   – FSR is presented yearly, Banking Sector Stability Review is presented quarterly
3. Banking System Stability Committee
4. The Board of the NBRB

} Macroprudential policy instruments or recommendations

5. Financial Stability Committee (NBRB, Ministry of Finance, Ministry of Economy, Agency for Deposit Insurance)
   – Data sources for macroprudential analysis: banks' prudential reports, monetary and banking sector statistics, economic statistics.

Main instruments of macroprudential analysis at the NBRB

1. Analysis of macroeconomic and monetary trends, and their influence on banking sector stability
2. Financial soundness indicators
3. Stress testing of the banking sector
4. Diagram of risks
5. Banking sector stress index
6. Elements of early warning system (econometric models for banking crisis probability).

Banking sector development

	2005	2006	2007	2008	2009	2010	01 Oct. 2011
Number of banks	30	28	27	31	32	31	31
Share of foreign capital in authorized capital, %	9.3	7.8	9.8	17	27.3	24.22	28.89
Authorized capital, USD bn	1.0	1.5	2.1	3.9	3.3	4.0	2.3
Regulatory capital, USD bn	1.9	2.4	3.0	5.1	4.7	5.9	4.0
Assets, USD bn	9.6	13.5	19.4	28.7	29.1	42.5	35.9

Belarus has a bank-based financial system. The share of bank assets in total assets of the financial sector is estimated at 90 percent.

Macroeconomic environment

	2008	2009	2010	01 Oct. 2011
Real GDP, % change	10.2	0.2	7.2	7.9*
Unemployment rate, % of economically active population	0.8	0.9	0.7	0.7**
Inflation rate (CPI), December-to-December % change	13.3	10.1	9.9	74.5
Refinancing rate, % per annum	12	13.5	10.5	30
Nominal official exchange rate, Belarusian rubles/1 USD	2,200	2,863	3,000	5,599
Nominal exchange rate (additional section at FE market), Belarusian rubles/USD	n/a	n/a	n/a	7,630
Deficit (-), surplus (+) of consolidated budget, % of GDP	1.4	-0.7	-2.6	3.3***
Current account, % of GDP	-8.2	12.6	15.2	-19.0
External debt, % of GDP	24.9	44.8	52.0	56.3
International reserves, USD mn	3,061.1	5,652.5	5,030.7	4,715.8

* January-June 2011 ** as of 01.08.2011 *** as of 01.09.2011

Threats to banking sector stability from deterioration of macroeconomic conditions in 2011

	01.01.	01.02.	01.03.	01.04.	01.05.	01.06.	01.07.	01.08.	01.09.	01.10.	Change from 01.01.,%
NC deposits, Belarusian rubles, bn	20,905	19,877	21,955	20,612	23,161	24,170	25,033	25,740	26,993	28,870	38.1
Natural persons	9,811	10,143	10,893	9,707	10,154	9,195	10,121	10,962	10,459	12,342	25.8
Legal persons	11,094	9,734	11,063	10,905	13,007	14,976	14,913	14,779	16,534	16,528	49.0
FC deposits, USD bn	7.4	7.4	7.5	7.4	7.0	6.6	6.5	6.4	6.6	6.7	-9.0
Natural persons	4.4	4.6	4.7	4.7	4.2	3.7	3.5	3.5	3.5	3.6	-18.8
Legal persons	3.0	2.8	2.8	2.8	2.8	2.9	3.0	2.9	3.1	3.2	5.4
Funds received by banks from non-residents, USD bn	5.7	6.0	6.1	6.7	7.1	6.9	6.8	6.7	6.6	6.6	15.9
Share of problem (substandard, doubtful and bad) assets in the assets subject to credit risk, %	3.55	3.0	2.97	2.83	2.94	3.26	3.12	3.24	3.76	n/a	

Economic and banking sector developments in 2008-2009

- What has happened:
  – Drop in external demand for Belarusian products
  – Slowdown in economic growth
  – Growth of inflation and devaluation expectations
  – Increase in the extent of the dollarization of the economy
  – Deterioration in the financial position of borrowers
  – Liquidity shortage in the banking sector.
- What has not happened:
  – No subprime
  – No toxic derivatives
  – No bank credit crunch
  – No mistrust between banks.

Economic and banking sector developments in 2010-2011

- What has happened:
  – Increase in energy prices in Belarus
  – Salary growth on the eve of the Presidential election (19 December 2010)
  – Customs union (Belarus, Russia, Kazakhstan) agreements coming into force (1 July 2011)
  – Large widening of foreign trade operations imbalance
  – International reserves decrease, cessation of the NBRB's interventions
  – Growth of devaluation expectations and demand for FC, ruble deposits withdrawal (March-May 2011), multiple FX rates, official devaluation (24 May, 2011)
  – Deterioration in the financial position of importers
  – Increase in the extent of the dollarization of the economy
  – Negative rating actions (sovereign ratings and banks' ratings downgrading).
- What has not happened:
  – No abrupt slowdown in economic growth
  – No sharp deterioration in bank assets quality
  – No outflow of funds from non-residents
  – No mistrust between banks
  – No systemic banking crisis.

- percent -

FSI of Belarusian banking sector	01.01.2009	01.01.2010	01.01.2011	01.09.2011
Capital adequacy				
Regulatory capital adequacy ratio	21.79	19.76	20.45	16.92
Fixed capital adequacy ratio (Tier 1)	16.94	14.41	14.87	12.31
Capital to assets ratio	17.39	15.84	13.64	10.41
Credit risk				
Growth of credit to the economy	24.25	41.32	19.60	10.12
Large open positions to regulatory capital	111.22	112.53	138.84	165.84
Share of problem assets in total assets exposed to credit risk	1.68	4.24	3.55	3.76
Share of NPL in total credit to the economy	0.59	0.95	0.64	0.62
Problem assets less provisions actually created against them/Capital	4.52	15.39	12.40	15.10
Distribution of loans by sector				
- Industry	39.84	42.91	38.73	-
- Agriculture	19.89	21.82	23.79	-
- Construction	3.50	3.42	4.15	-
- Trade	16.35	15.63	16.58	-
- Real estate operations	5.26	5.68	6.74	-
- Other	15.16	10.53	10.02	-
Income/returns				
Return on assets	1.90	1.96	2.14	1.93
Return on equity	13.03	11.93	14.63	15.76
Interest margin to gross income	35.66	39.23	41.88	14.48
Non-interest expenses to gross income	77.86	79.27	78.53	92.19
Staff costs to non-interest expenses	28.03	21.35	18.89	5.71

continued - percent -

	01.01.2009	01.01.2010	01.01.2011	01.09.2011
Interest rates spread				
- for new loans and deposits in Belarusian rubles (pp)	2.30	0.50	3.16	2.40
- for new foreign exchange loans and deposits (pp)	3.80	4.09	1.82	2.70
Liquidity				
Liquid assets/Total assets	23.20	28.41	29.21	32.94
Short-term liquidity	2.30	3.01	3.38	2.74
Instant liquidity	108.81	237.85	450.05	316.08
Current liquidity	102.01	172.72	225.31	187.97
Maturity mismatch between assets and liabilities over 12 months, trillion Belarusian rubles	-10.382	-12.112	-7.346	-7.147
Foreign exchange risk				
Total open foreign exchange position/ Regulatory capital	8.69	11.74	1.68	5.21
Share of clients' debt on loans and other asset operations in foreign exchange in clients' total debt on loans and other asset operations	31.91	30.65	22.43	30.03
Share of clients' resources in foreign exchange total resources attracted from clients	32.95	41.96	43.47	44.53

Stress tests: methodology

- Stress tests (sensitivity analysis) on a regular quarterly basis for all banks
- Vulnerability to credit, foreign exchange and interest rate risks based on the calculation of the values of net losses as a result of the preset shocks and their charging to the capital account
- Vulnerability to liquidity risk as a degree of changes in the liquidity ratios in case of a dramatic change in the level of liquid liabilities.

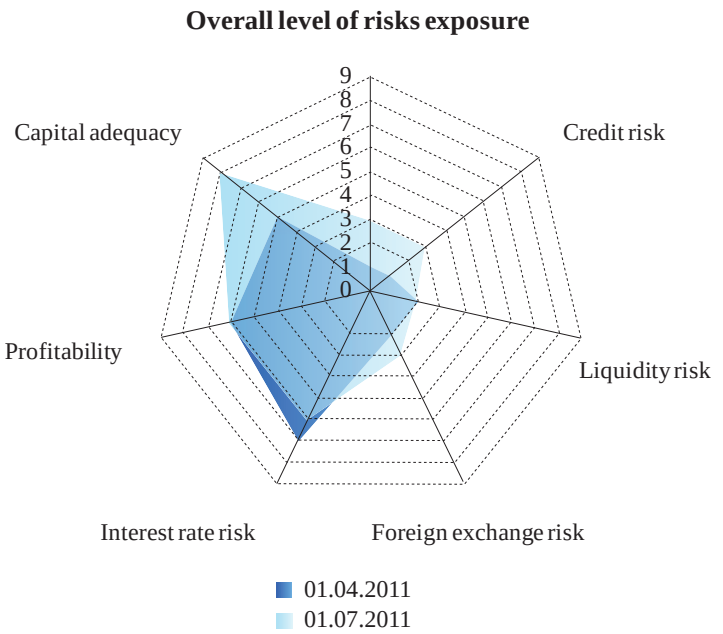
Stress test scenarios:

- Increase in the share of the problem assets by 15 percentage points
- Depreciation of Belarusian ruble against the US dollar by 20 percent
- Shift of yield curve in Belarusian rubles by 10 percentage points
- Increase of yield curve in FX by 5 percentage points
- Withdrawal of 20 percent of deposits
- Withdrawal of 50 percent of funds from non-residents.

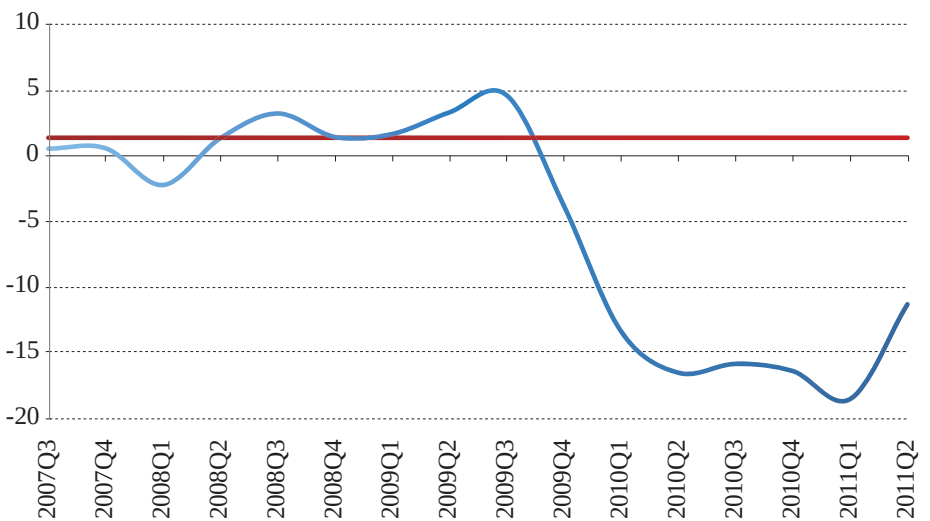
Stress tests results as of September 1, 2011

Scenarios:			Banking sector
Withdrawal of 20 percent of deposits (natural and legal persons)	Instant liquidity ratio (%)	actual	316.1
		after stress	276.7
	Current liquidity ratio (%)	actual	188.0
		after stress	165.2
	Short-term liquidity ratio (%)	actual	2.7
		after stress	2.2
	Liquid-to-total assets ratio (%)	actual	32.9
		after stress	26.6
Withdrawal of 50 percent of funds from non-residents in FC	Instant liquidity ratio (%)	actual	356.7
		after stress	209.9
	Current liquidity ratio (%)	actual	188.0
		after stress	124.5
	Short-term liquidity ratio (%)	actual	1.9
		after stress	1.4
	Liquid-to-total assets ratio (%)	actual	49.3
		after stress	36.4
Increase in the share of the problem assets by 15 percentage points	CAR	actual	16.9
		after stress	101
	Losses (+) versus profit over 12 months (times)		4.2
	Losses (+) versus capital (%)		46.1
20 percent depreciation of the Belarusian ruble against the US dollar	CAR	actual	16.9
		after stress	17.0
	Losses (+) versus profit over 12 months (times)		0.0
	Losses (+) versus capital (%)		-0.2

Diagram of risks as of July 1, 2011



Banking sector stress index dynamics in 2007 Q3 – 2011 Q2



Macroprudential analysis: challenges

- The need for more operative and flexible instruments for macroprudential analysis
- The need for alternative data sources (apart from banks balances and prudential report)
- The need to shift from macroprudential analysis to macroprudential policy actions (MP instruments; not only Banking Supervision Directorate's responsibility; not only the NBRB's responsibility).

Future development of macroprudential analysis at the NBRB

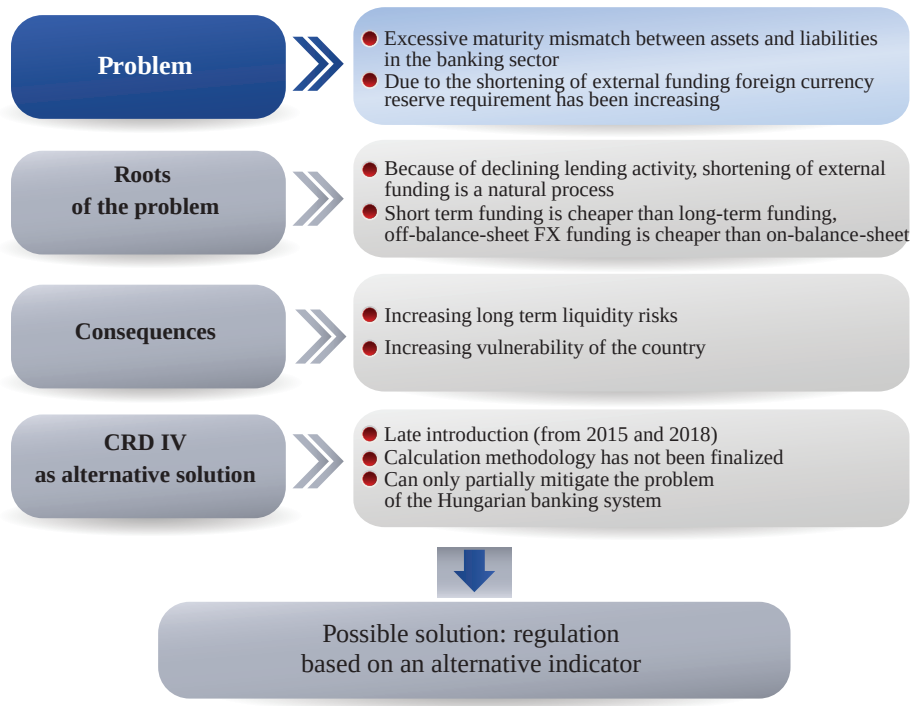
1. To develop more operative and flexible instruments of MA: standardized analytical forms for monthly review of banking sector stability, to increase flexibility of stress-test instruments…
2. To develop sophisticated methods and instruments of MA: macroscenarios stress-tests, interbank linkages models…
3. Expanding data sources for MA: credit registry data, banking managers' survey of risks…
4. To develop criteria for identification of systemic banks
5. To take into account financial stability issues while modelling monetary policy and vice versa.

Conclusions

- The NBRB has developed a system of macroprudential analysis of banking sector risks
- However, the instruments for macroprudential analysis need constant updating and upgrading.

MATURITY MISMATCH IN FX POSITION IN THE HUNGARIAN BANKING SYSTEM – MITIGATION POSSIBILITIES

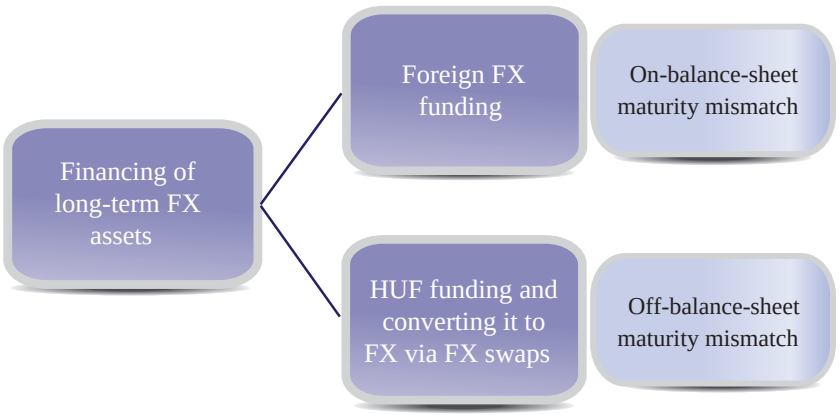
Dóra Siklós*



* Magyar Nemzeti Bank

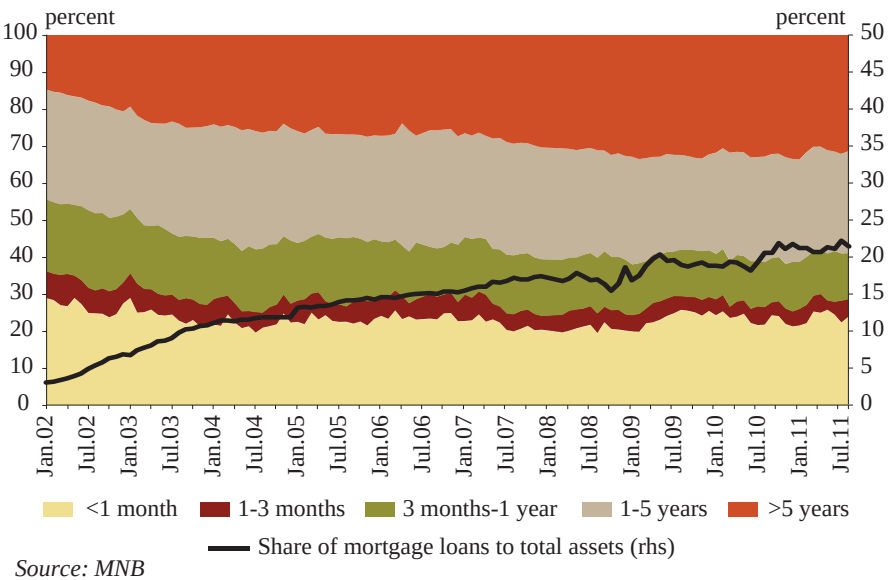
Motivation of the regulation proposal

Simultenaous maturity mismatch in FX position both on and off balance sheet



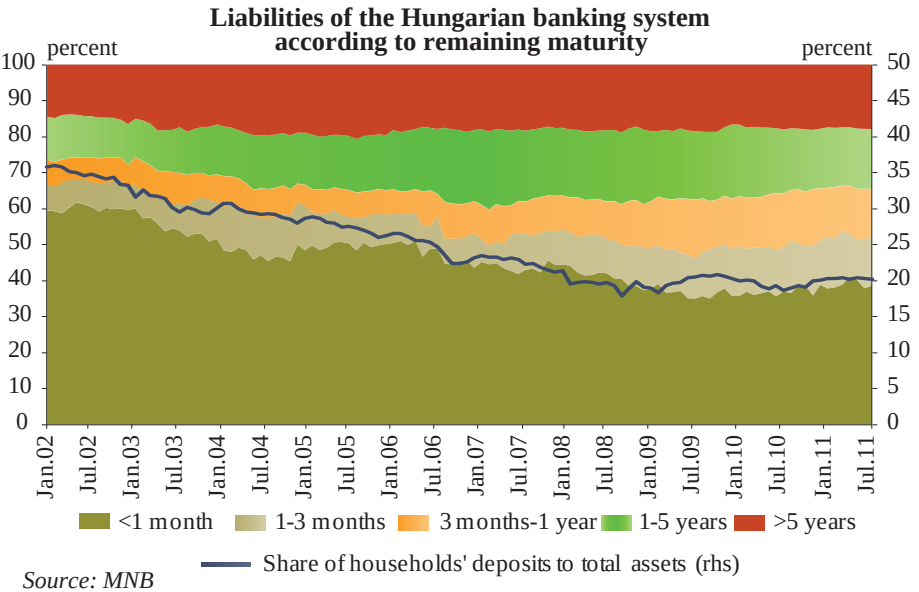
Maturity mismatch: "Lengthening" of the asset side…

Assets of the Hungarian banking system according to remaining maturity



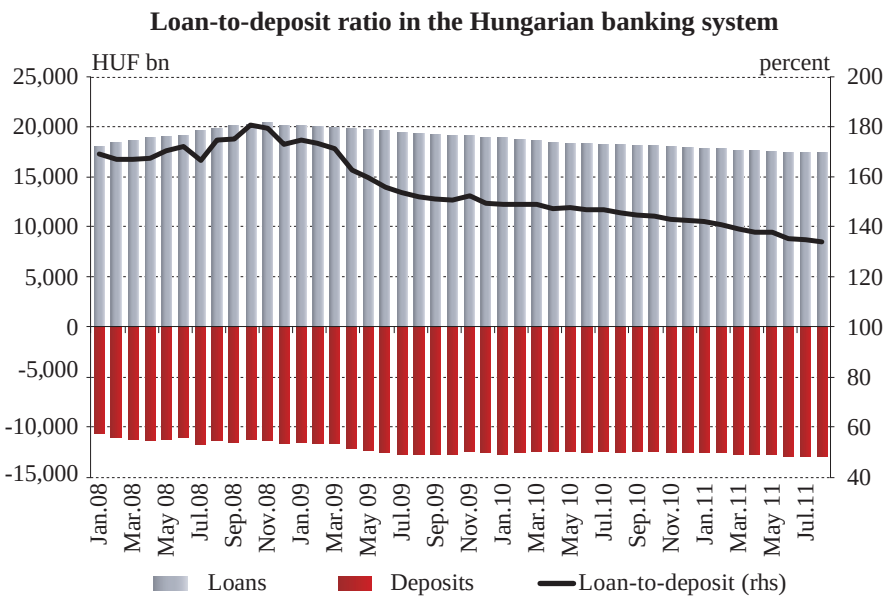
Source: MNB

…is not followed by the "lengthening" of the liabilities



Source: MNB

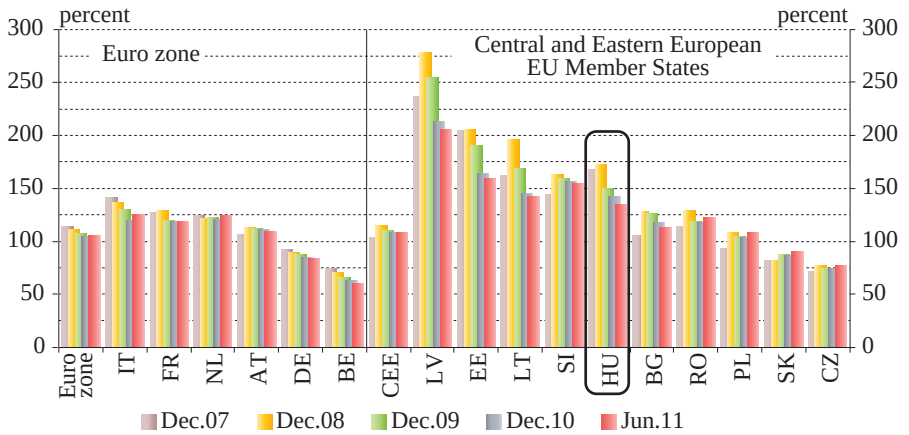
Reliance on foreign funding is substantial…



Source: MNB

… also in regional comparison

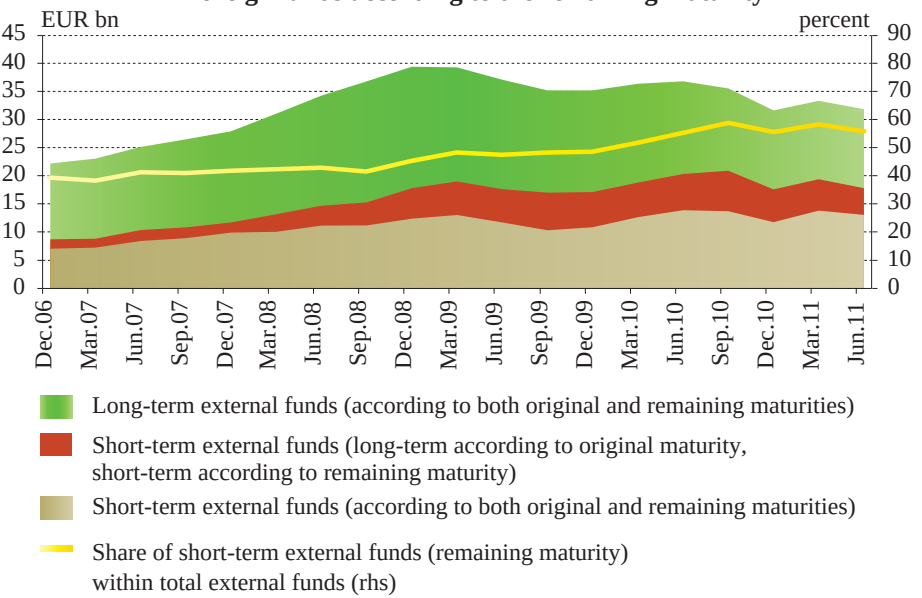
Loan-to-deposit ratio in regional comparison



Source: MNB, ECB

Shortening of the remaining maturity of foreign funds makes the country more vulnerable

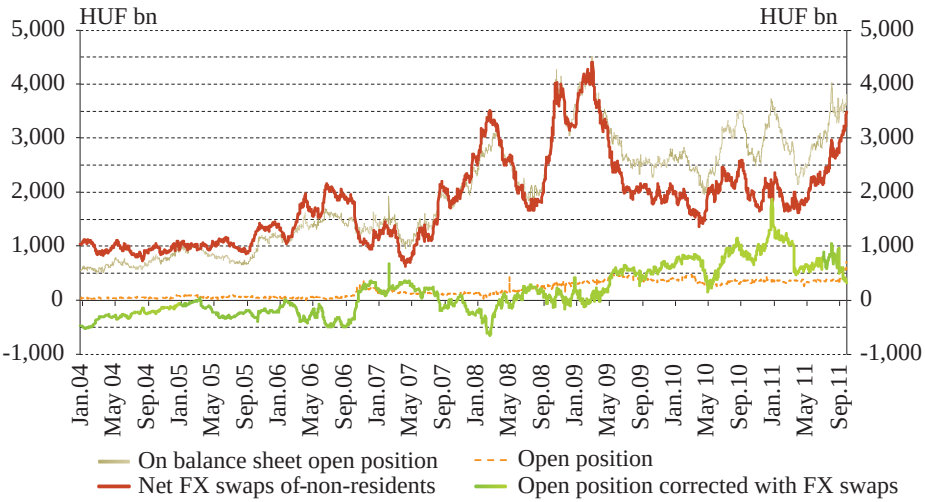
Foreign funds according to the remaining maturity



Source: MNB

The open position is usually closed via FX swaps

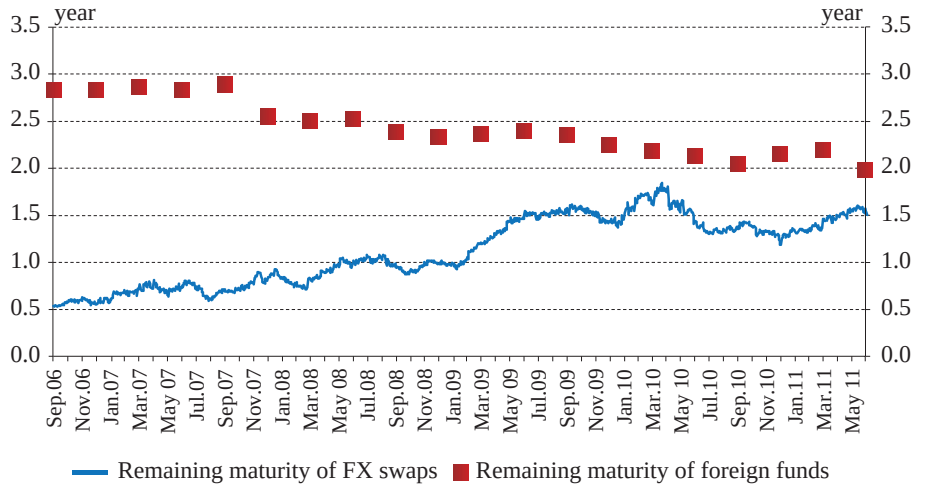
Open position of the Hungarian banking sector



Source: MNB

Remaining maturity of FX swaps is shorter than that of foreign funds

Remaining maturity of foreign funds and FX swaps

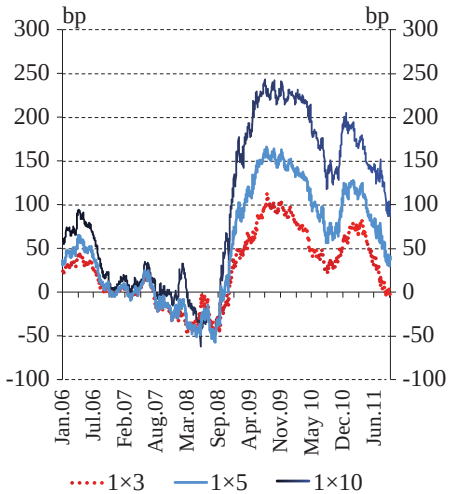


Source: MNB

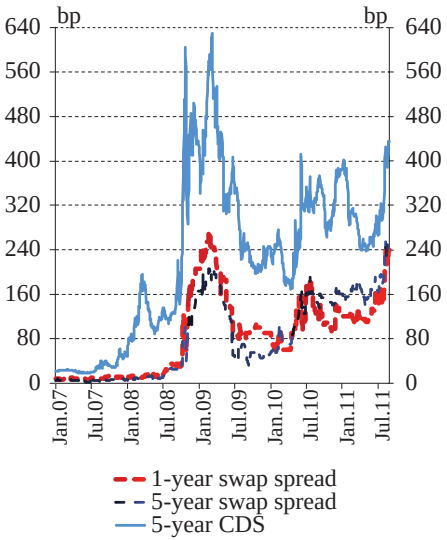
Behind the scene: cost and income considerations

Term premia derived from the euro interest rate swap yield curve, the difference between the interbank and FX swap implied HUF yield and the 5-year Hungarian sovereign CDS

Term premia derived from the euro interest rate swap yield curve



Difference between the interbank and FX swap implied HUF yield and the 5-year Hungarian sovereign CDS



Source: MNB

Proposal: FX funding adequacy ratio (FFAR)

$$\textbf{FFAR} = \frac{\textit{Available amount of stable foreign currency funding + Long term net FX swap position}}{\textit{Required amount of stable foreign currency funding}}$$

1. The indicator requires enough FX funding in line with the bank's FX asset structure
2. Equity and long-term foreign currency funds are qualified as stable funds
3. Households', SME's and corporates' FX deposits are considered in the nominator, but with smaller weights
4. 100 percent weight is allocated to long-term FX assets, 0 percent to highly liquid assets
5. Regarding the specific Hungarian problems that Hungarian banks usually gain FX liquidity off balance sheet, the indicator includes also the long-term net FX swap position in the nominator as stable FX funding.

FFAR mitigates the FX maturity mismatch with taking off balance sheet items also into consideration.

The majority of the Hungarian banks reach the 60 percent level

- 60 percent level:
  - ⇨ Major Hungarian banks' FFARs currently reach the 60 percent level (overwhelming proportion)
  - ⇨ At systemic level no adjustment is necessary, yet some adjustment is necessary for reaching this level on individual bank level
- 70 percent level:
  - ⇨ For the 70 percent level significant adjustment is required
- 80 percent level:
  - ⇨ Reaching the 80 percent limit forces banks for substantial balance sheet realignment.

CRD IV versus FFAR

$$\textbf{Liquidity Coverage Ratio (LCR)} = \frac{\textit{Stock of high quality liquid assets}}{\textit{Total net cash outflows over the next 30 calendar days}} \geq 100\%$$

Advantages:	Disadvantages:
■ liquidity can be kept at a good level even in case of a stress situation	■ conservative stress assumptions ■ makes great demands in stress situation
■ probability of panic can be mitigated	■ demand for liquid assets increases ■ does not take into account the credit lines provided by the owners

Net Stable Funding Requirement (NSFR) = $\frac{\textit{Available amount of stable funding}}{\textit{Required amount of stable funding}} > 100\%$

Advantages:	Disadvantages:
■ excessive on-balance-sheet maturity mismatch can be preceded	■ does not make difference according to the denomination
■ inspires diversification of liabilities, favours drawing long-term stable funds	■ does not take into account long-term, off-balance-sheet funding

Why CRD IV does not resolve the FX maturity mismatch problems of the Hungarian banking system?

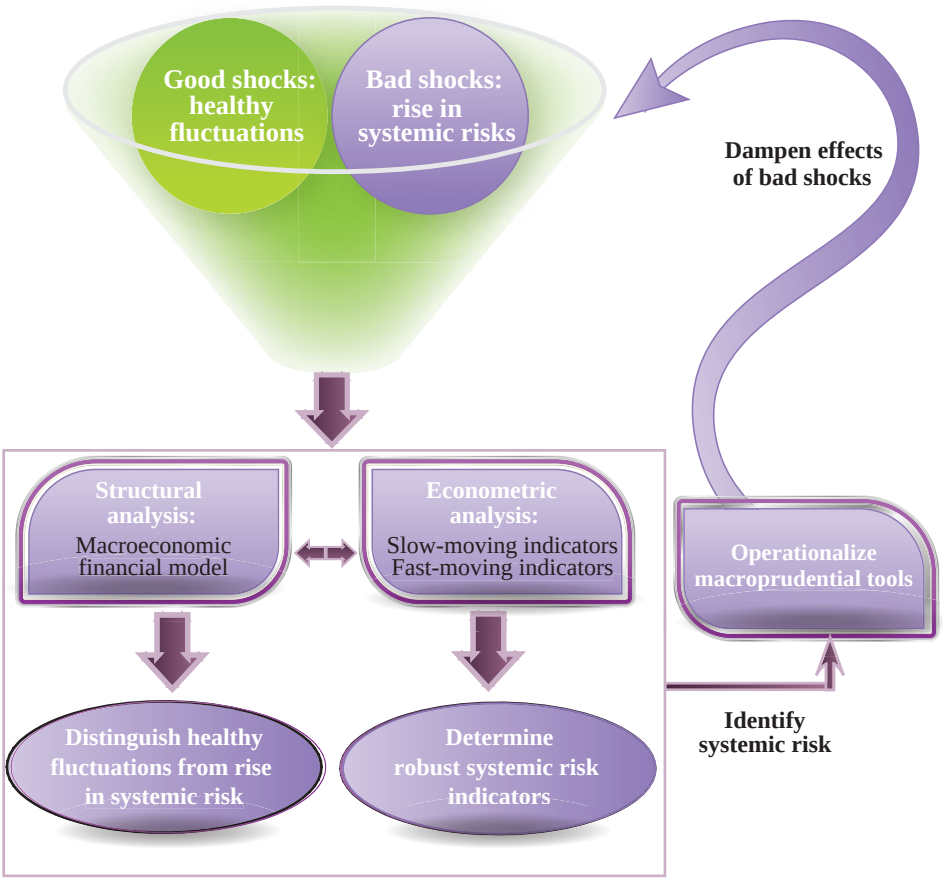
1. Does not handle on-balance-sheet FX maturity mismatch on a targeted way
2. Does not take into account off-balance-sheet items
3. Late introduction (from 2015 and 2018)
4. Calculation methodology has not been finalized.

SESSION 3
MACROPRUDENTIAL ANALYSIS (II)

TOWARDS OPERATIONALIZING MACROPRUDENTIAL POLICIES: WHEN TO ACT?

Christian Schmieder*

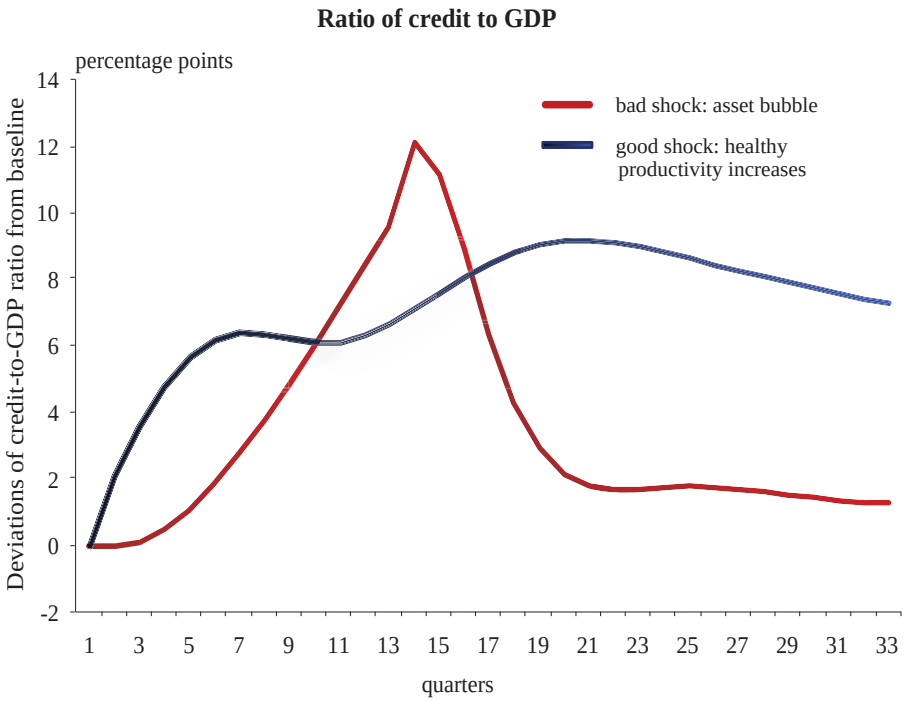
Road Map



* International Monetary Fund

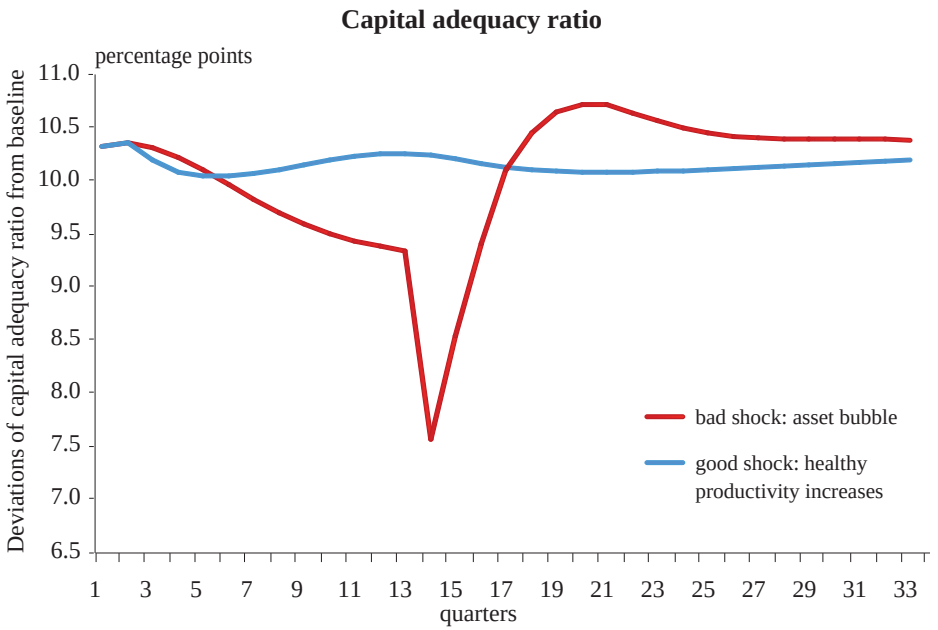
- GOAL: To find a set of meaningful early warning indicators for systemic financial risk so that policymakers know WHEN TO ACT
- The martini glass represents the economy with a cocktail of shocks – good (healthy productivity driven) and bad (lead to systemic risks like asset price bubbles and lax lending standards)
- The challenge is to distinguish between the two types of shocks – the chapter provides a framework to think about leading indicators with the help of a structural model (DSGE – dynamic stochastic general equilibrium) that contains macro-financial linkages and a set of empirical exercises
- The chapter examines slow-moving indicators to understand when systemic risk is rising due to bad shocks (leading indicators) and fast-moving indicators to understand when risks are about to unwind (near-coincident indicators)
- Once we know these indicators, we could use them to form policy tools that moderate excessive risk taking and help build buffers for the financial system to dampen the effects of bad shocks.

Credit growth: rapid in many scenarios



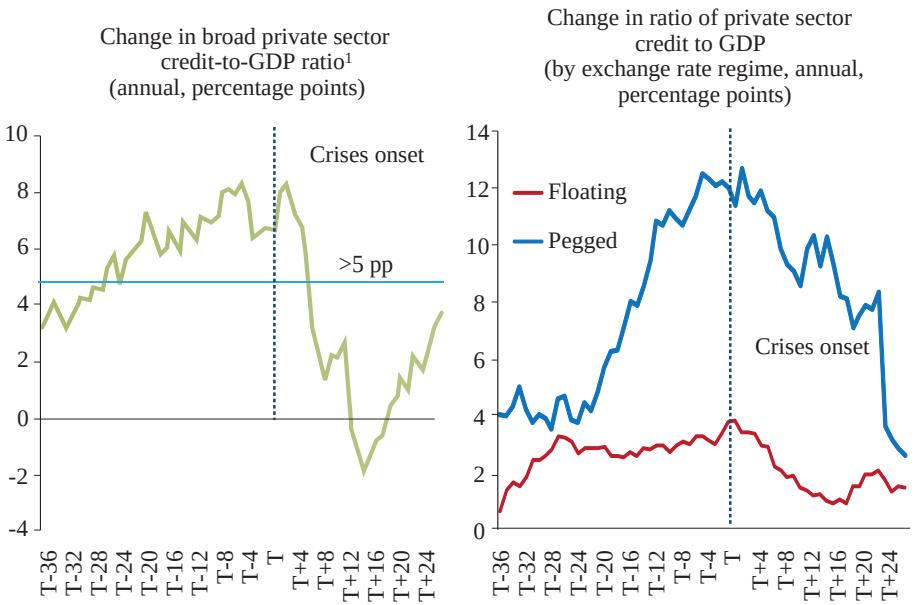
- Credit growth is at the heart of analysis of systemic risk ...
- ... but cannot, by itself, distinguish between good and bad shocks. DSGE model analysis shows that credit growth accompanies both good shocks and bad shocks – both are rising in the picture
- Needs to be accompanied by other indicators to be able to distinguish which types of shocks signal a rise in systemic risk.

Banking soundness indicators differentiate



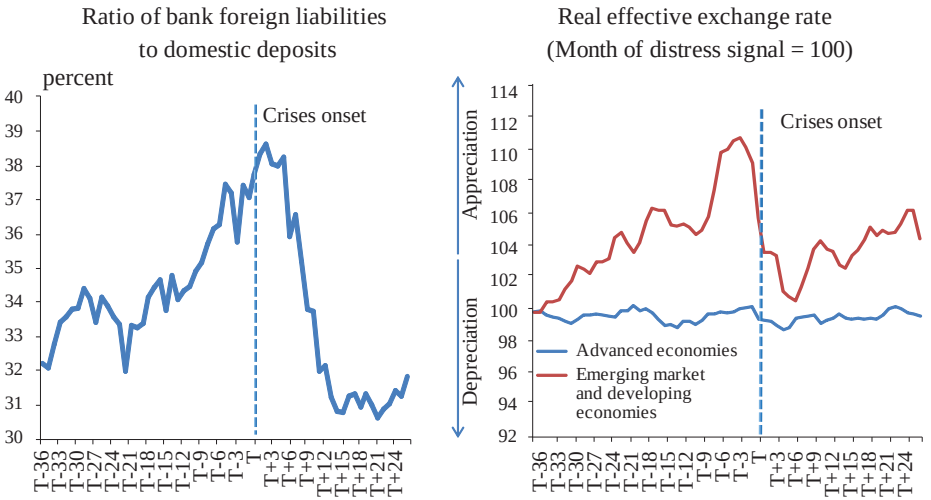
- One such distinguishing indicator is the capital adequacy ratio (CAR), which deteriorates significantly in bad shocks
- Other indicators are the trade balance and asset prices that react differently in the structural model
- For instance, banks riding on an asset price boom (e.g., housing) show that asset prices accelerate even more than would be the case with a good shock
- Hence, several indicators together with credit growth inform about a rise in systemic risk.

Event study:
3 years before to 2 years after financial crisis



[1] Broad credit includes both bank credit and cross-border credit to the private sector

- Structural analysis accompanied by empirical exercises
- Use the 5 percentile tail of the Financial Stress Index to depict financial stress events
- Policy makers need to be vigilant of a change in credit-to-GDP ratio in excess of 5 percentage points, especially when cross-border credit is included along with domestic bank credit. When this broader measure of credit growth exceeds 5 percentage points, there is a greater chance of a financial crisis within the next two years. At the same time, one needs to have a clear understanding of the underlying sources of the credit increase
- Looking at other indicators such as equity and house prices would help policy makers discern between the good and the bad causes of the credit increase and aid in the policy response.



- Other things to watch out for in order to distinguish between good and bad shocks:
  - ⇨ Banks' foreign borrowing
  - ⇨ Real exchange rate dynamics, especially appreciating real exchange rates in emerging economies.

Sounding the alarm: policymakers' preferences?

Noise-to-signal ratios for different credit indicators

(in percent unless noted otherwise)

Crisis measure	Warning signal issued when	Thresholds	Average NSR for countries (at least one forecasted crisis)	Number of countries	Average type I error	Average type II error	Fraction of countries with 100% type I error
Laeven and Valencia (2010)	Credit-to-GDP gap is:	1 std > mean	0.07	82	65	8	61
		1.5 std > mean	0.05		84	3	80
		2 std > mean	0.04		95	1	94
	Percentage change in credit-to-GDP is larger than:	3	0.38	78	17	37	15
		5	0.33		22	31	21
		7	0.29		36	25	33
	Percentage change in broad measure of credit-to-GDP is larger than:	3	0.18	8	0	18	0
		5	0.11		0	11	0
		7	0.18		13	6	0

- Now that policymakers have a set of indicators at hand, when should they sound the alarm? They need to consider the costs and benefits of issuing signals – use a "noise-to-signal" ratio (NSR)
- Looking first at indicators of credit excesses: growth in credit/GDP, the "gap" in credit/GDP from trend, a broad measure of credit growth (with cross-border credit included)
- NSR is a good way to judge whether a particular level of the indicator would send out too many wrong signals (Type II) or miss too many crises (Type I), or be just right (lowest NSR)
- Focusing on overall NSR could be tricky
  - ⇨ Example: Gap! Lowest NSR, but too many countries for which crisis is missed! Caveat: if sample is only advanced countries (similar to the BIS exercise), it looks better

- The growth of credit/GDP, the easiest to understand, has low Type I error, even though NSR is higher than gap
- If credit is redefined to include not only bank loans but also cross-border credit to the private sector, it's even better as a measure, but this analysis had severe data constraints.

Sounding the alarm: other indicators?

Receiver operating characteristics for other indicators

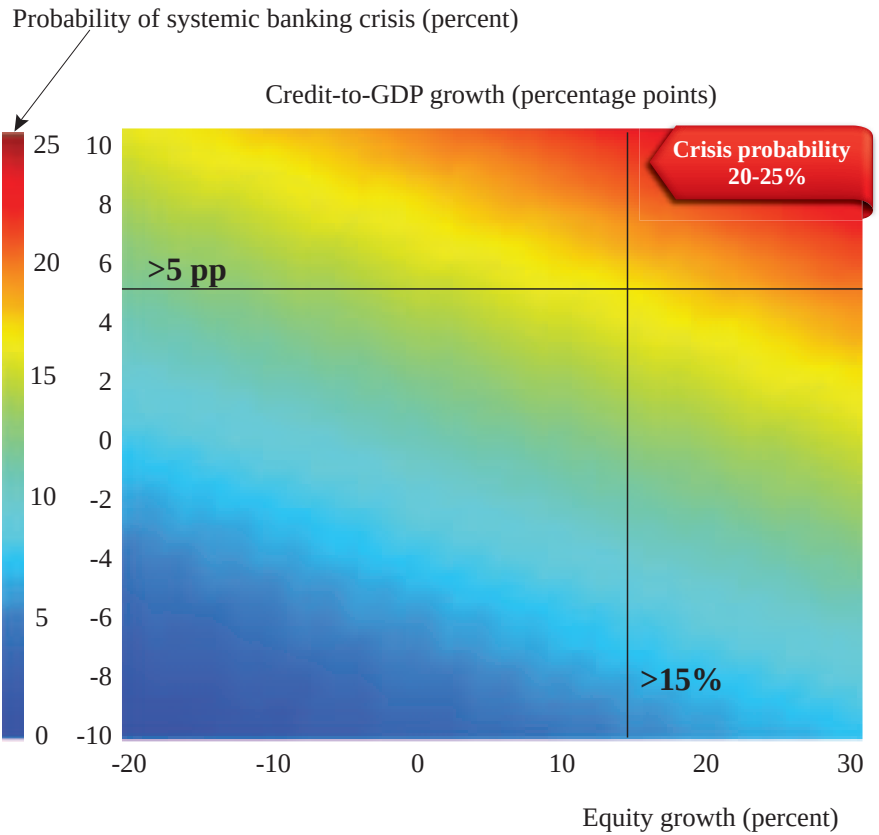
Predictive power of various indicators "x" years before the crisis

- percent -

	All crises observations	Crises observations "x" years before crises					All crises observations		
		1	2	3	4	5	Adv	Emerg	LIC
Credit-to-GDP (year-on-year change)	0.54	0.61	0.55	0.54	0.54	0.49	0.62	0.57	0.48
Equity price (year-on-year change)	0.67	0.67	0.67	0.66	0.71	0.62	0.71	0.69	0.63
House price (year-on-year change)	0.57	0.52	0.59	0.58	0.55	0.60	0.65	0.57	0.52
Real effective exchange rate	0.56	0.61	0.58	0.53	0.53	0.56	0.59	0.52	0.59
Foreign liabilities (year-on-year change)	0.50	0.67	0.50	0.58	0.28	0.34	0.63	0.44	0.68

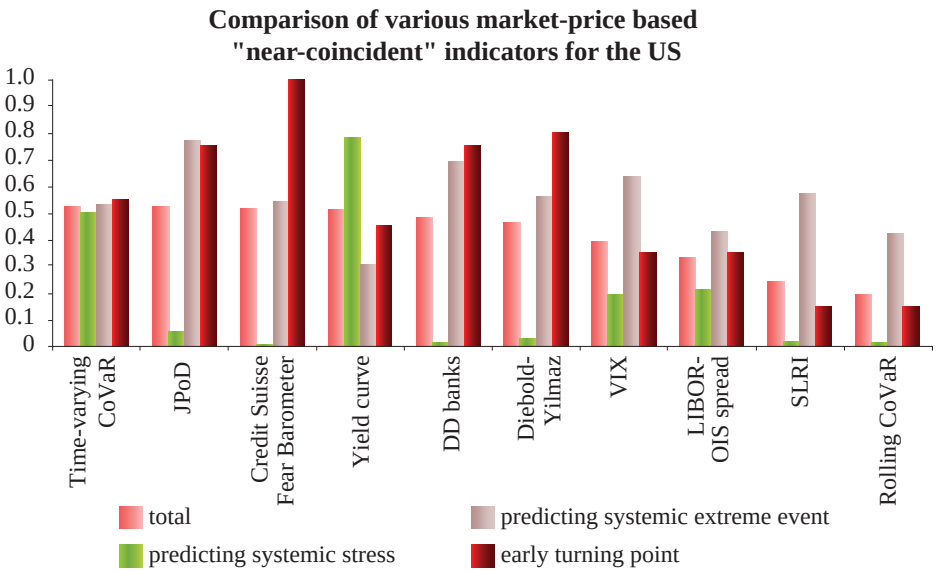
- Another technique to judge the predictive power of higher-versus-lower thresholds – receiver operating characteristics
- Shows the predictive power of indicators other than credit.

Credit and asset prices: powerful together



- Credit and asset price growth could form powerful signals as early as 2 years before a financial crisis
- This is derived from a panel regression, 36 countries, 1975-2010, Laeven-Valencia index of financial instability, spans 27 crisis observations
- It has good out-of-sample properties for showing rise in crisis probability of the US in the pre-crisis period
- Can be done for a large set of indicators, but the larger the set of indicators, the fewer the number of countries that have all the data and the smaller the sample.

Short-term alarm for imminent crisis

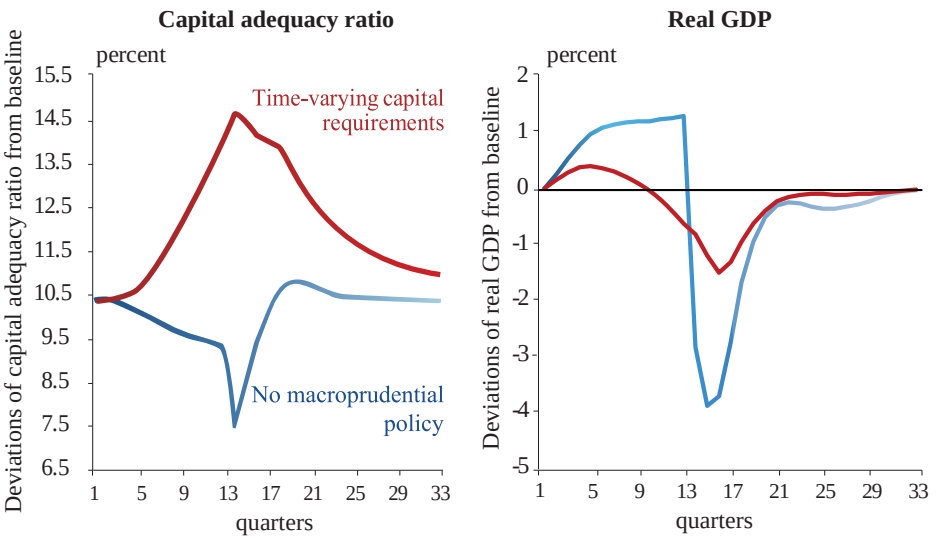


- Systemic stress tends to unwind very fast, need indicators to tell us in advance (few months) that crisis is imminent
- High frequency market price-based indicators are not good at warning years ahead – rather should be evaluated in terms of months → "near-coincident" indicators
- The chapter compares some of the indicators recently proposed
- Tested against ability to predict general stress in financial institutions (number of institutions with abnormally negative returns), extreme stress (25 percent or a greater number of institutions with abnormally negative returns), early turning point (when did they suddenly turn from their calmness 2002-2006)
- Overall time-varying COVAR (covariance of the Value-at-Risk) best-time-variation coming from yield-curve and LIBOR-OIS spread
- JPoD (Joint Probability of Distress) good for extreme stress, yield curve good for systemic stress in general, CSFB (Credit Suisse Fear Barometer) had the earliest turning point
- Note that the purposes of indicators vary – some indicators may not have good early warning properties, but could be good for stress testing purposes.

Indicators and policies

A stitch in time

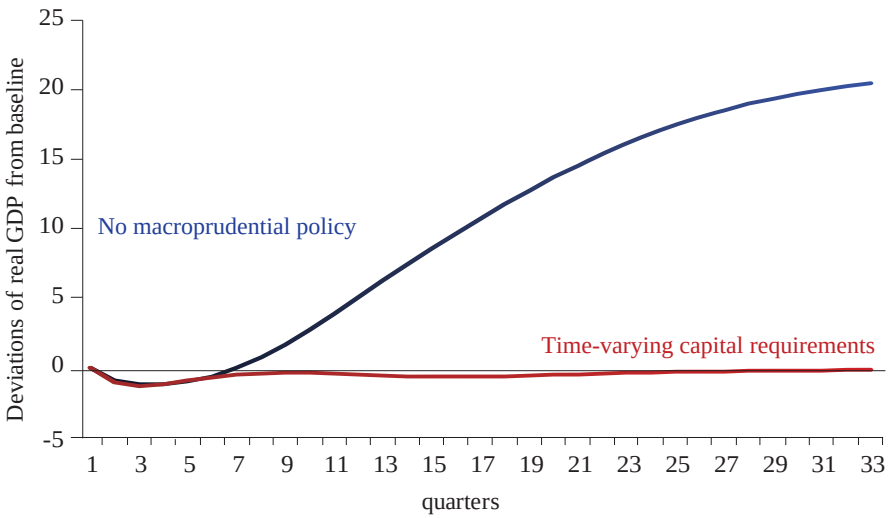
- Know when risks are building up (2 years in advance) with low-frequency balance sheet indicators



- Know when risks are about to materialize (use high frequency market price based-indicators) a few months ahead
- Once we know these two points, buffers could be built up both to reduce excessive risk taking in the upswing and to be drawn down when crisis is imminent or materializes
- Countercyclical capital buffers (CCBs) are an example, but there could be other policies too
- Assume microprudential and monetary policy (inflation targeting), flexible exchange rates as the base case
- Figures show: with and without a macroprudential policy tool of countercyclical capital buffers during an asset price boom
- Works for both fixed and flexible exchange rates (not shown here).

Policies costly if source of shocks mistaken

(ex: Squashing healthy growth with time-varying capital requirements)



- There could be policy mistakes if we only focus on credit growth and do not look at other indicators
- For instance, suppose we think credit growth is too high
- Use macroprudential policy (countercyclical capital buffers) against it
- But in reality, credit growth is being driven by productivity improvements and not giving rise to systemic risk
- Macroprudential instruments could derail the positive growth in the economy.

Practical guidelines

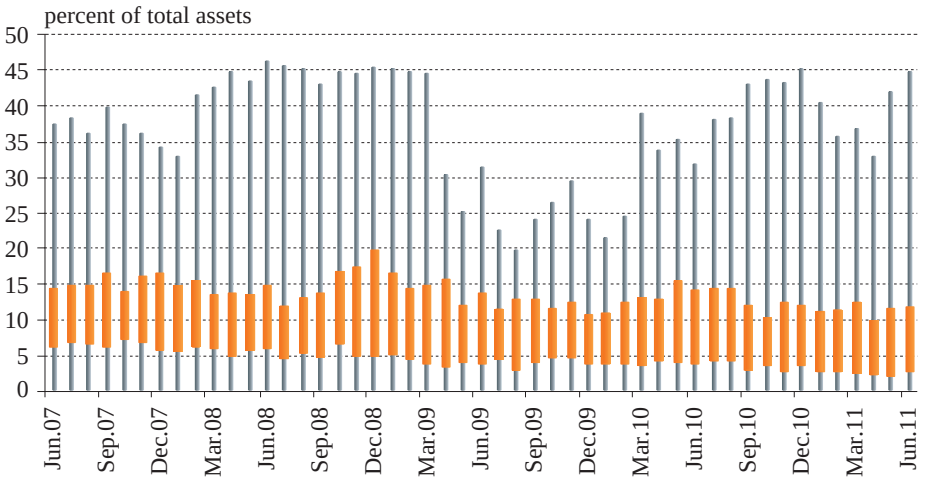
- Know sources of shocks
- Credit growth is important, but cannot be used to distinguish good from bad shocks
- Combine credit growth with other indicators: asset prices, foreign liabilities, direct cross-border lending to private sector …
- Thresholds reflect policymakers' preferences
- Near-coincident indicators: LIBOR-OIS and yield curve
- Policies universal in use, country-specific in design
- Case for coordination among policy makers especially:
  - ⇨ To understand the source of shocks
  - ⇨ In managed exchange rate regimes with FX-denominated loans (the effects of any shock get amplified).

CAPITAL FLIGHTS AND CENTRAL BANK MACROPRUDENTIAL INSTRUMENTS*

Florian Neagu**
Irina Mihai**

Motivation:
Banking sector relies on foreign funding → rollover risk, cost dependent on international market conditions

Short-term foreign funding to the Romanian banks [1]



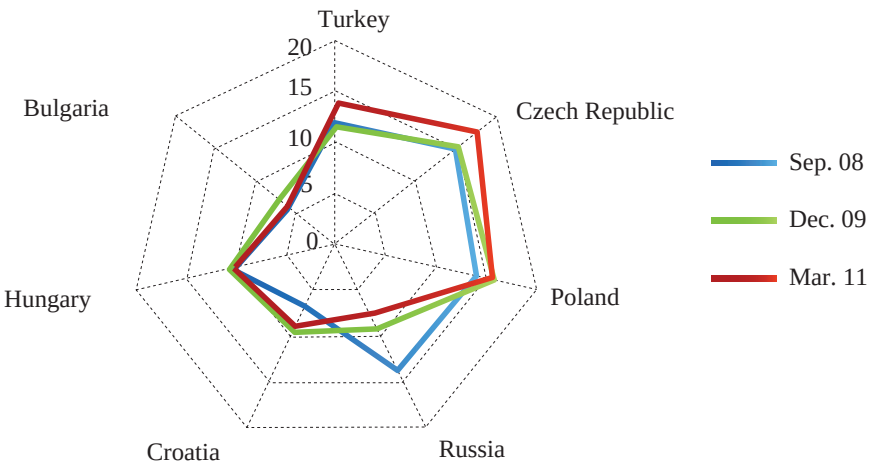
[1] For the first 19 Romanian banks covering more than 95 percent of total bank assets

Source: NBR

* Preliminary draft. Please do not quote.

** Financial Stability Department, National Bank of Romania

Sensitivity[1] of the Romanian banking sector to regional shocks through common lender channel

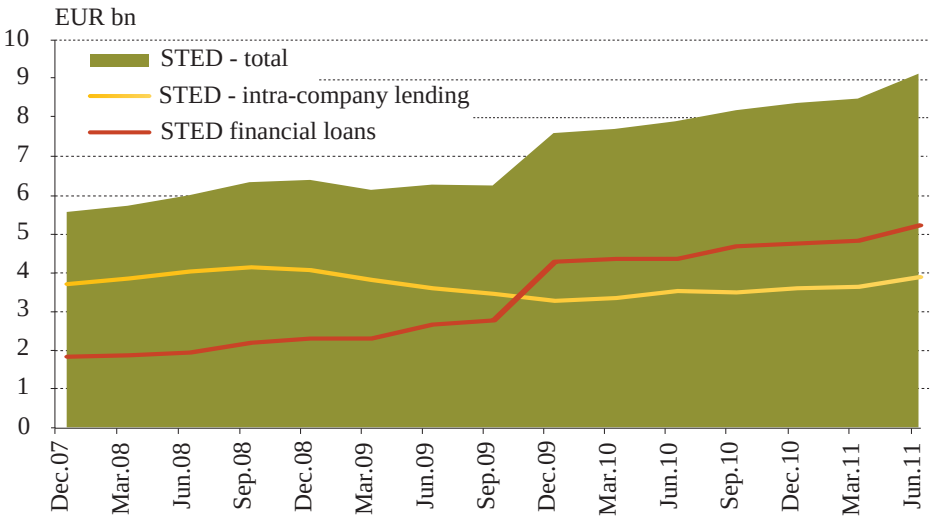


[1]The method used in calculating regional exposures is based on Fratzcher M., "On Currency Crises and Contagion", ECB Working Paper No. 139, April 2002

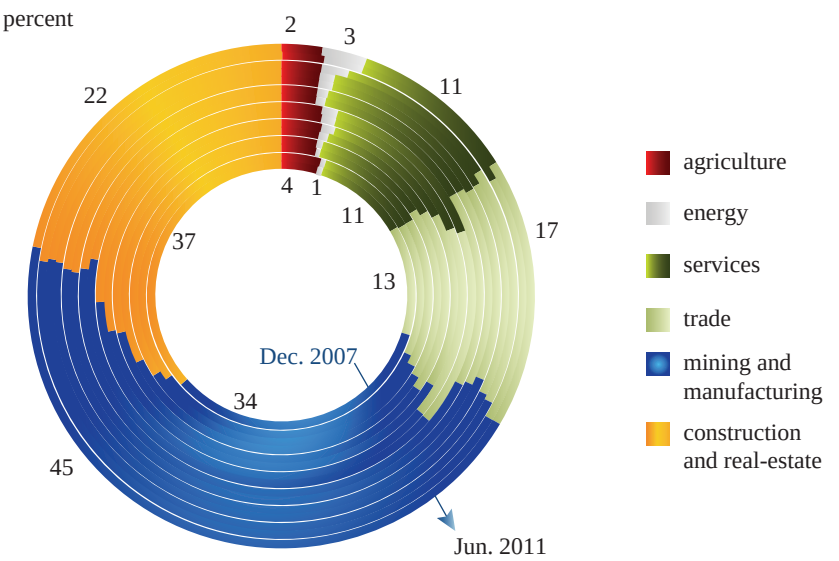
Source: BIS, NBR calculations

- The foreign debt stock of the banking sector increased at a moderate pace between early 2010 and June 2011, i.e. by approximately 9 percent, to reach EUR 25 billion, accounting for 34 percent of total assets in June 2011
- Loans with residual maturities longer than two years make up the largest part (around 51 percent in March 2011) of foreign loans, while those with residual maturities below six months further hold a large share (26 percent) in total foreign loans
- From a macro-prudential perspective, maintaining adequate liquidity and solvency levels is essential for an appropriate management of risks related to potential external liquidity shocks
- Include only the loans granted by financial institutions (accounting for 92 percent of total foreign loans).

Real economy finance with short-term external debt → one important vulnerability at the time the crisis broke out…



Source: NBR, MPF



Source: NBR, MPF

- The foreign debt stock – excluding intra-group loans – posted a 3.3 percent rise during December 2009-June 2011
- The importance to the real economy of the non-financial corporations that may be hit in the event of an external funding shock ranks from average to high, depending on scenarios:
  (i) they account for 19 percent to 28 percent of gross value added in their sector
  (ii) they hire between 12 percent and 10 percent of real sector employees
  (iii) they hold between 21 percent and 28 percent of non-financial corporations' assets.

- The capacity of non-financial corporations to cope with a scenario of withdrawing external capital flows has improved against October 2008 owing to cash flows in the core activity reverting to end-2008 values and to the moderate resumption of lending. Economic growth will magnify these effects, while mitigating the specified risk. Trade would be the hardest hit, accounting for more than 50 percent of the losses incurred in case adverse scenarios materialised, followed by manufacturing, with around 16 percent of losses. Non-financial corporations are relatively less likely to witness an external funding shock, as the STED was to a large extent rolled over and they further took foreign loans, albeit at a slow pace.

…non-financial corporations with external debt being important for both the economy and the financial sector

- They are important for the economy (as of end-2010):
  ⇨ They generate 28 percent of gross value added in their sector
  ⇨ They employ 16 percent of NFC workforce
  ⇨ They account for 33 percent of NFC assets

- They are important for the banking sector:

	Dec. 09	Dec. 10	Mar. 11	Jun. 11
Non-financial corporations (NFC) with external debt				
Domestic credit (lei mn)	20,204	24,824	23,878	24,717
Domestic credit (% total credit to NFC)	21	24	24	23
NPL ratio (%)	2.6	7.3	6.7	6.2
Non-financial corporations (NFC)				
NPL ratio (%)	6.4	12.3	12.7	13.4

The model

The purpose of the exercise

(i) to test the capacity of the banking sector to withstand an external capital outflow

(ii) to assess the importance of shock transmission channels between banking and non-financial companies

(iii) to analyze the efficiency of policy measures.

The general framework

- Two sectors:
  - ⇨ Banks and non-financial corporations
  - ⇨ It includes a policy response
- Two shock transmission channels:
  - ⇨ Direct: foreign investors decide not to rollover short-term credit to both Romanian banks and non-financial corporations
  - ⇨ Indirect: banks transmit part of the shock to the real sector by deciding not to rollover part of the granted credit lines
- Assumptions:
  - ⇨ Shock impacts simultaneously both sectors
  - ⇨ Money market freezes – no new interbank borrowings.

The liquidity position of the banking sector in case of a capital outflow

$$\Lambda_{i,t} = \sum_m A^i_{m,t}(1-h^A_{m,t}) - \sum_n L^i_{n,t}s^L_{n,t} - \sum_p NBS^i_{p,t} + \sum_q NCF^i_{q,\Delta t}$$

Liquidity gap:

Assets	Haircuts	Observations
Excess reserves at central bank	0	
Eligible securities for central bank's refinancing operations	0.05	
External assets – deposits	h^E	The percentage of deposits not part of a compensation agreement or a special notification clause
Other and external assets – securities	$h_s \sim \text{LogN}(\mu, \sigma^2)$	Not implemented yet
Net money market exposure	1	No new borrowings

Liabilities	Shock	Observations
Short-term external capital outflow	$s \in \{25\%, 50\%, 75\%, 100\%\}$	Alternative: 0.1% tail event Uniformly distributed on both banking and real sectors, but asymmetric shocks can be also tested
Retail and corporate deposits	s*	Not implemented yet

The liquidity conditions of the banking sector in case of a capital outflow

First test

$$\Lambda^i_t \geq 0 \Leftrightarrow$$
$$L^i_{ST,t} \cdot s \leq A^i_{CB,t} + A^i_{ES,t}(1-h_{ES}) + A^i_{S,t}(1-h_S) + A^i_{E,t}(1-h_E)$$

Second test:

- Banks that fail the first test might decide not to rollover credit lines for non-financial corporations
- The liquidity test becomes:

$$\Lambda_t^i + \sum_j \gamma_{i,j} AdjE_{j,t}^i \geq 0$$

The liquidity conditions of the real sector in case of a capital outflow

- The amount that companies are able to repay will depend on their liquidity position and on the magnitude of the two shocks generated by the capital outflow
- If a company has to deal with a simultaneous external and internal shock, we assume the obligation that the external creditor will be serviced first
  - ⇨ The amount that the bank will receive:

$$AdjE_{j,t}^i = [\lambda_{j,t} - (1 - PD_{j,t} LGD) E_{j,t}^i]_+$$

where λ is the company liquidity position.

The data

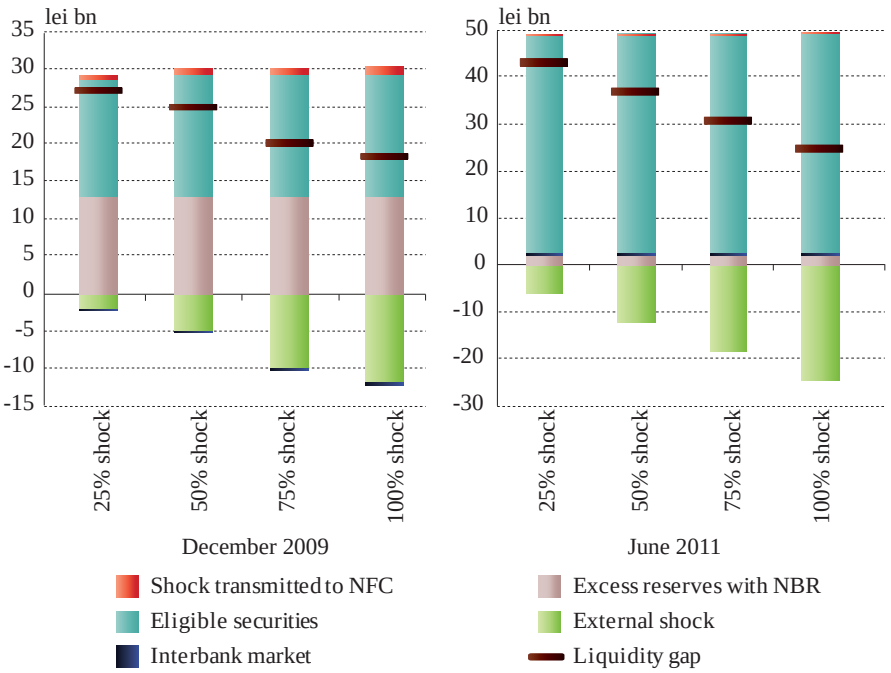
- Banks

$$\lambda_{j,t} = D_{j,t} + CFO_{j,\Delta t}$$

  - ⇨ Required reserves for each observation period
  - ⇨ NBR refinancing eligible collateral
  - ⇨ Balance sheet information for credit institutions
    - short-term external exposures
    - interbank exposures
    - account with the central bank
  - ⇨ External funding (residual maturity).

- Companies:
  - ⇨ Financial statements (all companies, available semi-annually) – 650,000 companies
  - ⇨ Credit Register Bureau – all credits above lei 20,000 (EUR ~5,000) – 230,000 credits, 95,000 companies
  - ⇨ Long-term external debt (DMFAS) – 12,500 credits, 5,500 companies
    - ▸ information on scheduled inflows and outflows for each credit
  - ⇨ Short-term external debt – 10,500 companies
    - ▸ short-term debt transactions are reported by banks as inflows and outflows (transaction by transaction).

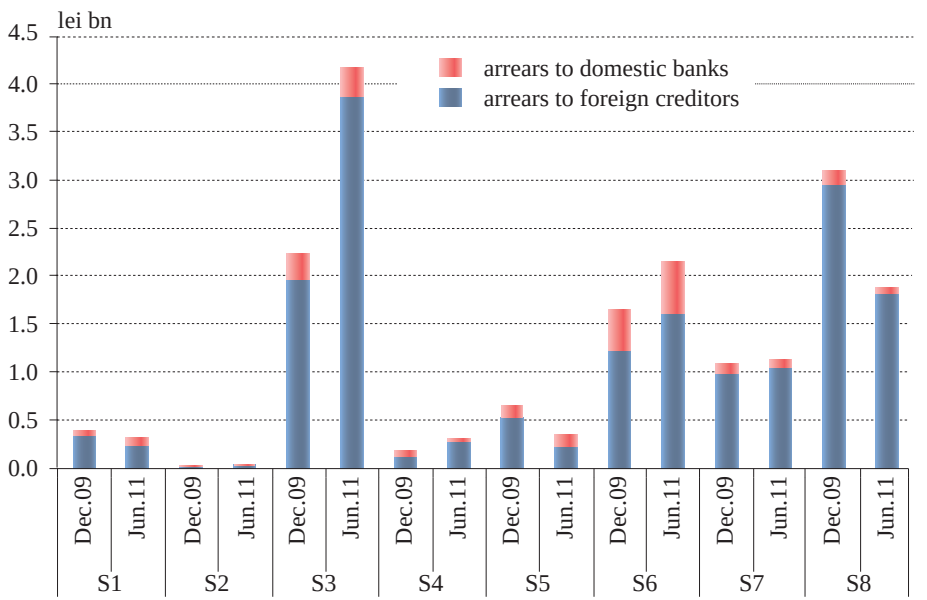
The results of the banking sector in case of a capital outflow



The results of the NFC sector in case of a capital outflow

- Arrears generated as of June 2011 are:
  - (i) between lei 9.2 and 37 billion to foreign investors
  - (ii) between lei 1.2 and 3.4 billion to domestic banks.
- The importance to the real economy of the affected non-financial corporations:
  - (i) they account for 19 percent to 28 percent of total value added in their sector
  - (ii) they hire 12 percent to 19 percent of real sector employees, and
  - (iii) they hold 21 percent to 28 percent of non-financial corporations' assets.

S1	Agriculture	Construction	S5
S2	Mining	Trade	S6
S3	Manufacturing	Services	S7
S4	Energy	Real estate	S8



Policy options

- Amend the prudential framework for liquidity risk
  - ⇨ Pro: rather easy to implement
  - ⇨ Contra: might deepen banks' pro-cyclical behavior
- Implement tougher supervisory regime for liquidity stance (including requiring contingency planning)
  - ⇨ Pro: easy to implement
  - ⇨ Contra: might deepen banks' pro-cyclical behavior
- Special agreements on the maintenance by participating banks of certain exposure levels within the home country and recapitalising their subsidiaries (like Vienna Initiative)
  - ⇨ Pro: ensure coordinated action for maintaining financial stability and build confidence in local markets
  - ⇨ Contra: might not be sufficient to determine adjustments of existing structural vulnerabilities, such as the loan/deposit ratio
- Extend the list of eligible securities (including ICAS)
  - ⇨ Pro: easy to implement
  - ⇨ Contra: market liquidity for new added securities might be lower or highly volatile, this measure might add new risks if these securities are not high quality instruments, moral hazard issues, asymmetric distribution within the banks
- Implement exceptional liquidity assistance (including maturity extension)
  - ⇨ Pro: addresses specific problems of banks in difficulty
  - ⇨ Contra: moral hazard issues
- Provide additional liquidity buffers (such as reducing MRR rates)
  - ⇨ Pro: easy to implement with immediate results

- ⇨ Contra: does not solve the problem of asymmetry within the system, raises long-term issues, a one-off measure, depends on the level of existing MRR rates

- Swap lines arrangements with the ECB for euro liquidity funding
  - ⇨ Pro: address the funding issues in currencies other than the national ones
  - ⇨ Contra: moral hazard issues
- Set up emergency supply arrangements of legal tender (hard currency) with the ECB in order to cope with possible important run of FX deposits
  - ⇨ Pro: adds confidence to small depositors
  - ⇨ Contra: difficult to implement.

Conclusions

- Capital outflows suddenly appear and liquidity crises develop over a very short-time span:
  - ⇨ Policy measures should be in place and functional
  - ⇨ Banks should hold adequate amounts of high-quality assets and have good solvency ratios
- Stress test tools are useful instruments for macroprudential purposes in order to assess:
  - ⇨ How the overall banking sector might withstand a shock
  - ⇨ How shocks are transmitted between sectors or markets
- However, predicting the outcome of a severe capital outflow remains a challenge
  - ⇨ Different triggering events
  - ⇨ Multiple transmission channels (also due to feedback responses).

CURRENT APPROACH AND NEW TECHNIQUES USED FOR MACROPRUDENTIAL ANALYSIS OF THE BANKING SECTOR

Virgil Dăscălescu*
Gabriel Gaiduchevici*

Stress test as a macroprudential analysis tool under the new regulatory requirements and business environment

- Conduct a comprehensive assessment
- Key component of an agile environment to support on-demand evaluations
- Pursue unified analytical approach
- Regulatory monitoring and systemic risk analysis – identify key links in the system
- Means of communication – inform (reassure) markets about the soundness of the banking sector.

Why stress testing has become increasingly important?

- Based on own methodologies, credit institutions must be able to determine a potential level of loss that is not covered by provisions based on the expected loss (probability-dependent level of economic capital covering both expected and unexpected losses, sometimes linked to the desired rating)
- New regulatory requirements for capital allocation and stress testing
- Elevated importance of liquidity risk
- Important tool in ensuring a sufficient level of capital in the banking system.

* Financial Stability Department, National Bank of Romania

The purpose of stress tests: identifying trends and potential risks

- Determine under what conditions the aggregate capitalization of the banking system would be severely affected by unexpected losses
- Forecast implications for bank losses and capitalization
- EBA objectives
  - ⇨ Initiate and coordinate Union-wide assessments of the resilience of financial institutions to adverse market developments
  - ⇨ Develop common methodologies for assessing the effect of economic scenarios on an institution's financial positions
  - ⇨ Address recommendations to the competent authority to correct issues identified in the stress test
  - ⇨ Develop an adequate stress testing regime to help identify those institutions that may pose systemic risk (and that should be subjected to strengthened supervision).

Why do we run stress tests at the NBR?

- Estimate the additional capital required to cover unexpected losses while maintaining the regulatory CAR for credit institutions affected under the scenarios
- Estimate potential liquidity shortfalls for credit institutions using a balance sheet approach
- Identify potential systemic risks and address weaknesses
- Guide discussion on adverse macroeconomic developments and abnormal market conditions
- Help monitor important portfolios exhibiting large exposures or extreme vulnerability to changes in the market

- Examine the effects of new sophisticated credit products
- Assess banks' attitude towards risk.

Instruments used for macroprudential analysis

- Banking sector Macro Stress Tests:
  - ⇨ Solvency stress tests
  - ⇨ Liquidity stress tests
- Bank contagion analysis
- Early warning systems.

Banking solvency stress tests

- Based on macroeconomic scenarios, they project the evolution of the CAR of credit institutions over a 2-year period
- Scenarios include at least two scenarios: a benchmark, the most probable scenario, and an adverse scenario, usually linked to weaker economic growth, currency depreciation, changes in the net interest margin linked to higher funding costs
- They are usually accompanied by sensitivity analysis and VaR estimations aimed at identifying individual threats to credit institutions, measured in terms of percentages of their capital. The aim is to assess whether the resilience of the banking system might be at stake, as well as to identify the potential recapitalization needs for banks where the CAR would fall below a certain threshold (currently, 10 percent)
- At present, the same as in the EBA stress test, a static balance sheet assumption is used.

Carrying out the solvency stress test

- Estimating a pre-provision operating profit from past data, usually a step where non-recurrent items are excluded
- Modelling direct effects over the P&L caused by changes in the market parameters: changes in the yield curve impacting net interest income as a major component of total income, impact of exchange rate changes over capital requirement, net interest income
- Modelling loan loss provisions following impairment. This is achieved using Credit Register data on individual exposures towards non-financial companies, for which financial statements are available on a semi-annual basis; macroeconomic variables are then linked to balance sheet items to allow a dynamic analysis. Because of data constraints, analysis made for the households is less granular
- Assessing the level of CAR and other metrics at the end of each year over the scenario horizon
- If needed, further analysis is carried out using the interbank contagion tool; however, as recent results show, a clear link between the size of the bank and its prospects, and the risk of contagion is significant only for large banks, so there was no such need.

Interbank contagion

- The current approach is based on Eisenberg and Noe's model (Systemic Risk in Financial Networks)
- In its pure form, it allows the analysis of effects induced by a sudden insolvency of one/more bank(s) to the rest of the system, taking into account bilateral exposures via the interbank market
- The number of stages in a contagion process depends on the stage where no other banks are induced into insolvency; the threshold currently used for determining insolvency is 2 percent of the CAR

- In each stage, the remaining equity for the banks induced into insolvency is used to partially cover the losses suffered by creditor banks on a pro-quota basis
- The analysis is carried out over an extensive period of time, using interbank data "snapshots", days considered to best represent each month over the reviewed horizon (days when the interbank exposures were at their highest level for that month)
- The severity of contagion is assessed through several criteria: cumulative market share of the banks that would fail following the initial scenario, the number of contagion stages, number of banks that would fail
- A recent add-on to the approach was the insertion of a real sector feedback by means of increased loan loss provisions in each stage for the remaining banks, assuming different levels of losses to depositors, non-financial companies, following the insolvency of some credit institutions. These losses are then retransmitted to the banking system depending on the share of loans granted by the solvent institutions to the real sector.

Liquidity stress test

- We are currently in the process of adopting the second-generation balance sheet based framework designed by the IMF and test for:
  - ⇨ Deposit withdrawal (bank runs)
  - ⇨ Maturity mismatch analyses and
  - ⇨ Simplified approach linking liquidity to solvency issues.

Statistical methods used in rating models

Method	Advantages	Disadvantages
Regression analysis	– intuitive because the estimated result represents the expected value of the performance variable when the borrower's characteristics are known – the forecasting model is linear and therefore easy to compute and understand – can be estimated using OLS.	– the absolute value of the estimated result cannot be interpreted – the residuals generated using OLS are heteroscedastic, therefore the parameter estimates are inefficient – if WLS is used, the parameter estimates are efficient but their standard error are biased which means there is no reliable way to assess their significance.
Discriminant analysis	– widely known method with easily available estimation algorithms – the scores can be computed using a straightforward linear function.	– the absolute value of the discriminant function cannot be interpreted in levels – statistical test for the significance of the model rely on the assumption of multivariate normality.
Scoring models	– suitable for evaluation retail exposures – suitable for quantitative variables – can (and should be) customized for different exposures and types of borrowers.	– most of the time the risk distribution of a variable is unknown *a priori*. This means that before analyzing a variable, it is not clear which outcomes correlate with high risks and which outcomes correlate with low risks – relies on univariate analysis to determine whether a variable has a high discriminatory power.
Logit / probit analysis	– the results can be interpreted as probabilities – the significance of the model and the individual coefficients can be tested – logit models are easier to handle because the coefficients can be easily interpreted.	– default event cannot be correctly captured if the explanatory variable shows a non-linear, non-monotone behavior – if highly correlated indicators are included in the model, the estimated coefficients will be significantly and systematically biased.
Panel models	– make it possible to capture the time component by expanding the cross-sectional input data to a panel dataset – panel models can integrate macroeconomic variables into the calculations with two immediate advantages: macro data is more up to date than borrower's characteristics and by stressing the macro inputs the model can be used as a stress-testing credit risk.	– design and data consistency problems, especially with distortions of measurement in time series data – panel data variables are not independent across time and therefore fitting logit models is cumbersome.

New approach

Method	Advantages	Disadvantages
Structural / reduced form / hazard models	– explicitly take into account the survival function and thus the time at which a borrower's default occurs – default probabilities can be calculated for different time horizons.	– estimating these models under realistic assumptions is not straightforward.
Neural networks	– able to model highly complex nonlinear relationships between the input and the output variables – no distributional assumptions – models can be quickly adapted to new information.	– are black boxes and difficult to interpret – there is no formal procedure to determine the optimum network topology for a specific problem.

Why use a neural network?

- It allows the modelling of complex, not easily observable links between a set of input variables and the outcome
- If correctly built, it can be a powerful tool, performing better than other approaches; however, the more complex the links captured, the less reliable to hold over time. The results generated by such a tool using several generated same-architecture networks with the same input are different!
- Thus, it is a good complement to other currently used techniques and should not be used as their substitute, with robustness as the major issue.

What is a neural network?

- It is a network of interconnected neurons
- In supervised learning, it is aimed at finding a function mapping inputs to their presented output
- It is comprised of several layers:
  - ⇨ The input layer – the layer that contains the input data into intermediary output depending on the weight given to the particular inputs
  - ⇨ The inner layers, "the hidden layers", layers similar to the input layer; their input is dependent on the weights given to the previous intermediary outputs, their output depends on the function associated with the neurons
  - ⇨ The output layer – with a number of neurons given by the type of problem the network is meant to solve.

The architecture of a neural network

- Number of layers depending on the complexity of the problem to be solved
- Type of network (for our purpose, we've used the feed-forward type)
- Functions associated with the neurons: can generate either a discrete number of values (e.g. perceptions) or a value on a continuous interval
- Training algorithms, updating the weights and biases used.

How does it work ?

- A number of inputs is presented to the input layer, the network now begins to compute starting from left to right (feed-forward type)
- Adjustment of weights used (initial weights usually generated on some random-function algorithms): starting from right to left, depending on some error definitions between the observed output and the model-generated output (back-propagation)
- Once all weights are recomputed, the input data is once again passed through the network. The algorithm stops if the performance criteria are met, the number of iterations is above a preset value or the gradient is below a certain threshold.

Can we trust the results?!! … It depends

- On whether the network "has been kind enough" to learn the pattern on the sample presented, performing poorly on other data sets – typically, the result of over-fitting; this problem can be overcome
- The presence of extreme values: there might not be a sufficient number of iterations, until the adjustment of weights used in the network pushes them towards their optimal value. This can be the case even after winsorizing the values, if dealing with ratios computed from missing values for which default values are used
- Further complicating the issue is the matter of the "quality" of the data used (for instance, extremely poor quality restructured loans giving the appearance of non-default debtors).

Beyond theory

Data used for simulations include:

- Financial statements, from which financial ratios are computed
- Credit Register data, from which soft default is defined (a year later more than 90-days past due debtors that were overdue by less than 90 days at the time the financial statements refer to)
- The data is then treated for missing values, extreme values
- Data is fed into the network, initially rewriting each n-dimension input vector into a reduced dimension (PCA)
- 2, 3 and 4 layer neural networks are generated, with the output layer comprised of a single sigmoid neuron. Networks to be tested further are chosen through Monte Carlo simulation
- Intermediary results obtained so far show good accuracy ratios both for out-of-sample data as well as for different time periods.

SESSION 4

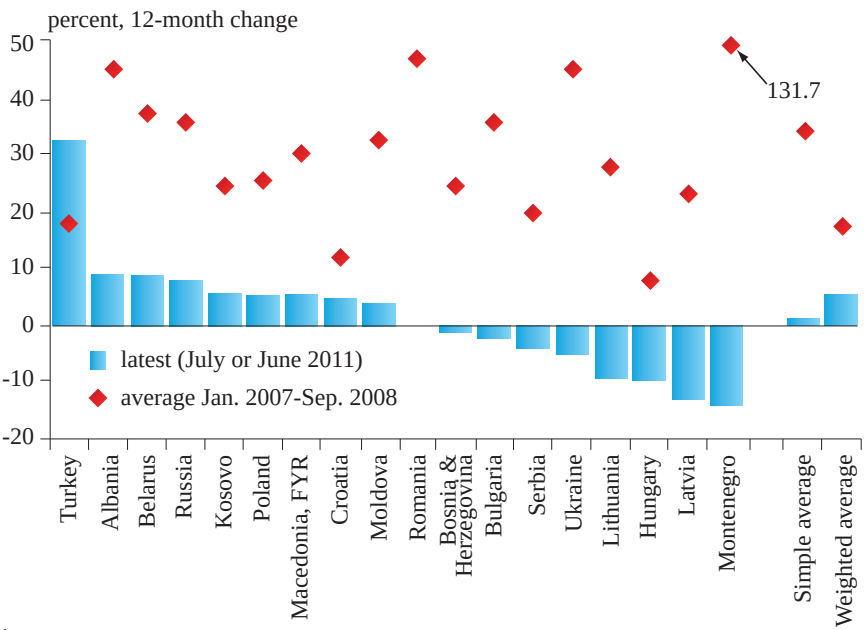
MACROPRUDENTIAL INSTRUMENTS IN THE CENTRAL BANKS' TOOLKIT

CHOOSING MACROPRUDENTIAL POLICIES: MODELS, INSTRUMENTS AND PRELIMINARY EMPIRICAL FINDINGS

Joseph Crowley*
Heiko Hesse*

Credit growth and NPLs in Emerging Europe

Emerging Europe: real private sector credit growth 2007-2008 versus latest[1]

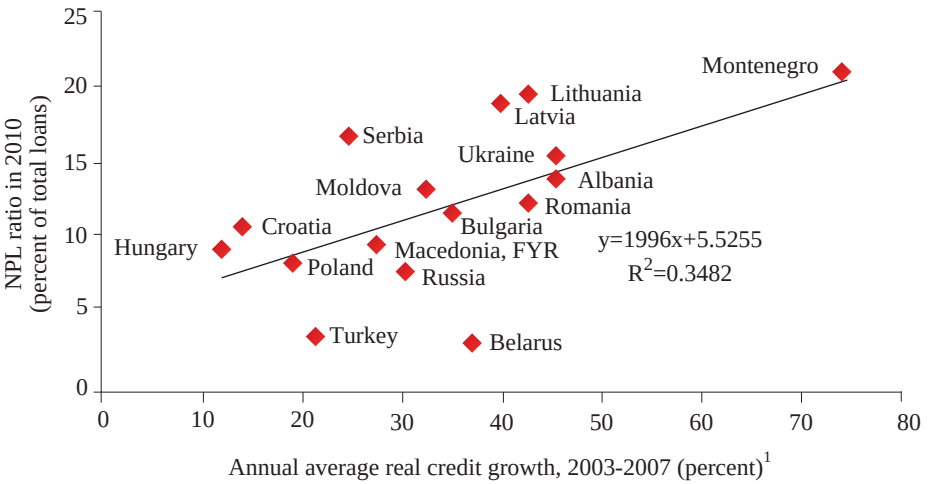


[1] Derived from stock data in domestic currency, adjusted by CPI inflation. May include valuation effects from foreign currency-denominated loans.

Source: IMF, Regional Economic Outlook: Europe (October 2011)

* International Monetary Fund

Emerging Europe: NPL levels and past credit growth



Note: Annual average growth is over 2004-2007 for Hungary, Latvia, Macedonia and Serbia; 2005-2007 for Belarus, Lithuania and Poland; 2006-2007 for Moldova.

[1] Derived from stock data in domestic currency, adjusted by CPI inflation. May include valuation effects from foreign currency-denominated loans.

Source: IMF, Regional Economic Outlook: Europe (October 2011)

NPLs and bank provisions in Emerging Europe

Selected countries: Bank nonperforming loans to total loans

[1] 2009 instead of 2010

Source: IMF, Regional Economic Outlook: Europe (October 2011)

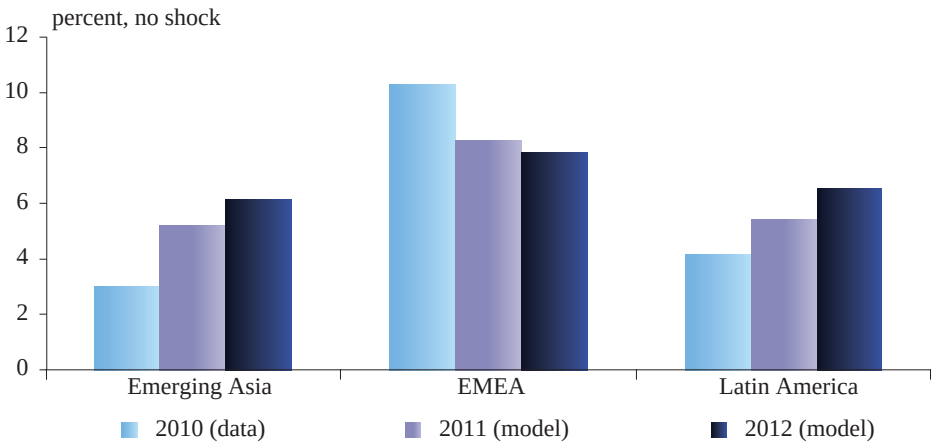
Emerging Europe: Bank provisions for nonperforming loans, 2010-2011[1]

[1] latest available

Source: IMF, Regional Economic Outlook: Europe (October 2011)

Rapid credit growth now can lead to rising nonperforming loans later

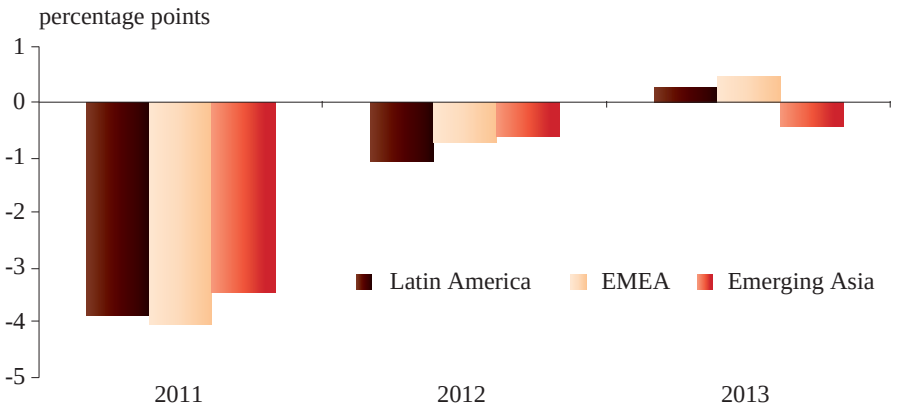
Model prediction for NPL ratios in 2011 and 2012 based on 2010 values



Source: *IMF – Global Financial Stability Report, September 2011*

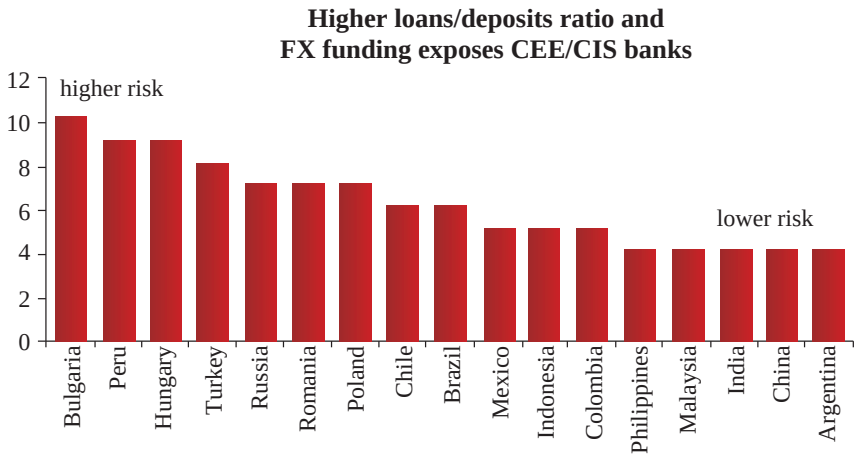
An external shock would test the resilience of emerging market banks

Absolute change in capital adequacy ratios under combined macro shocks

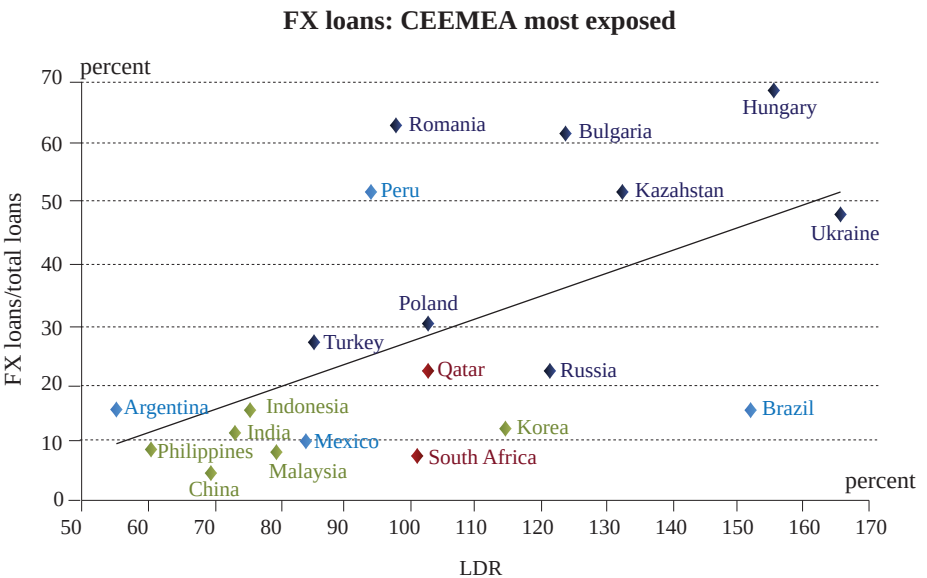


Source: *IMF – Global Financial Stability Report, September 2011*

A market perspective on EMEA external vulnerabilities and banks' funding (Morgan Stanley)

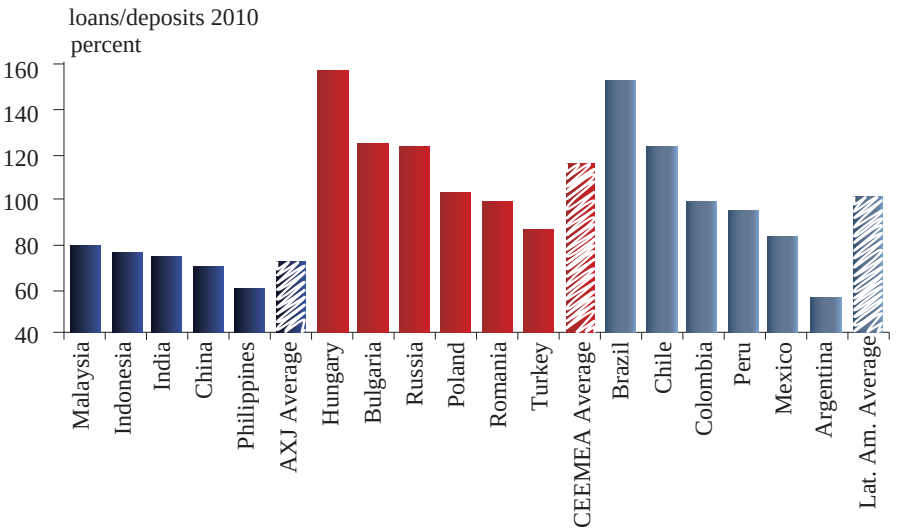


Source: Morgan Stanley Research. We measure the risk of a banking sector to funding market stress by assigning a score of 1-5 (1 being the best, 5 the worst) to the respective banking system on two credit metrics: loans/deposits ratio and FX funding as percent of total liabilities. The higher the combined score, the higher the risk.



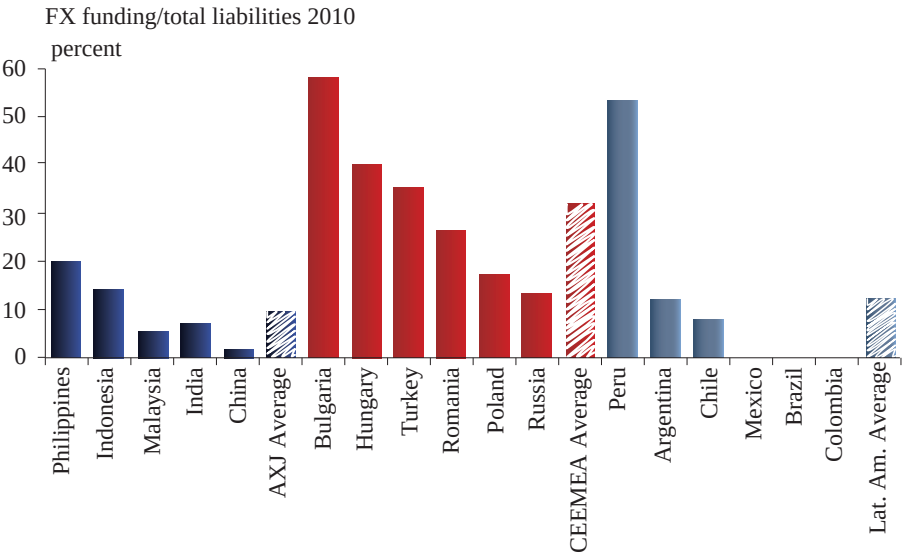
Source: Haver Analytics, central banks, Morgan Stanley Research

EM Europe has highest reliance on wholesale funding



Source: National banks and bank regulators, CEIC. Morgan Stanley Research estimates

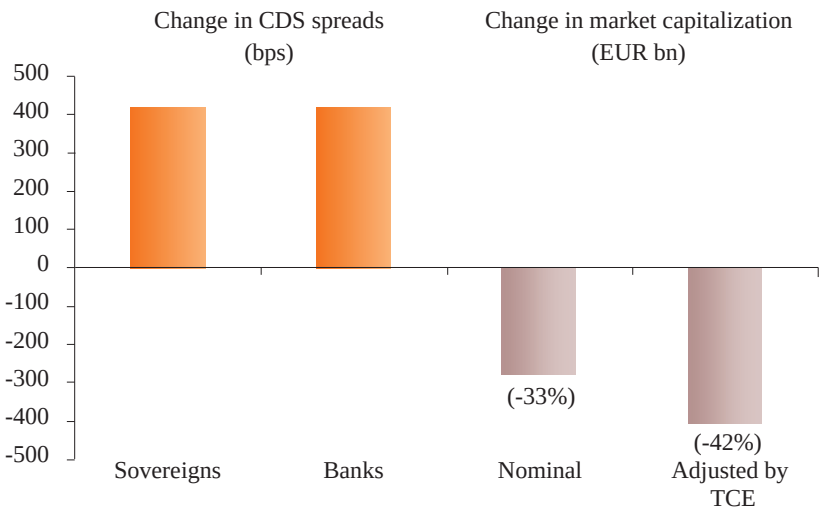
FX funding is mostly relevant for EM Europe



Source: National banks and bank regulators, CEIC. Morgan Stanley Research estimates

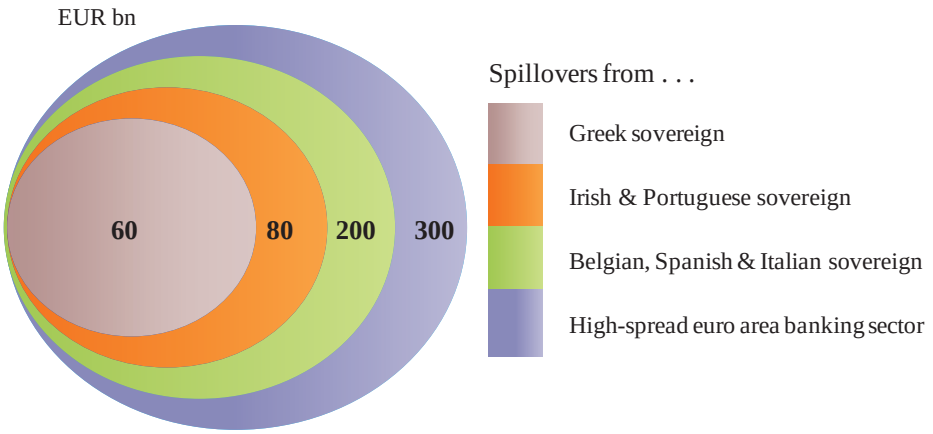
Euro area sovereign risks have spilled over to the EU banking system ...

Sovereign and bank credit risks and market capitalization (changes since January 2010)



Source: *IMF – Global Financial Stability Report (September 2011)*

European banking system mark-to-market impact from high-spread Euro area sovereign spillovers



Source: *IMF – Global Financial Stability Report (September 2011)*

Macroprudential policies are new and relatively untested

- Views and recommendations are still evolving at the IMF
- What institutional models to use for macroprudential policy?
- Which instruments have been most effective, and under what conditions?
- Which macroprudential tools to use specifically for capital flows?
- What are the next steps?

Institutional models: twofold objective**

- Assess strengths and weaknesses of institutional models for macroprudential policy
- Provide some basic guidance for countries who review the institutional arrangements supporting macroprudential policies.

IMF 2010 survey: macroprudential models

- Over half of the surveyed countries have an integrated institutional setup where the central bank serves as banking supervisor – but typically not as the insurance and securities supervisor
- Although the majority of countries have multi-agency set-ups, less than one-third have committees that play a coordinating role among the central bank and other regulatory authorities
- Where a financial stability committee exits, the executive branch (fiscal authority) has a leading role in half of these cases
- While most countries have an institution with a financial stability mandate, less than half have an institution with a macroprudential policy (crisis prevention) mandate
- A macroprudential mandate is more common in emerging markets and is most often assigned to the central bank, although implicitly based on the institution's financial stability functions
- To date, the decision to use macroprudential tools appears uncorrelated with whether an institution has an explicit macroprudential mandate
- However, in many cases, the existing powers of many monetary and supervisory authorities may not be broad enough for them to fulfill a macroprudential mandate

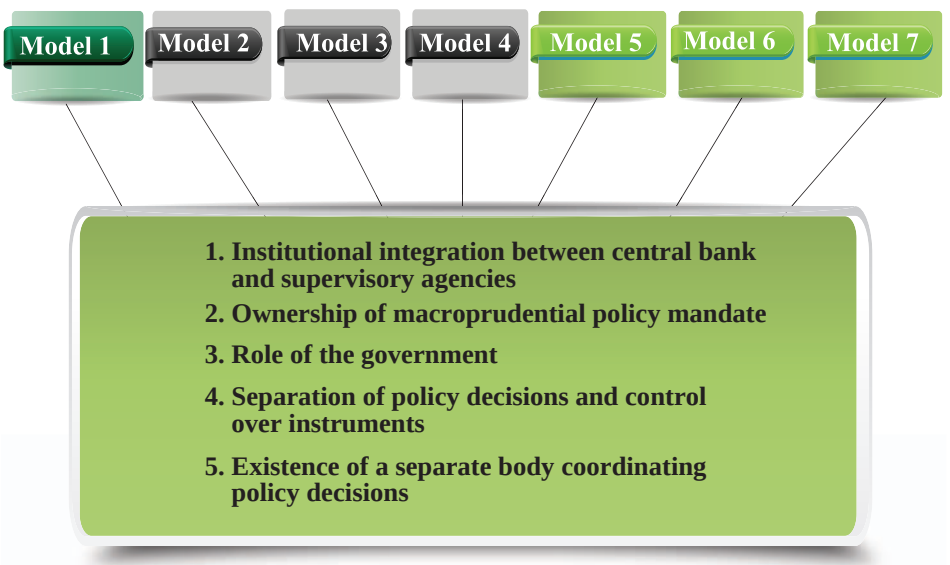
** Based on IMF Board Paper (August 2011) on "Towards Effective Macroprudential Policy Frameworks: An Assessment of Stylized Institutional Models"

- In most countries, accountability mechanisms exist for central banks and supervisory institutions, but formal accountability requirements for macroprudential policies *per se* are rare
- While most often not explicitly required, most countries do communicate on systemic risk assessments and policies, mainly through issuing a FSR, and some countries are working to improve the policy content of these.

Focus on stylized models

- "Real-life" institutional models for macroprudential policies are new and emerging. Hence, it is not possible to assess the effectiveness of these models empirically
- We therefore identify "stylized" institutional models for macroprudential policies, drawing on existing financial stability frameworks, and in light of key dimensions that differentiate them
- We assess the strengths and weaknesses of these models conceptually, based upon criteria that are important for successful mitigation of systemic risks.

A typology of stylized models

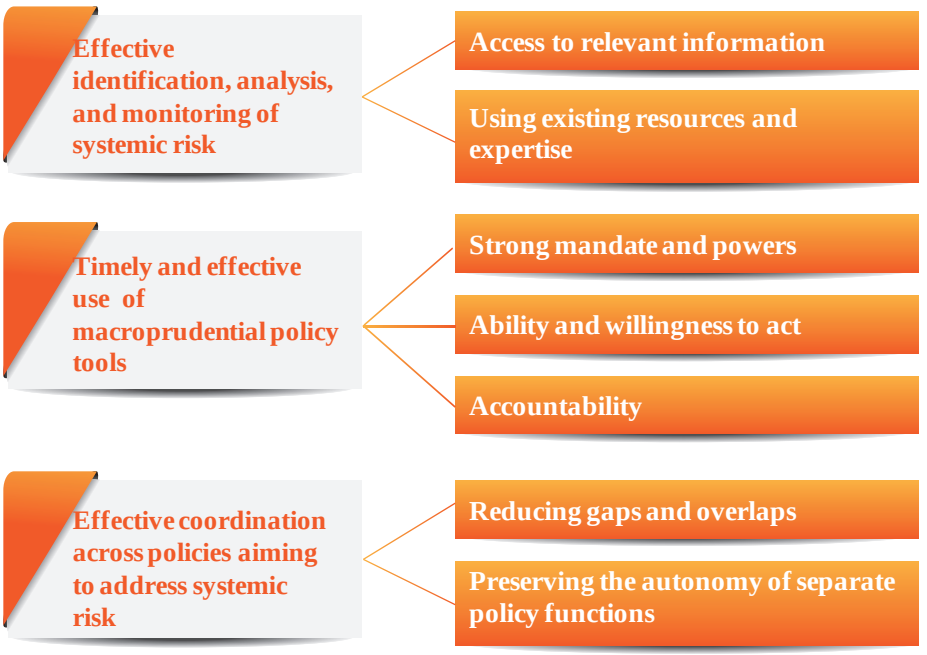


Stylized models for macroprudential policy

Features of the model/Model	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model R 1
1. Degree of institutional integration of central bank and supervisory agencies	Full (at a central bank)	Partial	Partial	Partial	No	No (Partial*)	No	No
2. Ownership of macroprudential policy and financial stability mandate	Central bank	Committee "related" to central bank	Independent committee	Central bank	Multiple agencies	Multiple agencies	Multiple agencies	Committee (multinational; regional)
3. Role of MoF/ treasury/government	No (Active*)	Passive	Active	No	Passive	Active	No	Passive (European Commission; Economic and Financial Committee)
4. Separation of policy decisions and control over instruments	No	In some areas	Yes	In some areas	No	No	No	Yes
5. Existence of a separate body coordinating across policies	No	No	No (Yes**)	No	Yes	Yes (de facto**)	No	No
Examples of specific model countries/ regions	*Czech Republic Ireland* (new) Singapore**	*Malaysia Romania Thailand United Kingdom (new)*	*Brazil** France United States*	*Belgium (new) The Netherlands Serbia*	*Australia*	*Canada Chile* Hong Kong SAR* Korea** Lebanon Mexico**	*Iceland Japan Peru Switzerland*	*EU (ESRB)*

Criteria for an assessment of the models

- A desirable institutional model should be conducive to the mitigation of systemic risk. It should provide for:



Some key desirables (general)

- The central bank should play an important role in every model
- Fragmentation of institutions should be avoided, and needs otherwise be addressed through strong coordination mechanisms
- Participation of the treasury in policy process is useful, but a leading role may pose risks
- Systemic risk prevention and crisis management are different functions that should be supported by separate arrangements.

Some key desirables (specific)

- At least one institution involved in assessing systemic risk should have access to all relevant data and information

- Institutional mechanisms should support willingness to act against the buildup of systemic risk and reduce the risk of delay in policy actions
- A macroprudential authority should be identified, be vested with mandate and powers, and made accountable for systemic risk mitigation
- Macroprudential policy frameworks should not compromise the autonomy of other established policies
  - ⇨ Including monetary and microprudential policy.

Summary

- All models have strengths and weaknesses, but not all models appear equally supportive of effective macroprudential policy making
  - ⇨ The paper suggests mechanisms to address possible weaknesses
- However, no one-size-fits-all
  - ⇨ Countries' specificities are also important in building a macroprudential policy framework. For instance:
    - institutional factors (quality of existing institutional arrangements, legal traditions)
    - political economy considerations, cultural issues
    - the availability of resources.

Macroprudential reforms in the EU: Objectives and progress

- Since January 1, 2011, the European Systemic Risk Board (ESRB), in charge of macroprudential oversight at the EU level, and the new European Supervisory Authorities (ESAs) – endowed with enhanced supervisory and regulatory powers – have become operational and are expected to become the core of an integrated European financial stability framework
- On the macroprudential front, this framework will require appropriate collaboration among EU institutions to be effective, including sharing of information and adequate access to data
- To be effective, the EU macroprudential framework also requires adequate national macroprudential frameworks

- Institutional arrangements for macroprudential oversight are indeed being strengthened at national levels
  - ⇨ The United Kingdom, as part of the major overhaul of its financial regulatory structure, is taking the lead in establishing a strong macroprudential framework with a Financial Policy Committee (FPC) within the Bank of England
  - ⇨ France established in 2010 a Financial Regulation and Systemic Risk Council (FRSRC), headed by the Finance Minister
  - ⇨ In several other countries, macroprudential oversight (with varying mandates and powers) has been given to the central bank (Hungary and Ireland), or such a move is being considered (Belgium, Germany, and the Netherlands).

2010 IMF Survey on Financial Stability and Macroprudential Policy***

- Two thirds of respondents have used macroprudential instruments since 2008
- Used more extensively by emerging economies than by advanced economies both before and after the global financial crisis
- Emerging economies introduced some instruments to address systemic risk following their own financial crises in the 1990s
- For many emerging market economies, the instruments are part of a broader macrofinancial stability framework that also includes the exchange rate and capital account management
- Respondents indicated that macroprudential policies are less blunt and more flexible than macroeconomic alternatives. They are easier to implement, introduce minimal distortions, can be narrowly targeted to reduce drag on economic activity, and have smaller implementation lags
- Countries with fixed or managed exchange rates rely more on macroprudential instruments because their interest rate policy options are limited
- Most country authorities who have used macroprudential instruments believe that they are effective.

*** Based on IMF Board Paper (September 2011) on "Macroprudential Policy: What Instruments and How to Use Them?"

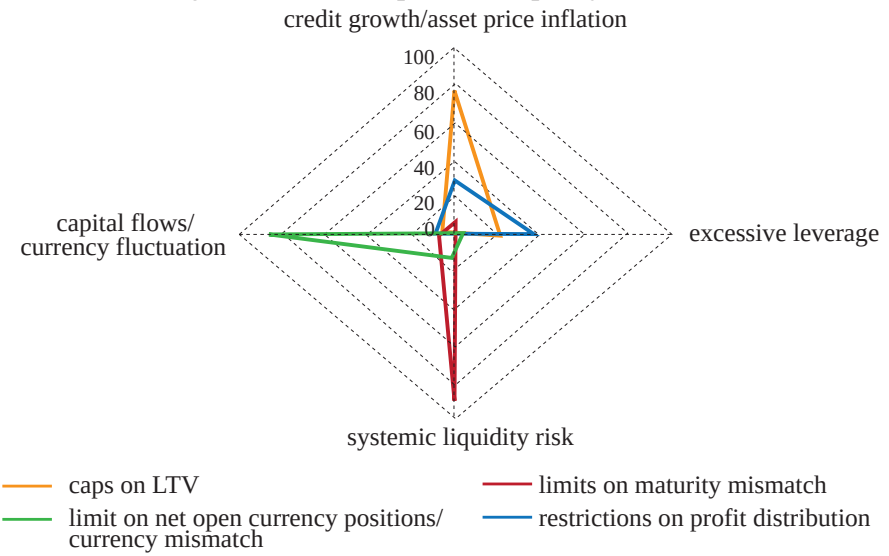
10 most frequently used instruments

- Credit-related:
  - ⇨ Limits on the loan-to-value (LTV) ratio
  - ⇨ Limits on the debt-to-income (DTI) ratio
  - ⇨ Limits on foreign currency lending
  - ⇨ Limits on credit or credit growth.
- Liquidity-related
  - ⇨ Limits on net open currency positions or currency mismatches
  - ⇨ Limits on maturity mismatch
  - ⇨ Reserve requirements
- Capital-related
  - ⇨ Countercyclical or time-varying capital requirements
  - ⇨ Dynamic provisioning
  - ⇨ Restrictions on profit distribution.

Summary of risks

- Strong credit growth, including asset price inflation
- Systemic liquidity risk
- Excessive leverage (assets to equity) and consequent deleveraging
- Large and volatile capital flows, including currency fluctuations.

Objectives of macroprudential policy instruments

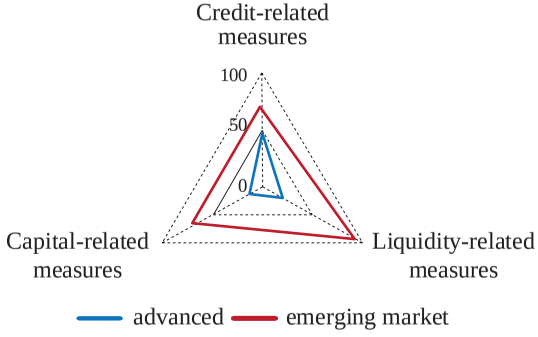


Source: IMF Financial Stability and Macroprudential Policy Survey, 2010

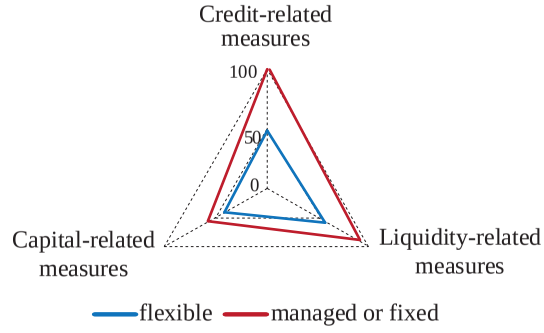
Use of instruments

(percent of countries in each group using each type of instruments)

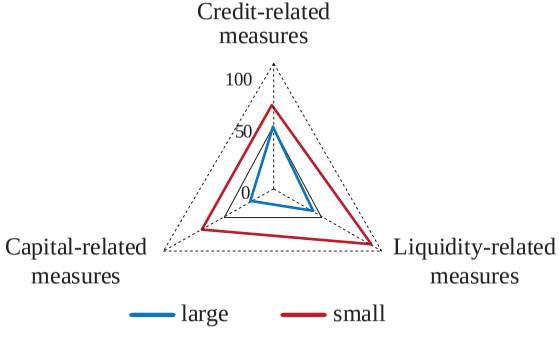
Advanced versus emerging market



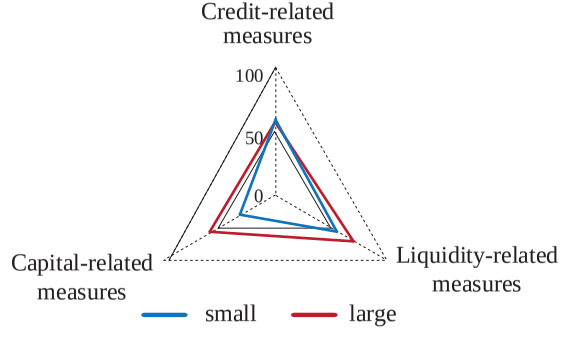
Flexible versus fixed exchange rate



Large versus small financial sector[1]



Large versus small capital inflow[2]



1/ The ratio of credit/financial claims to GDP. Countries with the ratio at or above the medium are classified as “large”, otherwise “small”.
2/ The ratio of net capital inflow to GDP. Countries with the ratio at or above the medium are classified as “large”, otherwise “small”.

Source: IMF Financial Stability and Macroprudential Policy Survey, 2010

Instruments: summary of key choices

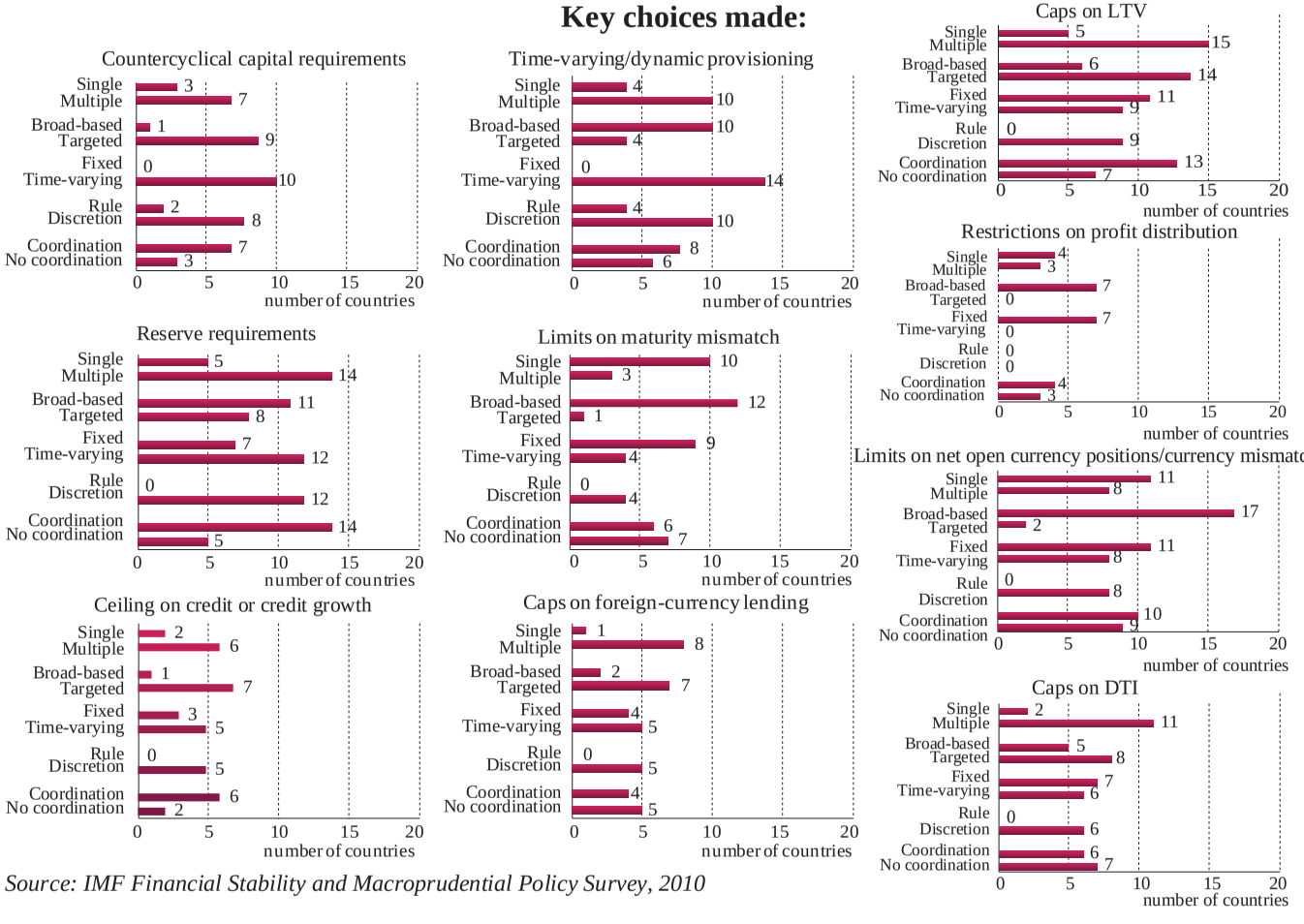
- **Single versus multiple**. Use of multiple instruments reduces the scope for circumvention and provides greater assurance of effectiveness. But it also increases the regulatory burden and the likelihood of activity migrating to the nonbank sector
- **Broad-based versus targeted**. Targeting specific types of transactions makes instruments more precise and generally more effective. For example, loan to value ratios can be targeted to loan size or to the location of the property
- **Fixed versus time-varying**. Adjusting instruments at different phases of a financial cycle makes them more effective at smoothing out the cycle. Instruments to control credit growth are adjusted most frequently
- **Rules versus discretion**. Rules-based adjustments to instruments such as dynamic provisioning ensure political independence and objectivity. However, it is difficult to design rules with foresight of all circumstances
- **Coordination with other policies**. Monetary or fiscal policy tools can reinforce macroprudential objectives. Stand-alone policies tend to be inferior to a coordinated set of policies. Credit cycles often correspond to business cycles, so measures to address both can be useful.

Key choices I

Instrument	How to use	Pros	Cons	Do's and dont's
Single versus multiple	Single	Can be targeted to specific source of risk	May be ineffective when used alone	Use when risk is well-defined from a single source
	Multiple	Help tackle a risk from various angles More effective if sources of risk vary	Impose a higher cost on banks	Do not overdo the use of multiple instruments and impose costs that are too high
Targeted versus broad-based	Broad-based	Greater impact Smaller scope for circumvention	May be blunt	Use if granular data are not available and risks are generalized
	Targeted	Achieve objective while minimizing potential distorsions; avoid bluntness of other policies	Granular data requirement Higher administrative cost Circumvention	Be ready to adjust fine-tuning; anticipate channels for evasion Supplement with broader-based measures to limit the scope for circumvention Avoid excessive complexity

Key choices II

Instrument	How to use	Pros	Cons	Do's and dont's
Fixed versus time-varying	Fixed Time-varying	Provide a minimum buffer Low administrative cost Avoid timing the cycle	May be ineffective in rapidly changing circumstances	Adjust parameters with changing circumstances
		Buffer adjust and remain adequate through the cycle	Ad hoc and frequent changes may be disruptive Hard to time the cycle	Design sound and transparent principles governing the adjustment
Rules versus discretion	Rules-based	Transparent, lower risk of inaction Provide regulatory certainty	Susceptible to circumvention Changes to calibration may be necessary	Use when risk of inaction is high and risk management and supervision capacity is weak Re-assess calibration periodically
	Discretionary	Flexible and responsive Can be adjusted countercyclically for greater potency	Less transparent No regulatory predictability: subject to regulatory capture	Use in case of deep structural changes and rapidly evolving risks Do not overdo discretion
Coordination with other policies	Fiscal, monetary and prudential	Signals willingness to tackle the challenges Enhances policy effectiveness	Coordination challenges if multiple agencies are involved; slows decision making process; accountability may not be clear	Establish mechanisms to resolve conflict and clear accountability and governance arrangements



Source: IMF Financial Stability and Macroprudential Policy Survey, 2010

Note: 0 represents no use of instruments, and 1 denotes the use of a single instrument. For each of the following attributes, i.e., multiple, targeted, time-varying, discretionary and used in coordination with other policies, the value of 1 is added.

Source: IMF Financial Stability and Macroprudential Policy Survey, 2010

Measuring effectiveness: methdology

- **Panel regression analysis on 49 countries**
- **10 most frequently used instruments**
- **Period 2000-2010**
- **Systemic risk can have either a time dimension or a cross-sectional dimension**. This analysis emphasized success in dampening procyclicality with less emphasis on cross-sectional risks because of data limitations
- **Separating the effects of macroprudential policies is challenging**:
  - ⇨ Interest rates and GDP growth are included in regressions to control for macroeconomic policies
  - ⇨ Dummy variables are used to control for the type of exchange regime, the size of the financial sector, and the degree of economic development. Also fixed effects regressions are run
  - ⇨ The Generalized Method of Moments is used to address endogenous explanatory variables.

Interpretation

- **Excessive importance should not be placed on these results**

  The interaction between macroprudential policies, macroeconomic policies, and economic shocks is complex and causality is difficult to establish. This analysis needs to be corroborated

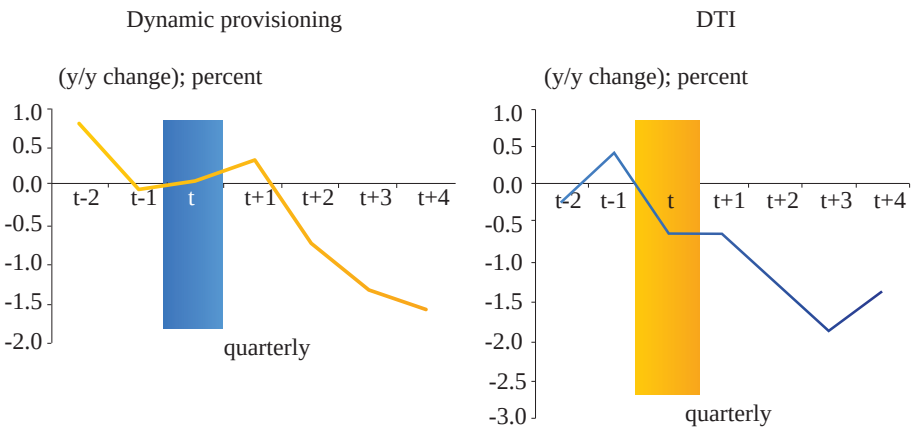
- **Macroprudential instruments have different impacts in different countries, so average results should be interpreted carefully**
- **Existing policies will affect the impact of macroprudential policies**

  These include the strength of the regulatory framework and the quality of supervision and macroeconomic policies

- **The analysis suggests that instruments that are used in coordination with other macroeconomic policies tend to be better at reducing systemic risks**.

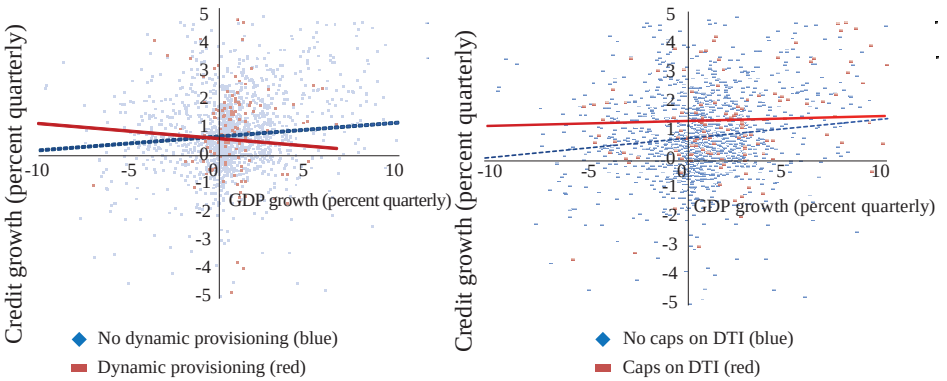
Simple correlation

Change in credit growth after the introduction of instruments
(average across countries)



Source: International Financial Statistics

Credit growth versus GDP growth



Source: International Financial Statistics

Results: reducing procyclicality of credit growth

Effectiveness of macroprudential instruments in reducing the procyclicality of credit

Coefficients of 5 of the 10 instruments dummy variables are significant

These instruments may reduce the correlation between credit growth and GDP growth

This is in line with findings of previous studies that associate higher LTV ratios with higher house price and credit growth over time

Independent Variables	Dependent variable[1]: Quarterly credit growth rate$_t$							
Quarterly credit growth rate$_{t-1}$	0.0819 (8.19)***	0.0909 (15.16)***	0.1034 (30.07)***	0.0817 (33.60)***	0.0855 (2.81)***	0.0825 (17.95)***	0.0855 (20.02)***	0.0779 (17.08)***
GDP growth$_t$	0.0791 (5.89)***	0.0889 (10.44)***	0.0667 (9.39)***	0.0869 (6.17)***	0.0729 (5.47)***	0.0436 (4.50)***	0.0487 (5.46)***	0.0454 (5.59)***
Interest rate$_t$	-0.0777 (-11.35)***	-0.0804 (10.48)***	N/A[2]	-0.0839 (-19.74)***	-0.0618 (-10.07)***	-0.0779 (-18.38)***	-0.0843 (-17.84)***	-0.0804 (-17.04)***
Caps on loan-to-value[3] x GDP growth$_t$	-0.0634 (-3.01)**							
Caps on debt-to-income[3] x GDP growth$_t$		-0.0976 (-4.96)***						
Limits on credit growth[3] x GDP growth$_t$			-0.1227 (-4.17)***					
Reserve requirements[3] x GDP growth$_t$				-0.0800 (-4.27)***				
Dynamic provisioning[3] x GDP growth$_t$					-0.1776 (-2.12)**			
Limits on forex lending[3] x GDP growth$_t$						0.0055 (0.21)		
Countercyclical cap. req.[3] x GDP growth$_t$							0.0438 (0.63)	
Restriction on profit dist.[3] x GDP growth$_t$								0.0664 (4.21)

***, **, * indicate statistical significance at 1%, 5% and 10% (two-tail) test levels, respectively.

1. The dependent variable is credit growth (top) or leverage growth (bottom), the log change in the real level of credit or leverage. Credit is measured as claims on private sector from both bank and non-bank financial institutions (source: IFS) and leverage is measured as assets over capital (source: IMF FSIs). The interest rate is the nominal long-term interest rate on prime lending, from the IMF's International Financial Statistics. The estimation period is 2000-2010. The sample is composed of 48 countries.
   The regression includes dummy variables to correct for different degrees of flexibility in the exchange rate regime, individual (country) effects, a time trend (year effect) and a dummy variable for the use of other MPP instruments.
   Instrumental variables for the policy instrument and the GMM Arellano-Bond estimator are used to address selection bias and endogeneity.
2. Non-significant results when interest rate included
3. The coefficient corresponds to the interaction term between GDP growth and a dummy for the respective macroprudential instrument.

Note: The coefficients in blue offset the GDP growth coefficient to determine the total impact of GDP growth on credit growth. In the first column, GDP growth of 1 percent adds 0.0791 percent to the credit growth rate. But when there is a cap on the loan to value ratio that figure is lowered by 0.0634 percent.

Source: IMF staff estimates

Results: reducing procyclicality of leverage

Effectiveness of macroprudential instruments in reducing the procyclicality of leverage

Coefficients of 6 instruments dummy variables are significant

These instruments may reduce the correlation between growth of leverage and GDP growth

Independent Variables	Dependent variable[1]: Quarterly leverage growth rate $_t$							
Quarterly leverage growth rate $_{t-1}$	0.0012	-0.0116	-0.0095	-0.0170	-0.0167	-0.0102	-0.0120	-0.0142
	(0.12)	(-2.88)***	(-1.62)	(-5.35)***	(-0.73)	(-1.69)***	(-2.03)**	(-4.71)***
GDP growth $_t$	0.0346	0.0418	0.0394	0.0880	0.0323	0.0376	0.0429	0.0244
	(2.58)**	(5.43)***	(7.15)***	(4.81)***	(4.36)***	(10.90)	(7.71)***	(4.64)***
Interest rate $_t$	0.0591	0.1121	0.1429	0.1362	0.0956	0.1031	0.1724	0.1181
	(0.94)	(3.22)***	(5.43)	(4.31)***	(3.09)**	(1.78)*	(3.74)*	(4.95)***
Caps on loan-to-value[2] x GDP growth $_t$	-0.0121							
	(-0.44)							
Caps on debt-to-income[2] x GDP growth $_t$		-0.0406						
		(-3.35)***						
Limits on credit growth[2] x GDP growth $_t$			-0.0317					
			(-1.82)*					
Reserve requirements[2] x GDP growth $_t$				-0.0959				
				(-3.44)***				
Dynamic provisioning[2] x GDP growth $_t$					-0.2744			
					(-4.78)***			
Limits on forex lending[2] x GDP growth $_t$						-0.0207		
						(-1.91)*		
Countercyclical cap. req.[2] x GDP growth $_t$							0.1286	
							(-2.72)***	
Restriction on profit dist.[2] x GDP growth $_t$								0.0942
								(2.57)**

***, **, * indicate statistical significance at 1%, 5% and 10% (two-tail) test levels, respectively.

1. The dependent variable is credit growth (top) or leverage growth (bottom), the log change in the real level of credit or leverage. Credit is measured as claims on private sector from both bank and non-bank financial institutions (source: IFS) and leverage is measured as assets over capital (source: IMF FSIs). The interest rate is the nominal long-term interest rate on prime lending, from the IMF's International Financial Statistics. The estimation period is 2000-2010. The sample is composed of 48 countries. The regression includes dummy variables to correct for different degrees of flexibility in the exchange rate regime, individual (country) effects, a time trend (year effect) and a dummy variable for the use of other MPP instruments. Instrumental variables for the policy instrument and the GMM Arellano-Bond estimator are used to address selection bias and endogeneity.

2. The coefficient corresponds to the interaction term between GDP growth and a dummy for the respective macroprudential instrument.

Source: IMF staff estimates

Results: reducing cross-sectional risks

Effectiveness of macroprudential instruments in reducing cross-sectional risks

Independent Variables	Dependent variable[1]: Foreign liabilities/Foreign assets$_t$	Dependent variable[1]: Credit/Deposits$_t$
Foreign liabilities/Foreign assets$_{t-1}$	0.8041 (1089.88)***	
Credit/Deposits$_{t-1}$		0.7129 (16.91)***
GDP growth$_t$	0.3651 (-37.40)***	-0.0208 (-4.55)***
Interest rate$_t$	-0.3340 (-3.17)**	-0.0169 (-0.70)
Limits on net open positions in foreign currency[2]	-0.1485 (-7.98)***	
Limits on maturity mismatch[3]		-0.0526 (-2.50)**

Coefficients of 2 instruments dummy variables are significant

These instruments may reduce the correlation between foreign exposure or leverage and GDP growth

***, **, * indicate statistical significance at 1%, 5% and 10% (two-tail) test levels, respectively.

1. The dependent variables are the ratio of financial system liabilities with foreign residents to claims on foreign residents (1) and the ratio of banking institutions claims to deposits (2), obtained from the IMFs International Financial Statistics. The interest rate is the nominal long-term interest rate on prime lending, also from IFS. The estimation period is 2000-2010. The sample is composed of 48 countries. The regression includes dummy variables to correct for different degrees of flexibility in the exchange rate regime, individual (country) effects, a time trend (year effect) and a dummy variable for the use of other MFP instruments. Instrumental variables for the policy instrument and the GMM Arella no-Bond estimator are used to address selection bias and endogeneity.
2. The coefficient corresponds to a dummy variable with a value of 1 for countries with limits on net open positions in foreign currency, and zero otherwise.
3. The coefficient corresponds to a dummy variable with a value of 1 for countries with limits on maturity mismatches, and zero otherwise.

Source: IMF staff estimates

- Controlling for macroeconomic policies does not diminish the effectiveness of macroprudential instruments. Coefficients on dummy variables to control for the type of exchange rate regime, the size of the financial sector and the degree of economic development are all insignificant. A combination of policies may be mutually reinforcing.

Panel regression
Statistically significant (✓) or not (×)

Reductions in:	Procyclicality of		Interconnectedness	
	Credit	Leverage	Foreign funding	Wholesale funding
Caps on LTV	✓	×		
Caps on DTI	✓	✓		
Limits on credit growth	✓	✓		
Limits on NOP			✓	×
Limits on maturity mismatch			×	✓
Reserve requirements	✓	✓		
Time-varying/dynamic provisioning	✓	✓		
Countercyclical/time-varying capital requirements	×	✓		

Lessons and policy messages

- Many instruments are found to be effective
- Effectiveness does not seem to depend on:
  - ⇨ Stage of economic development
  - ⇨ Exchange rate regime
- As with regulation in general, there are costs involved
  - ⇨ May lower growth unnecessarily
  - ⇨ May generate unintended distortions
  - ⇨ Benefits should be weighed against costs.

Case Study
Bulgaria, Croatia, Poland, Romania and Serbia

Imbalances

Macroeconomic indicators, average 2003-2008

percent

	GDP growth	CA/GDP	Fiscal deficit/ GDP	Public debt/ GDP	External debt/ GDP	Net capital flows/ GDP	FX regime	FX liabilities/ total liabilities, 2007
Bulgaria	6.3	-15.7	2.2	28.7	79	24.3	CB	58.6
Romania	6.6	-9.7	-2.6	20.5	42.3	13.5	floating	42.5
Croatia	4.3	-6.6	-2.9	35.1	77.4	13.1	stabilized (de jure managed float)	73.6
Serbia	5.7	-12.5	-1.0	51.7	64.3	19	floating	67.8
Poland	5.2	-3.3	-4.1	46.6	49.2	5.6	floating	[28][1]

[1] For Poland, the figure is for FX lending in percent of total lending.

Source: WEO database, various central banks, MCM exchange rate classification

Responses

All countries used multiple instruments to tackle broad-based risks

First measure: countercyclical adjustments in reserve requirements

- ⇨ Not used in Poland, which maintained a unified low reserve requirement
- ⇨ When the crisis hit, the rates were lowered in all cases, or lifted altogether to release FX liquidity.

	Bulgaria	Croatia	Romania	Serbia
Conditions set				
By currency (FX RR >LC RR)	x	x	x	x
By maturity (usually 2 year split)		x	x	x
By source of funding				
Deposits	x	x	x	x
including FX indexed		x		x
by type e.g., households				x
External liabilities		On new foreign borrowing	x	x
Local currency securities purchased by non-residents		Special RR		
FX subordinated obligations				x
FX assets of leasing companies				x
Speed bumps: on credit growth exceeding a threshold rate	x	x		

In Croatia and Serbia, frequent adjustments were needed to expand the RR base, mainly to deal with circumvention. Marginal reserve requirements were lifted in Bulgaria in 2007 and in Croatia after the outbreak of the crisis.

Source: Central bank websites

Other measures: (FX, real estate, consumer loans, capital and provisioning)

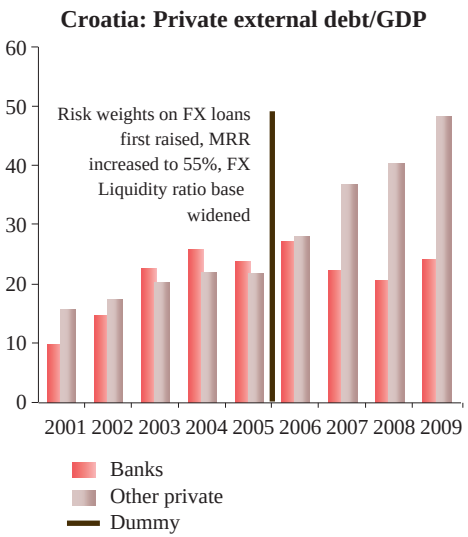
	Bulgaria	Croatia	Poland	Romania	Serbia
Measures on FX exposures					
FX liquidity requirement		x			x
Net open position		x		x	x
Gross exposure limits				on unhedged	
Differential lending criteria				x	
Differential provisioning				x	
Differential risk weights on FX		x	x		x
Differential buffers for FX moves			x		
Real estate exposures					
Loan to value limits	x	x	x	until EU accession	x
Differential risk weights on LTV	x				
Consumer lending					
Debt to income				x	x
Other					
Countercyclical provisioning	x	x			x
Countercyclical capital					for HH
Restriction on profit distribution or treatment of profits in regulatory capital	x	x	x	x	x
Memo (percent)					
Higher minimum capital requirement	12	10		until EU accession	12 from 2008

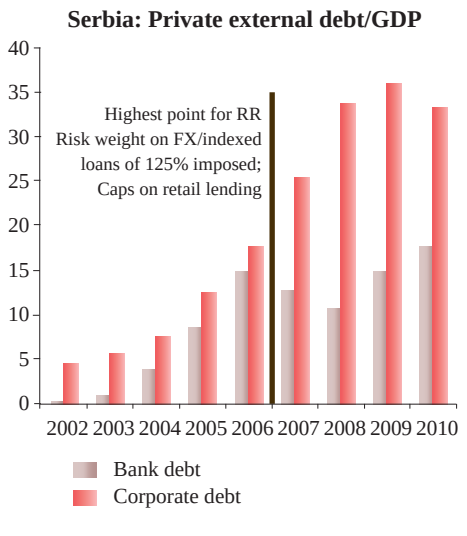
Adjustments

- In all cases, the use of these instruments can be characterized as discretionary due to the frequency of adjustment, and trial and error/learning-by-doing approach. Examples:
  - ⇨ Several countries imposed higher reserve requirements on short-term liabilities and found that banks exceeded the limit only slightly to evade the requirement
  - ⇨ In Croatia and Serbia, FX-indexed loans had to be brought into the same umbrella as FX loans
  - ⇨ Banks evaded measures by channeling funding through non-bank subsidiaries or through asset sales to avoid speed bumps (Bulgaria, Croatia). The authorities then widened the perimeter of regulation and harmonized prudential rules.
- Since the crisis:
  - ⇨ Required reserve ratios have been lowered and some removed altogether (Bulgaria, Croatia)
  - ⇨ Also relaxed were separate FX liquidity requirements (Croatia, Serbia), provisioning rules, and limits on including interim profits in regulatory capital
  - ⇨ In Croatia, the minimum capital adequacy ratio was increased from 10 percent to 12 percent in 2010 in the context of Basel II adoption, to compensate for the high risk weights being removed
- The degree of cooperation with macroeconomic policies was mixed
  - ⇨ Monetary policy in all five countries was consistent with the exchange rate regime
  - ⇨ During Article IV Consultations the IMF considered fiscal policy sufficiently tight only in Bulgaria.

Outcomes

- The survey responses indicated that the instruments had been effective in slowing credit growth and building capital and liquidity buffers
- Bank debt stopped growing in Croatia and Serbia



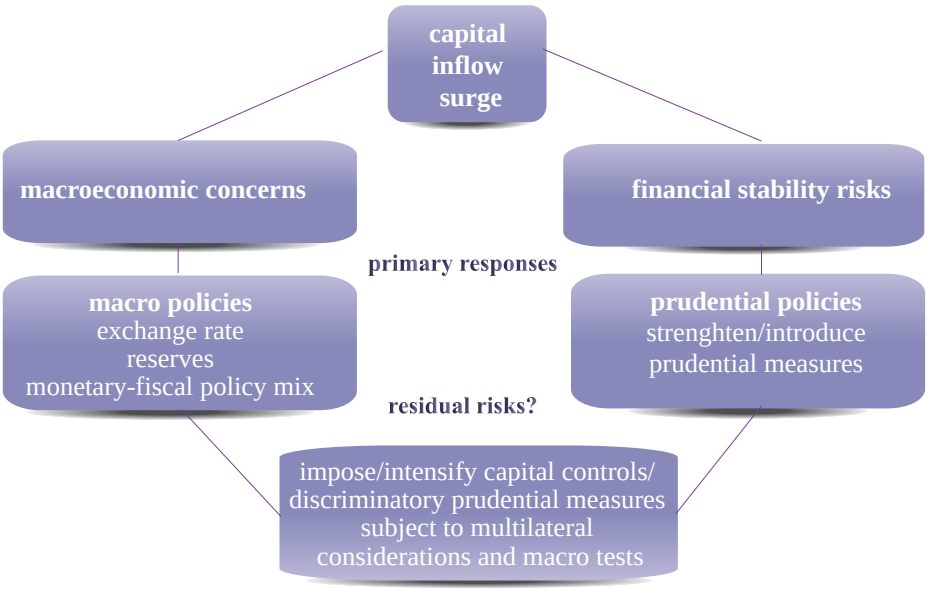


Source: Galac, 2010 and Croatian National Bank *Source: National Bank of Serbia*

- A detailed study on Croatia found that combinations of measures had been effective in building capital buffers and slowing private sector credit growth, but some had been less successful in reducing growth in banks' FX liabilities or a buildup of private sector debt (Galac, 2010).

Macroprudential policy and capital flows

- While international financial integration is fundamentally beneficial to EM, capital inflows pose challenges and require an appropriate policy response to alleviate economic overheating, excessive appreciation, credit booms and asset price bubbles
- Primary policy responses to address macroeconomic and financial stability risks from capital flows are macro and prudential policies, the very same policies that would be used for non-capital flow shocks to the economy.
- National authorities should first exhaust the available macropolicy space, allow some appropriate exchange rate strengthening as well as reinforcing nondiscriminatory prudential tools before resorting to capital controls
- Controls are part of the toolkit when certain macro conditions are satisfied: exchange rate overvalued on multilateral basis, further reserve accumulation undesired, overheating concerns preclude monetary easing and little scope for more fiscal tightening.

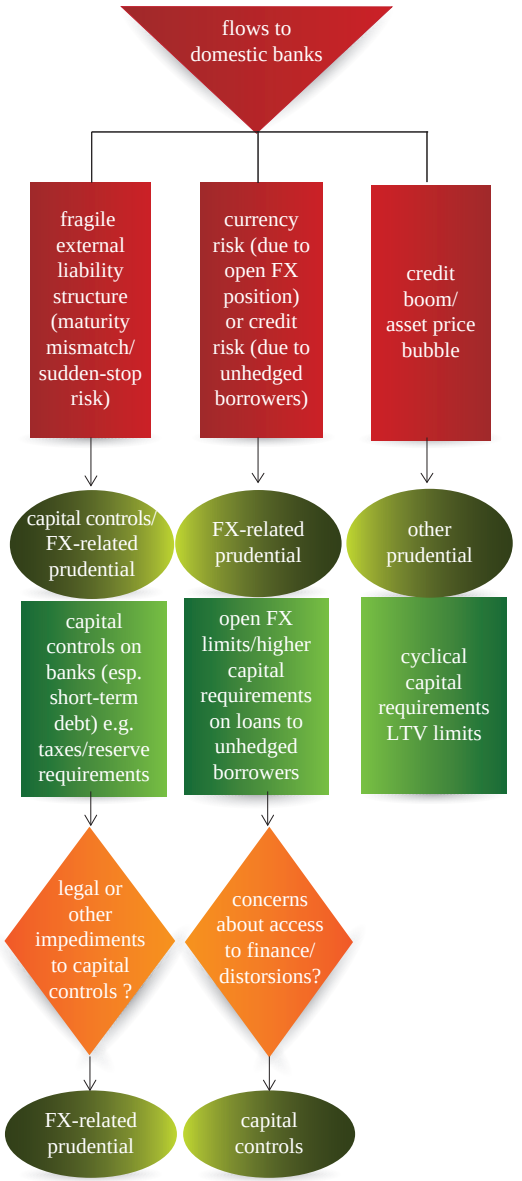


Based on IMF Staff Discussion Note (April 2011) on "Managing Capital Inflows: What Tools to Use"

Prudential Policies – micro versus macro

- Microprudential Policies Examples: Improve individual institutions' resilience to risks including to those of international capital flows
  - ⇨ Forward-looking provisioning of expected losses
  - ⇨ Valuation reserves to cover the risk of mean reversal in prices of marked-to-market assets
  - ⇨ Caps on LTVs/minimum collateral haircuts
  - ⇨ Higher risk weights on specific types of exposures (such as real estate lending)
  - ⇨ Minimum capital requirements, including better quality of capital (as in Basel III)
  - ⇨ Leverage ratios
  - ⇨ Capital conservation buffer (Basel III)
  - ⇨ Liquid assets buffer (Basel III)
  - ⇨ Limits on currency and maturity mismatches (Basel III NSFR).
- Macroprudential Policies Examples: Aimed at systemic risks
  - ⇨ Cyclically varying provisioning requirements
  - ⇨ Cyclically varying LTVs
  - ⇨ Countercyclical capital buffer (Basel III)
  - ⇨ Capital/liquidity surcharge/levies on SIFIs
  - ⇨ Tax on volatile funding (Shin, 2010)
  - ⇨ Caps on credit growth
  - ⇨ Higher reserve requirements.

Choice of instruments to mitigate risks (banking system)

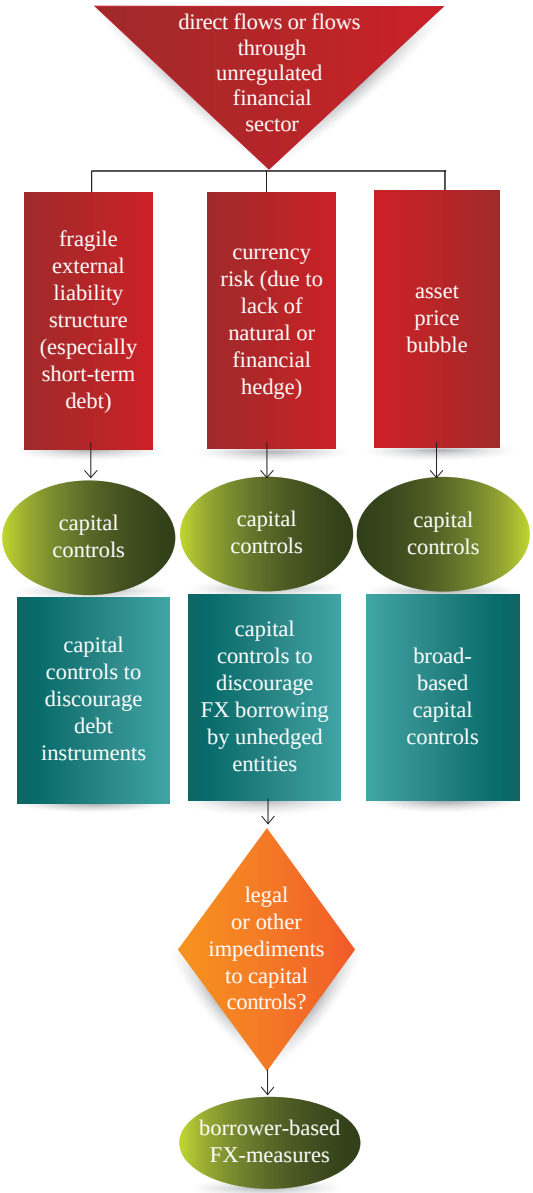


Note: Assuming macro policy options have been exhausted and taking due account of multilateral considerations

- If banks incur an excessively risky external liability structure, prudential tools (such as currency- dependent liquidity requirements) or capital controls (e.g. limits on external borrowing, or higher reserve requirements on liabilities to non-residents) could be used, in some combination
- If bank assets are excessively risky and credit risk is associated with FX lending, more stringent FX-related regulations on banks or even outright prohibitions on borrowers without a natural hedge, may be appropriate
- If currency risk is reflected in open FX positions, possible responses include tighter FX open position limits and FX liquidity requirements
- Capital controls may also be useful if prudential measures cannot effectively deal with the targeted risks in a timely manner
- Risks that capital flows migrate to the unregulated financial sector.

Choice of instruments to mitigate risks (unregulated sector)

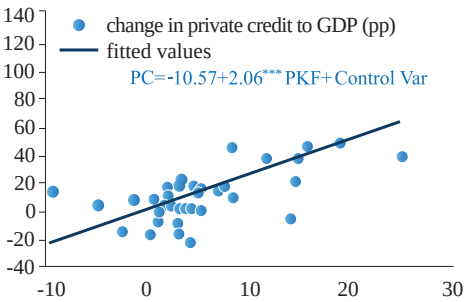
- If non-financial entities (firms or households) take on an excessively risky external liability structure, this calls for potential capital controls especially if measures that do not discriminate between resident- and non-resident sources of funds take too long to be implemented or are too costly
- If private non-financial balance sheets have excessive currency risk, FX-related measures such as prohibiting borrowing in FX by domestic (non-financial) entities or capital controls might be appropriate
- If direct borrowing from abroad by non-financial entities fuels asset price inflation and possibly bubbles, neither monetary policy nor prudential regulation will likely have much traction, capital controls on foreign borrowing and (complementary instruments) could be needed
- A key takeaway is that for flows to the unregulated financial system, the case for using capital controls is stronger
- Exceptions.



Note: Assuming macro policy options have been exhausted and taking due account of multilateral considerations

Evidence: domestic credit and net capital flows

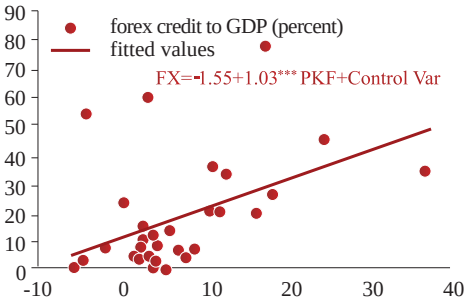
Domestic private credit boom*



* PC - change in domestic private credit to GDP over 2003-2007 (percentage points)
PKF - pre-crisis net private capital flows to GDP averaged over 2003-2007
Control var includes initial condition (private credit to GDP in 2003) and average real GDP per capita (PPP) in 2003-2007

Source: IMF staff estimates

Foreign currency credit*



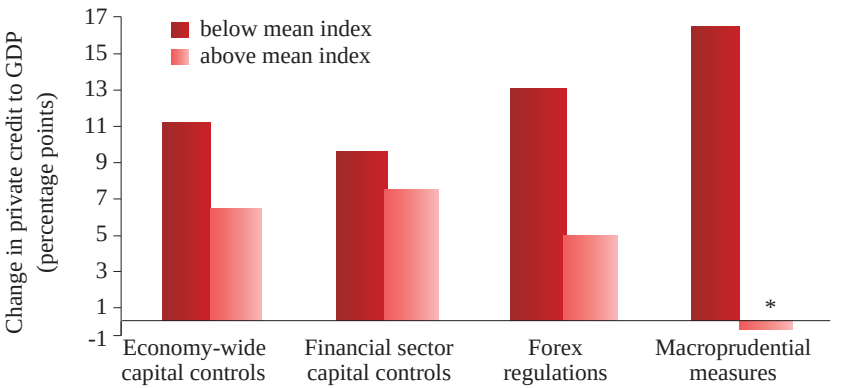
* FX - forex credit to GDP in 2007 (percent)
PKF - pre-crisis net private capital flows to GDP (percent) is the average over 2005-2007
Control var includes private credit to GDP in 2005 and a dummy variable indicating the exchange rate regime in 2007 (1 - *de facto* peg, 0 - otherwise)

Source: IMF staff estimates

- There is a strong association between capital inflows and both credit booms and FX lending by domestic banks
- In a sample of 41 emerging market countries over 2003-2007, and defining booms as surges at the top decile, half of credit booms are associated with a capital inflow surge, and these same booms are also those that ended in bust.

Evidence: domestic private credit and policy measures

(a) Domestic private credit boom

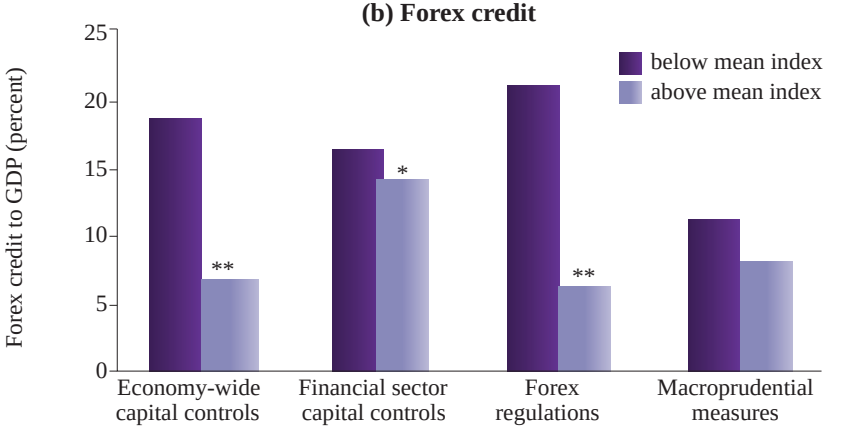


Note: Private credit boom is the residual (including constant) obtained after regressing change in private credit to GDP over 2003-2007 on private credit to GDP in 2003. Policy indices are averages over 2000-2002 except for macroprudential measures index, which pertains to 2005.

* indicates significance at 5 percent level.

Source: IMF staff estimates

(b) Forex credit

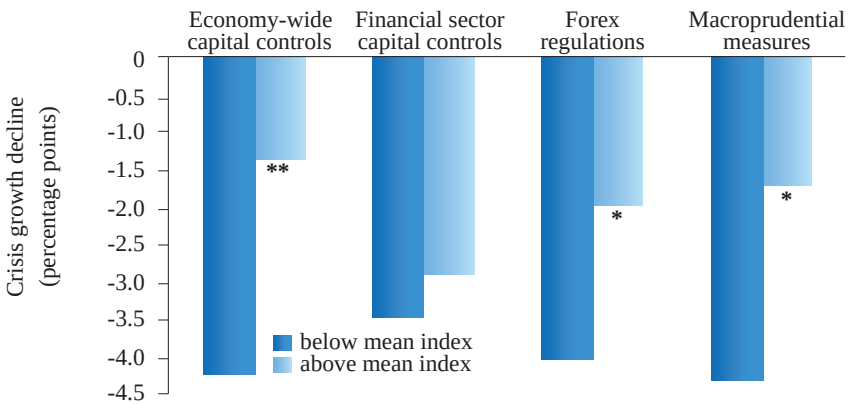


Note: Forex credit is the residual (including constant) obtained after regressing forex credit to GDP in 2007 on private credit to GDP in 2005 and a binary variable indicating the *de facto* exchange rate regime in 2007 (equal to one if fixed and zero otherwise). Policy indices are averages over 2003-2005 except for the macroprudential measures index which pertains to 2005.

* and ** indicate significance at 5 and 1 percent levels, respectively.

Source: IMF staff estimates

(c) Crisis resilience and policy measures



Note: Crisis resilience is the residual (including constant) obtained after regressing the difference between real GDP growth rates averaged over 2008-2009 and 2003-2007 on trading partner growth and terms of trade change. Policy indices are averages over 2000-2002 except for the macroprudential measures index, which pertains to 2005.
* and ** indicate significance at 10 and 5 percent levels, respectively.

Source: IMF staff estimates

- Controls on capital inflows are associated with reduced FX lending, but do not affect lending booms generally
- FX-related prudential measures are strongly associated with a lower reliance on FX-denominated lending but the effect of such measures on general lending booms is weak. Prudential measures are associated with a reduced frequency of general lending booms but are not significantly associated with the extent of FX lending
- The crisis period of 2008-2009 is suggestive of greater growth resilience in countries that had either capital controls or prudential measures in place in the years prior to the crisis.

Conclusion on macroprudential policy and capital flows

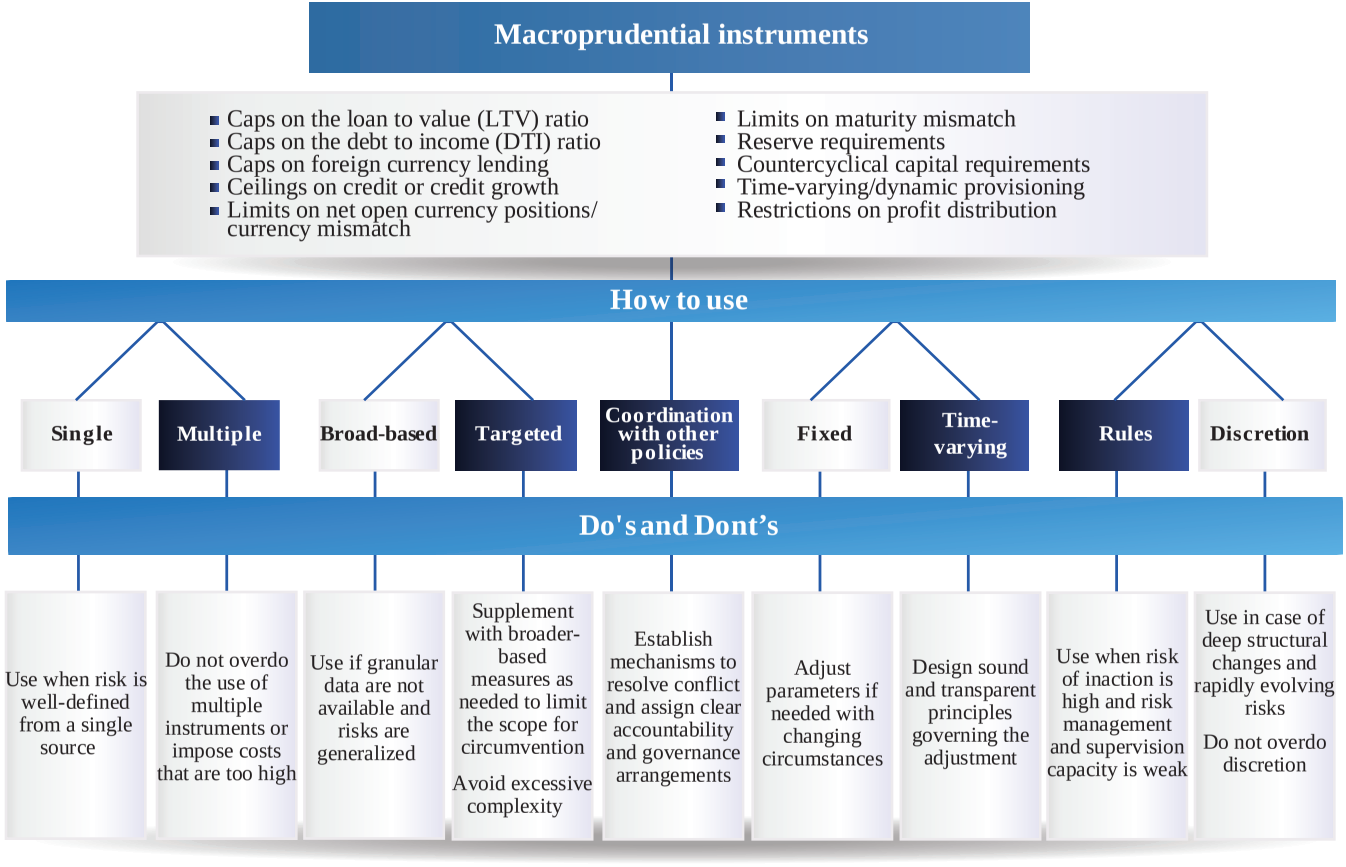
- Capital controls are an important part of the policy toolkit for managing surges in capital inflows, in addition to macroeconomic and prudential policies
- A prerequisite for using capital controls is that domestic macroeconomic policies are appropriately set, and that non-discriminatory prudential policies have been adjusted to the extent possible
- This requires that the exchange rate is consistent with its multilateral medium-run fundamental level; that fiscal and monetary policies are consistent with internal balance and public debt sustainability in the face of inflows; and that official reserves have been adequately built up from a country-insurance perspective
- Once the macroeconomic prerequisites for invoking capital controls are met (but not before), and if prudential measures cannot suffice or are not effective, capital controls can be used to mitigate the risks associated with inflow surges
- The appropriate mix of prudential regulations and capital controls depends upon the channels through which inflows enter the economy, and thus on the specific risks to which the surges give rise
- In designing the capital control component of the overall package to deal with inflows, it is necessary to take account of both the persistence and the volatility of capital inflows.

Next steps on macroprudential institutional arrangements

- Our analyses represent a step towards basic guidance to member states. But more work is needed and feasible as more experiences are gained
- Areas for further research in the work stream on macroprudential institutional arrangements include:
  - ⇨ Country specific conditions affecting the choice of institutional models
  - ⇨ Trade-offs between precision and flexibility of mandates and powers
  - ⇨ Trade-offs between policy autonomy and policy accountability and
  - ⇨ Mechanisms to address problems caused by institutional separation between agencies (e.g. incentive problems, flow of information).

Next steps: The use of the macroprudential policy toolkit

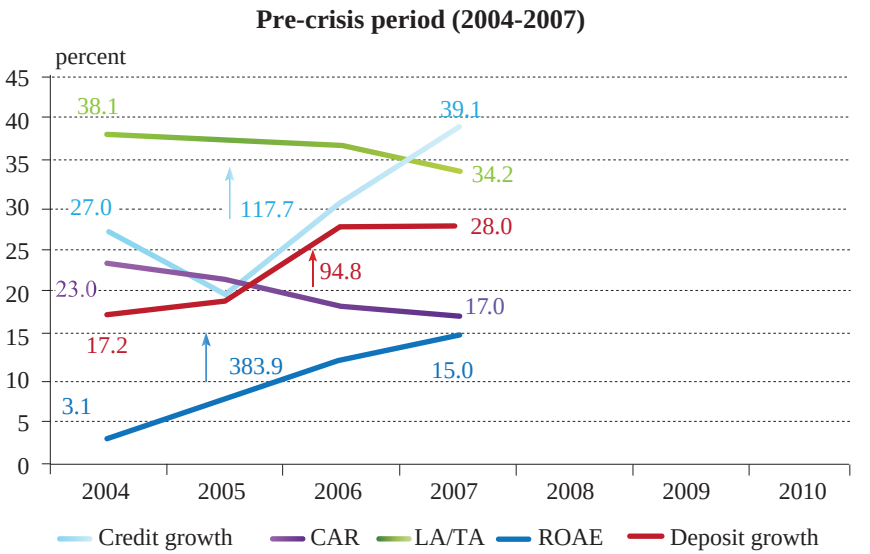
- Deeper analysis of interconnectedness (cross-section dimension)
  - ⇨ Data availability is a constraining factor
- Deeper understanding of design and calibration of instruments
- Estimates of cost of implementation: distortions, unintended consequences
- Relationship between macroprudential and microprudential regulation.


Macroprudential instruments
Caps on the loan to value (LTV) ratio
Caps on the debt to income (DTI) ratio
Caps on foreign currency lending
Ceilings on credit or credit growth
Limits on net open currency positions/ currency mismatch
Limits on maturity mismatch
Reserve requirements
Countercyclical capital requirements
Time-varying/dynamic provisioning
Restrictions on profit distribution
How to use
Single
Multiple
Broad-based
Targeted
Coordination with other policies
Fixed
Time-varying
Rules
Discretion
Do's and Dont's
Use when risk is well-defined from a single source
Do not overdo the use of multiple instruments or impose costs that are too high
Use if granular data are not available and risks are generalized
Supplement with broader-based measures as needed to limit the scope for circumvention
Avoid excessive complexity
Establish mechanisms to resolve conflict and assign clear accountability and governance arrangements
Adjust parameters if needed with changing circumstances
Design sound and transparent principles governing the adjustment
Use when risk of inaction is high and risk management and supervision capacity is weak
Use in case of deep structural changes and rapidly evolving risks
Do not overdo discretion

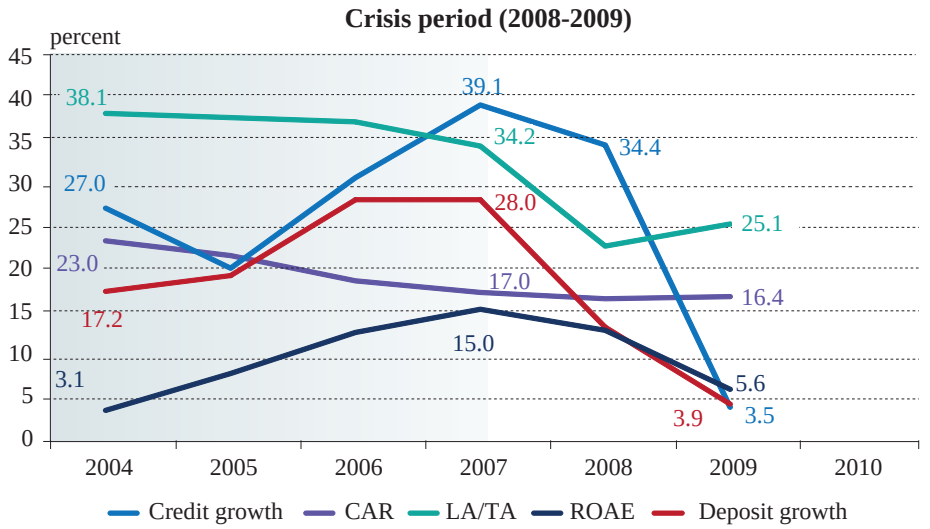
MACROPRUDENTIAL MEASURES TO THE BANKING SYSTEM AT THE TIME OF CRISIS: THE CASE OF MACEDONIA

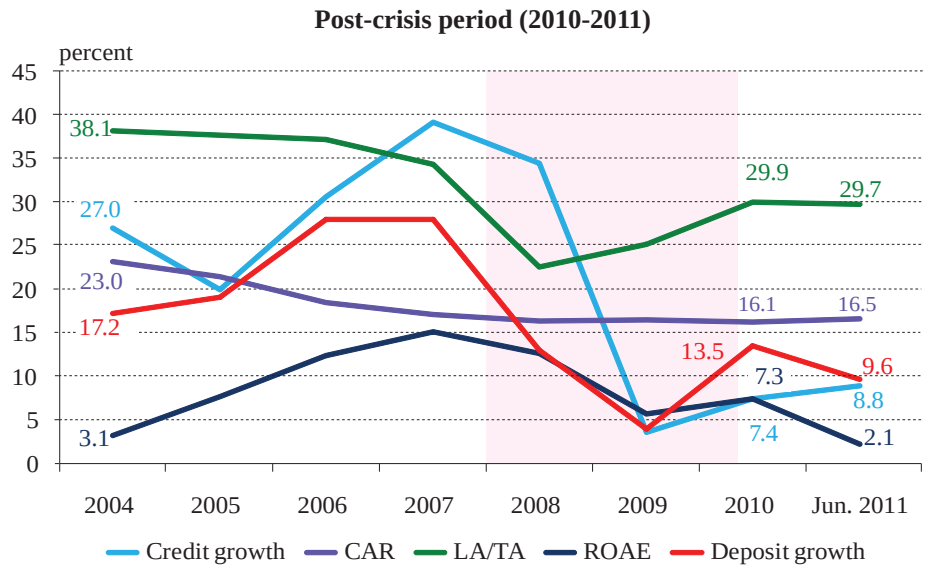
Viktorija Gligorova*

Pre-crisis, crisis and post-crisis trends (2004-2010)



* Financial Stability, Banking Regulations and Methodology Department, National Bank of the Republic of Macedonia


Crisis period (2008-2009)
percent
45
40
35
30
25
20
15
10
5
0
38.1
39.1
34.2
34.4
27.0
28.0
25.1
23.0
17.0
16.4
17.2
15.0
3.1
5.6
3.9
3.5
2004
2005
2006
2007
2008
2009
2010
Credit growth
CAR
LA/TA
ROAE
Deposit growth


Post-crisis period (2010-2011)
percent
45
40
35
30
25
20
15
10
5
0
38.1
29.9
29.7
27.0
23.0
16.1
16.5
17.2
13.5
9.6
7.3
8.8
3.1
7.4
2.1
2004
2005
2006
2007
2008
2009
2010
Jun. 2011
Credit growth
CAR
LA/TA
ROAE
Deposit growth

Impact of the crisis

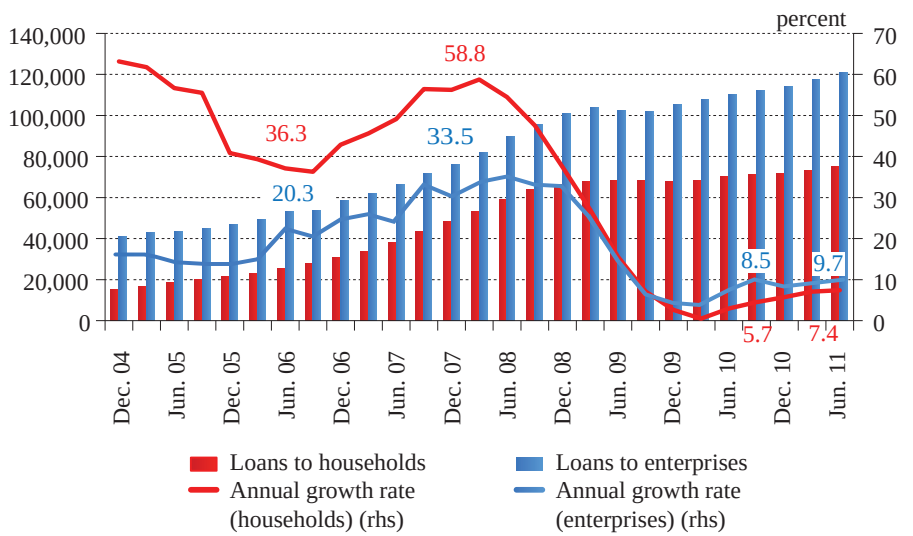
- Decline of the deposit growth
- Significantly lower credit growth ratios
- Lower profitability ratios
- Deterioration of credit quality.

	2007	2009	2010	06.2011
NPLs/Total loans	10.3%	9.1%	9.3%	9.3%

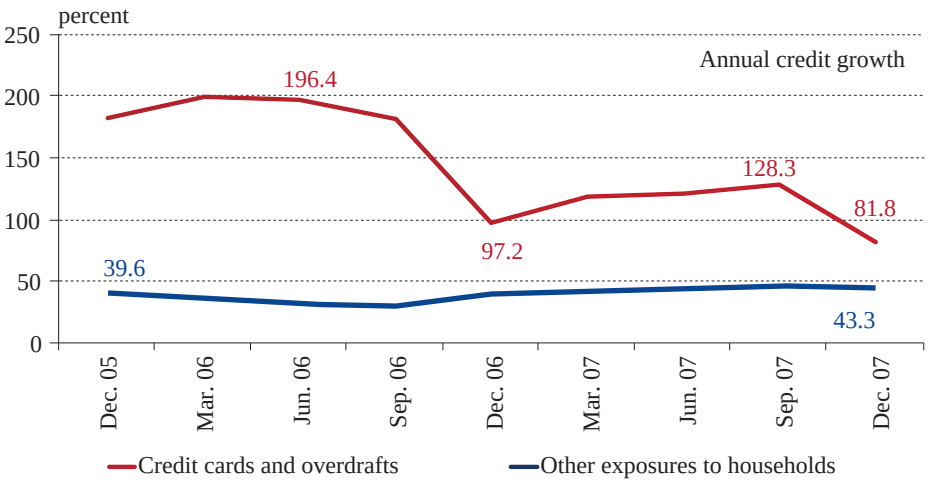
However,

- Stable liquidity and solvent position
- No need for direct financial support by the Government.

Prevention of high credit growth risk



Capital requirements



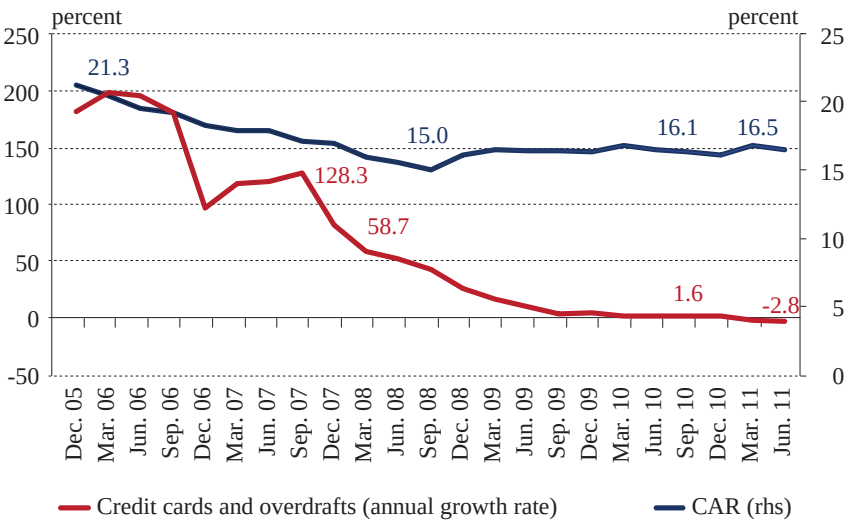
	2006	2007
Total number of issued credit cards	419,168	716,611
Total value of transactions (mil. denars)	2,442.3	7,693.6
Percent of unsecured claims (credit cards and overdrafts)	N/A	74.5
Percent of C, D and E claims (credit cards and overdrafts)	3.8	4.1

- ½ of the growth of the total loans to households
- 40 percent of the annual growth of C, D and E exposures to households
- Maturing of the portfolio

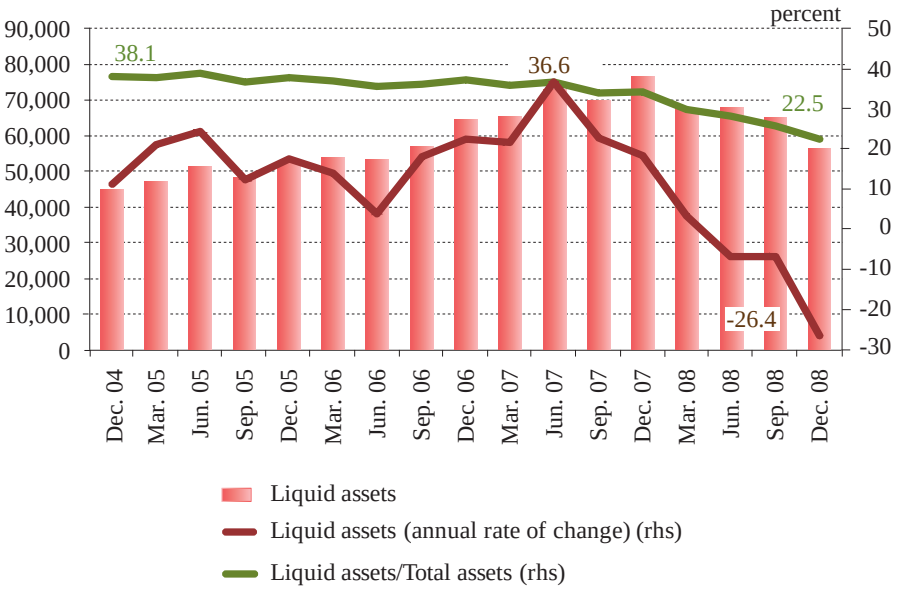
Amendments to the capital adequacy methodology – March, 2008

- Raising of risk weights on credit cards and overdrafts to 125 percent
- Why capital risk weights?
  - ⇨ Requires additional capital
  - ⇨ Reduces credit growth risk to an acceptable level
  - ⇨ System-wide measure – impact on all banks.

Capital requirements



Liquidity ratios



Decision on liquidity risk management – December 2008

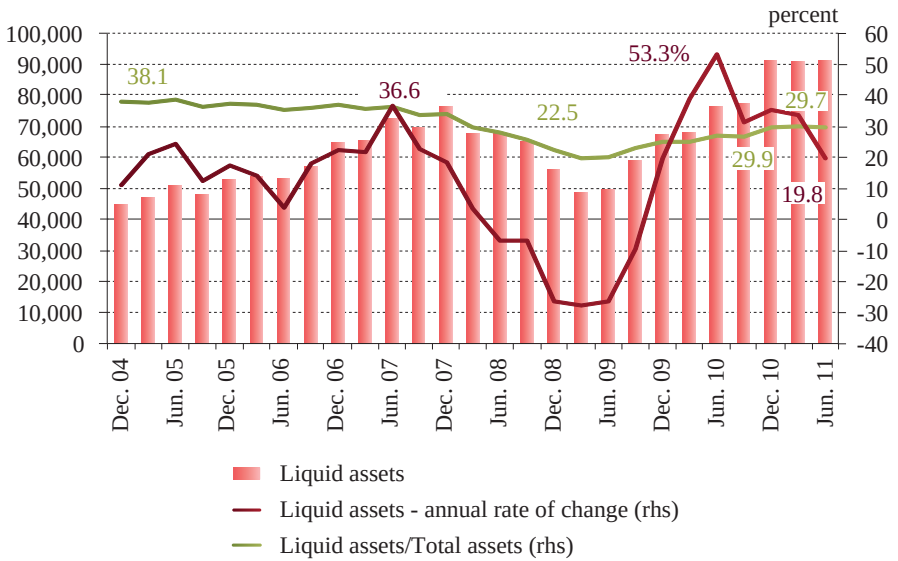
- Minimum liquidity ratios – LR30 and LR180
  - ⇨ Assets/Liabilities maturing in the following 30 days, i.e. 180 days = 1
  - ⇨ Separate ratios for the Denar and FX assets and liabilities
  - ⇨ Monthly dynamics
    - 28.02.2011 – liquidity ratios (30 days)
    - 28.02.2014 – liquidity ratios (180 days)
- Requirements for liquidity risk management
  - ⇨ Enhanced role of the Senior management
  - ⇨ Explicit requirement for stress-testing
  - ⇨ Level of concentration
  - ⇨ Estimation of the expected maturity of assets and liabilities
  - ⇨ Internal liquidity ratios.

- Compliance with the decision (August 2011)
  - ⇨ All banks have achieved the minimum denar and FX liquidity ratios up to 30 days
  - ⇨ No bank has liquidity ratios up to 180 days lower than the prescribed dynamics.

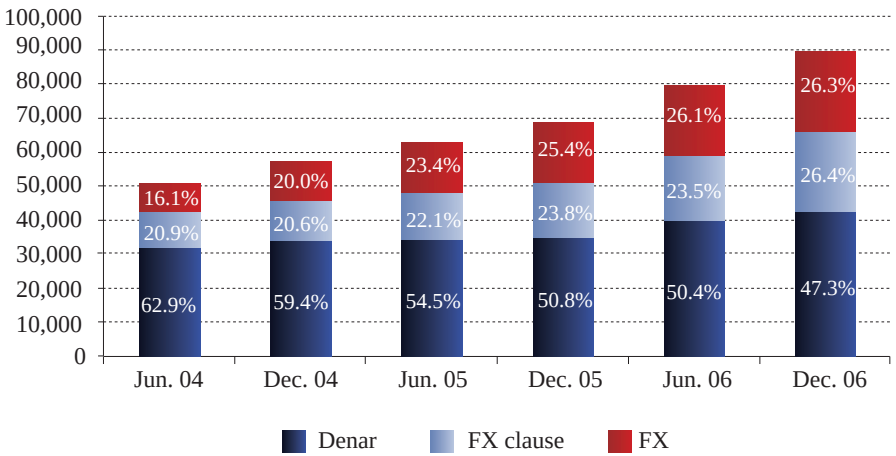
New decision on liquidity risk management – effective November 2011

- Single liquidity ratios (for denar and FX) up to 30 days and up to 180 days – all banks will comply immediately.

Liquidity ratios



Regulation on FX lending

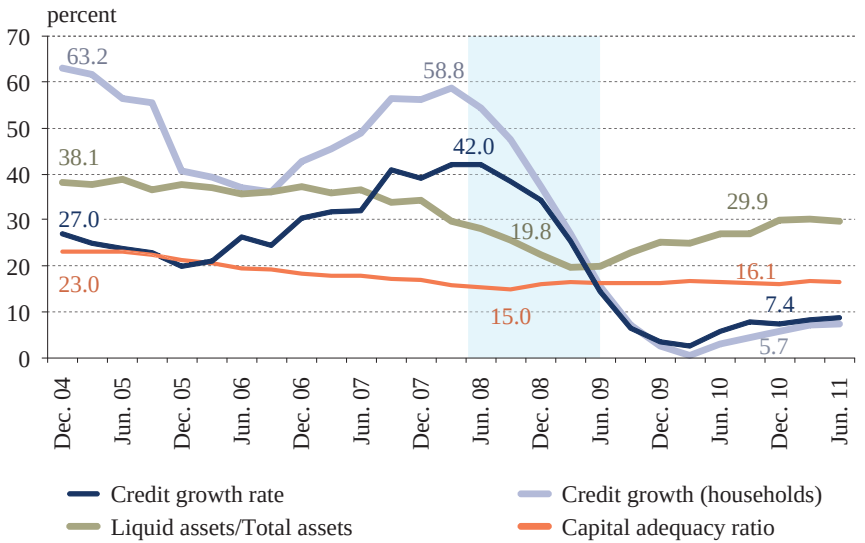


Decision on the conditions and the manner of extending FX loans and denar loans with FX clause – March 2006

- Extending FX loans and Denar loans with FX clause
  - ⇨ Clients classified as A or B clients by the bank and by the banking system (data from the NBRM's Credit registry), or
  - ⇨ First-rate collateral (cash or cash equivalents, guarantees by the RM, NBRM, EU countries, first-rated banks, etc.)
- Written policy and procedures for management of the induced credit risk
  - ⇨ Criteria for assessment of the (mis)match of clients' FX assets and liabilities
  - ⇨ Limits on the FX exposure
  - ⇨ Stress-testing of the FX risk (at least annually).

Conclusions

Impact of the measure



The role of the NBRM

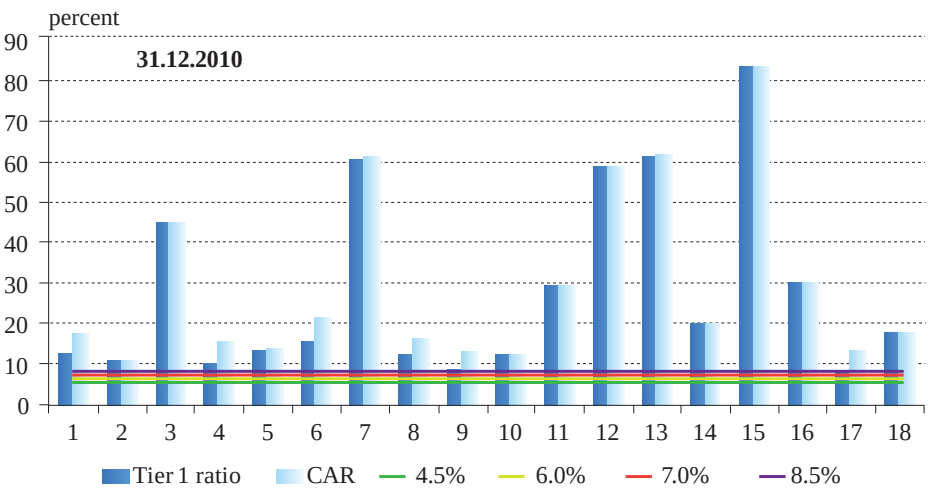
- Responsible for the monetary policy
- Sole banking supervisor
  - ⇨ Microprudential supervision
  - ⇨ Macroprudential supervision
- Assessment and monitoring of financial stability.

Future challenges

When to end the macroprudential measures?

- Capital requirements
  - ⇨ NPLs/Total loans = 9.3 percent
  - ⇨ NPLs (households)/Total loans (households) = 7.8 percent
  - ⇨ C, D, E (credit cards and overdrafts)/Total (credit cards and overdrafts) = 6.3 percent
- Liquidity ratios
  - ⇨ The banking system has relatively stable and high liquidity
  - ⇨ Basel III liquidity ratios
  - ⇨ Liquidity coverage ratio ≈ LR30
  - ⇨ Net stable funding ratio – longer time horizon than LR180.

Basel III implementation



MONITORING ACCESS TO FINANCE OF THE CORPORATE SECTOR*

Florian Neagu**
Adrian Costeiu**
Alina Tarța**

I. Scope of research

1. Identifying the main explanatory factors for companies' access to finance
2. Looking for the main supply factors explaining banks' willingness to provide credit to companies
3. Investigating how banks perform one of their crucial tasks of selecting viable projects in the economy.

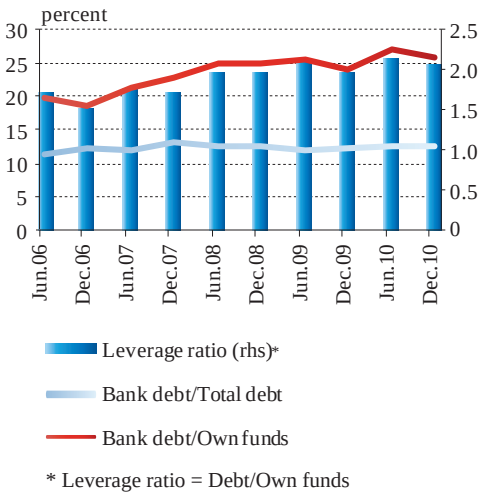
Literature approach

- Balance sheet approach: Stiglitz and Weiss (1981); Fazzari, Hubbard and Peterson (1988);Valverde, Fernández and Udell (2008)
- Survey approach: Parker (2002); Kunt, Leaven and Moksimovic (2008)
- Our approach:
  - ⇨ We use as proxy for loan demand the information regarding banks' interrogation of a potential debtor in the Credit Register Bureau (CRB)
  - ⇨ We analyze a 3-months horizon from each interrogation to see if the firm demand was met by the bank supply.

* Preliminary draft. Please, do not quote.
** Financial Stability Department, National Bank of Romania

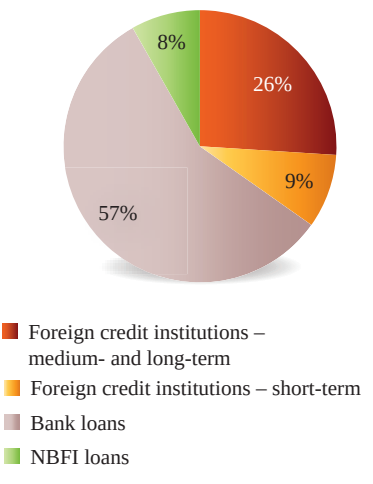
II. Role of financial creditors in running companies' business

Indebtedness of non-financial corporations



Source: MPF, NBR, own calculations

Structure of corporate loans by creditor



Source: NBR, own calculations

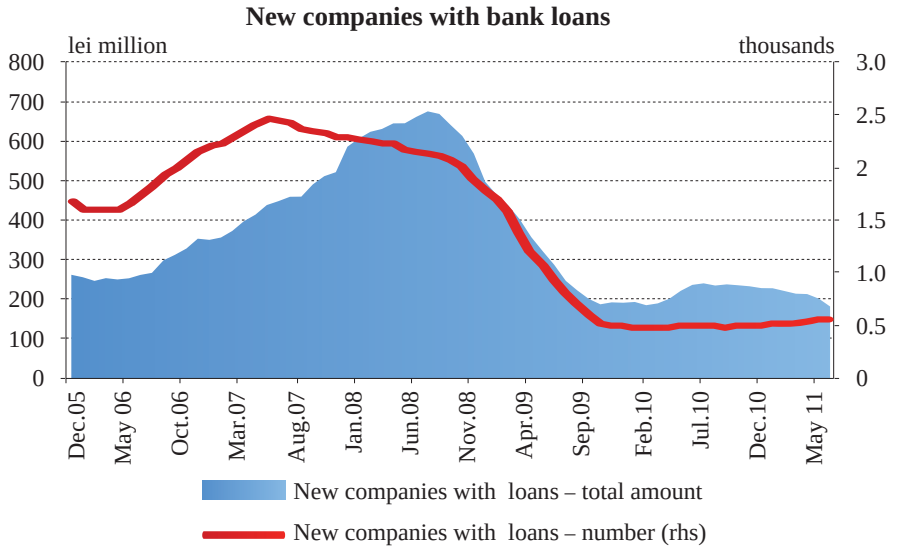
Companies with bank loans

	2007	2008	2009	2010
Number of companies	86,937	94,709	80,241	73,947
Value added	71%	70%	70%	69%
Number of employees	57%	59%	57%	55%
Export volume	75%	71%	72%	74%
Financial external loans	57%	56%	55%	54%
Intra-company loans	57%	56%	57%	56%

Companies without bank loans

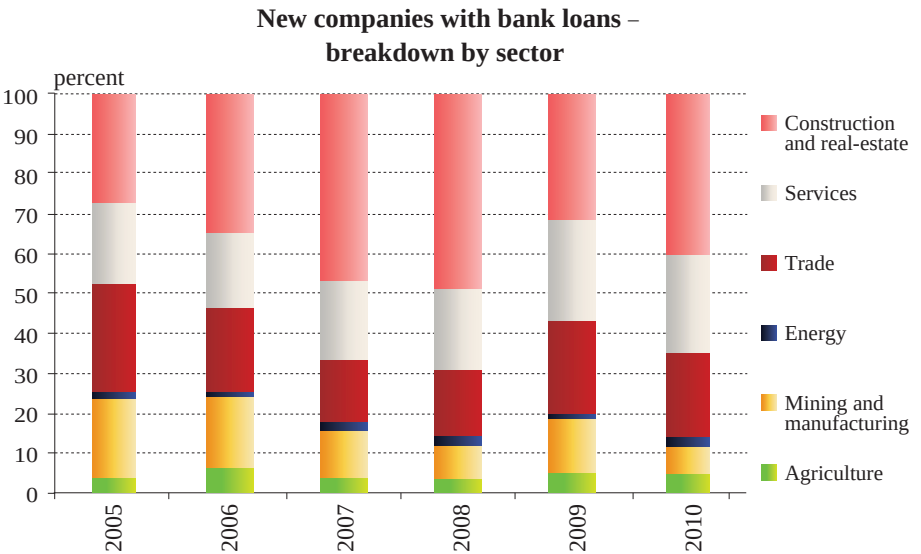
	2007	2008	2009	2010
Number of companies	519,012	555,410	516,615	522,489
Value added	29%	30%	30%	31%
Number of employees	43%	41%	43%	45%
Export volume	25%	29%	28%	26%
Financial external loans	43%	44%	45%	46%
Intra-company loans	43%	44%	43%	44%

Source: MPF, NIS, NBR, own calculations



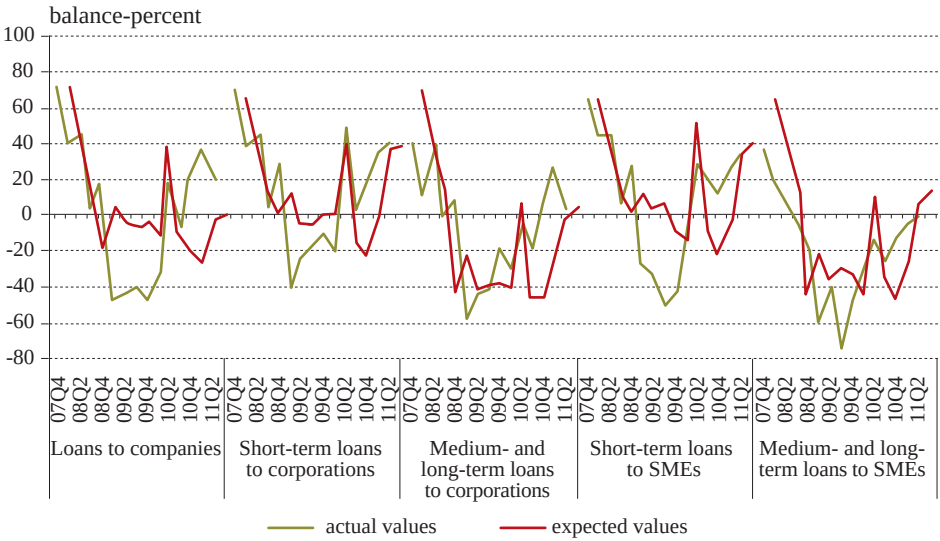
Note: Both series are calculated as a 12-month moving average

Source: CCR, own calculations



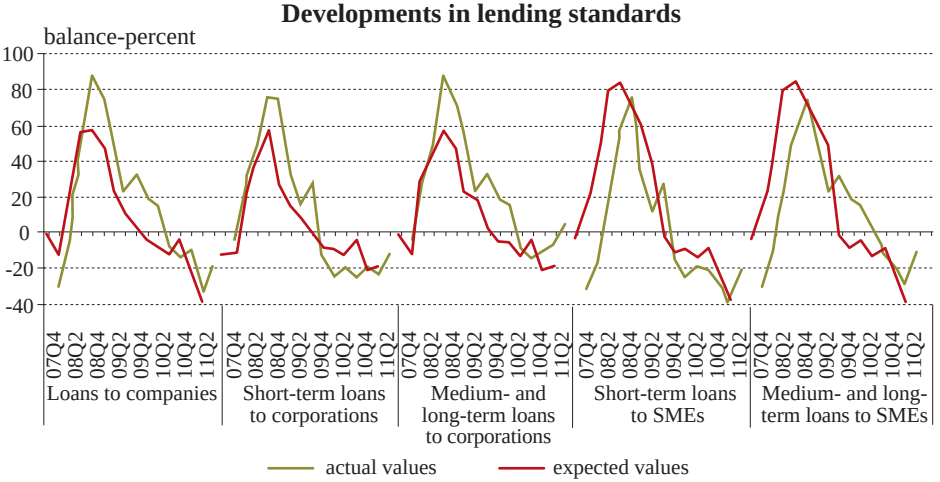
Source: CCR, own calculations

Developments in loan demand



Note: Positive readings in the balances show an increase in loan demand.
Source: NBR – Bank Lending Survey

Developments in lending standards



Note: Positive readings in the balances show a tightening of lending standards.
Source: NBR – Bank Lending Survey

III. Determinants of companies' access to credit

Data sources

Data	Source	Collection method	Frequency
Firm financial statements	National Trade Register Office	Aggregated by MPF	Semi-annualy
Credit information	Central Credit Register	Automated reception	Monthly
Client interrogation by bank	Central Credit Register	Automated reception	Monthly

Methodology

- We use a logit methodology in order to estimate the probability that a company will obtain finance using as explanatory variables firms' financial characteristics prior to bank's decision
- Filtering explanatory variables using 3 tests (automated procedure):
  - ⇨ Linearity and monotony test: the logit requires that the log (odds of default) be linear and monotonous with the variables
  - ⇨ Univariate logit model – we drop variables with ROC < 50 percent
  - ⇨ Multicolinearity test – we drop the least powerful variable out of any pair with a correlation coefficient greater than 0.7.
- Backward logit estimation technique
- We adjust the estimated logarithm of the odds of default with the difference between the historical observed default rate of the underlying portfolio and the proportions used in the bootstrapping exercise.

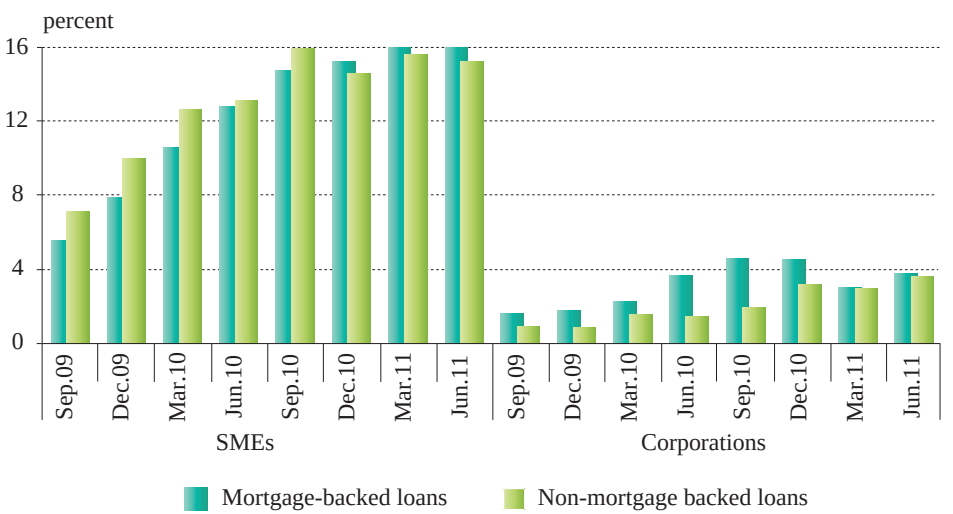
Results

Number of observations in the dataset used for building the model: 835 out of which 161 companies receive credit*
Number of observations in the bootstrapping exercise: 200 out of which 100 companies receive credit
In sample accuracy ratio: 38.44 percent and ROC: 69.22 percent
Out of sample dataset: 100 out of which 18 companies receive credit
Out of sample accuracy ratio: 30.21 percent and ROC: 65.10 percent

Variables**	Coefficient	t-stat
Intercept	-0.4086	-11.71379
Interest expenses/total assets	-4.2830	-3.531155
Sales/claims	0.0001	3.125702
Sales/total assets	0.0306	3.562473
Fixed assets***	0.2392	-3.207836
McFadden R-squared	16.06%	

* Three months horizon
** Balance sheets and P&Ls as of December 2009
*** Normalized data

Companies' non-performing loan ratio by collateral type



Note: Non-performing loans: 90 days past due loans (using contagion by debtor at bank level); liquidation procedures are also taken into account.

Supply factors

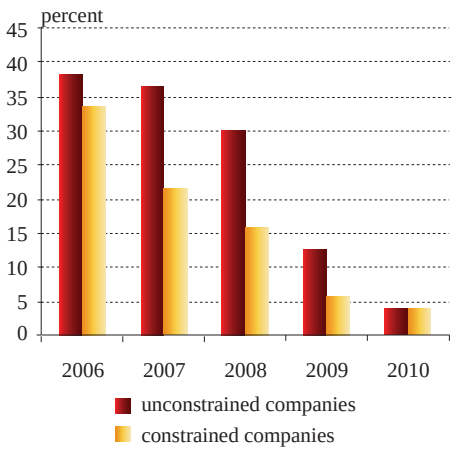
Model type: Panel model with random efects (probability of 82 percent - Haussman Test)
Period of time: March 2007-June 2009, number of banks: 22
Number of observations: 220
Dependent variable: share of companies that didn't have a loan in the past 12 months, were interrogated in CRB and received a credit in the next 3 months in total number of interrogated companies.

Variables	Coefficient	t-stat
Intercept	0.498436	5.057961
Loans/Deposits	-0.027368	-2.392328
Non-performing loan ratio*	-2.053978	-2.839100
Euro interest rate on new loans	-0.020876	-5.512934
Lei interest rate on new loans	0.023298	2.495110
Adjusted R-squared	41.06%	

* 90 days past due loans (using contagion by debtor at bank level) in total loans; liquidation procedures are also taken into account.

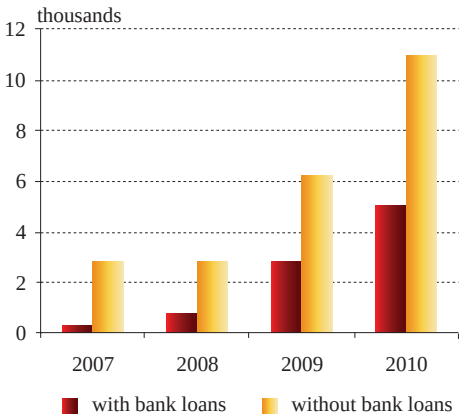
Do banks select viable projects to finance?

Return on equity



Source: MPF, NBR

Number of bankrupt companies



Source: The National Trade Register Office, NBR

IV. Conclusions

- The main factors identified to grant a company access to credit are:

  (i) capacity of the debtor to fulfill its financial obligations
  (ii) ability to generate operational cash-flow and
  (iii) to provide adequate collateral in order to back its loan demand

- On the supply side, monetary policy might count less in banks' lending decision. Main triggers are:

  (i) impact of provisioning status
  (ii) structural liquidity stance
  (iii) euro interest rate on new loans

- Companies that received financing managed to:

  (i) encounter higher profitability
  (ii) pose a lower risk of entering bankruptcy compared with firms whose financing demand was rejected.

DEVELOPING MACROPRUDENTIAL FRAMEWORKS AND TOOLS IN UKRAINE

Rufat Farukhsyn*

Basel II in Ukraine

- According to draft regulation "Basel II Implementation":

Pillar III "Market discipline"		2007
Pillar II "Supervisory review"		2008
Pillar I "Minimum capital requirements"	Credit risk – standardized approach	2010
Pillar I "Minimum capital requirements"	Operational risk – basic indicator approach	2010
Pillar I "Minimum capital requirements"	Operational risk – standardized approach	2015
Pillar I "Minimum capital requirements"	Credit risk – internal ratings-based approach	2020

Main problems with Basel II implementation

- Absence of statistical data on losses due to credit, operational and market risk action
- Absence of reliable internal rating agencies
- Problem of capital adequacy method choice
- Absence of information on markets
- Non-permanent and regular expenses with Basel II implementation
- Banks' unwillingness to modernise the system's implementation due to the lack of financial, human and information resources.

* Economic Analysis and Forecasting Department, National Bank of Ukraine

Risk assessment system in Ukraine

- RAS of NBU consists of:
  - ⇨ General Provisions of supervision based on risk assessment
  - ⇨ Glossary – main terms used in RAS
  - ⇨ Specific part – how we estimate one or another risk.

Integrated risk assessment system

Risk classification

- Measured:
  - ⇨ Credit
  - ⇨ Liquidity
  - ⇨ Interest rate
  - ⇨ Currency
  - ⇨ Market
  - ⇨ Operational.
- Not measured:
  - ⇨ Reputational
  - ⇨ Legal
  - ⇨ Strategic.

Risk assessment factors

- General
  - ⇨ Assessment factors, criteria recommended to help the supervisor make decisions in the RAS context
- Specific
  - ⇨ All data are given in the table, with three possible choices of assessment.

Assessment components

- For measured risks:
  - ⇨ Quantitative
  - ⇨ Risk management quality
  - ⇨ Overall assessment
  - ⇨ Direction of risk change.
- For not measured risks:
  - ⇨ Overall assessment
  - ⇨ Direction of risk change.

Risk assessment

- Risk quantity:
  - ⇨ Low
  - ⇨ Moderate
  - ⇨ High.
- Risk management quality
  - ⇨ High
  - ⇨ Improvement request
  - ⇨ Low.
- Direction of risk change:
  - ⇨ Down
  - ⇨ Stable
  - ⇨ Up.

Overall risk matrix

		Risk quantity		
		Low	**Moderate**	**High**
Risk management quality	High	Low overall risk	Low overall risk	Moderate overall risk
	Improvement request	Low overall risk	Moderate overall risk	High overall risk
	Low	Moderate overall risk	High overall risk	High overall risk

Disadvantage of RAS

- Analysis of the banking system ONLY

Objective of FSR drafting and key problems

- Objective:
  - ⇨ Production of a high-quality Financial Stability Report for NBU – internal use within 6 months in joint cooperation between the Economic Analysis and Forecasting Department, the Statistics Department, the Balance of Payments Department and the Research Centre.
- Key problems:
  - ⇨ Untested cooperation: all three departments have their own financial stability products; departmental duties take priority; different access to data
  - ⇨ Analytical challenge: quality of data and statistics; limited experience in forward-looking.

Monitoring financial stability indicators

- In the second half of 2006, subdivisions of the economic block started to prepare analytical publications similar to those which are published by central banks in many countries of the world (FSR) – it was called monitoring financial stability indicators (MFSI)
- MFSI consisted of the following key elements:
  - ⇨ Macroeconomic factors
  - ⇨ Financial stability of basic market agents of the real sector
  - ⇨ Financial markets
  - ⇨ Housing market
  - ⇨ Financial stability of the banking sector.

Choice of structure: segregated or integrated?

- Segregated Structure:
  - ⇨ Step-by-step analysis of the economic sectors (external, households, corporate), the financial sector (banks: assets, liabilities, capital; non-banks; markets), and conclusion
  - ⇨ Advantages:
    - easier to draft, easier to delegate
    - completeness of analysis
- Integrated Structure
  - ⇨ Focuses on key risks
  - ⇨ Easier to describe the systemic risks of a complex financial system.
- Final choice: Using segregated structure, but emphasizing in each chapter the KEY RISKS emerging from the analysis, and adding a focused Executive Summary.

The structure of the FSR draft

- Introduction
- Executive summary
- Economic and Financial Developments
  - ⇨ External factors
  - ⇨ Internal macroeconomic factors
    - economic growth and inflation
    - public finances and fiscal policy
    - external economic balances and price competitiveness
    - sector indebtedness.
  - ⇨ Financial stability of basic market agents of the real sector
    - sector of non-financial enterprises
    - financial potential of the household sector
    - analysis of current situation of the housing market

- Financial stability of the banking sector
  - ⇨ Structure of the banking sector
  - ⇨ Credit activity of banks
    - ◗ structure and dynamics of banks' loan portfolio
    - ◗ credit risk assessment.
  - ⇨ Banking resources assessment
    - ◗ structure and dynamics of banks' liabilities
    - ◗ liquidity risk.
  - ⇨ Analysis of FX imbalances and risks
  - ⇨ Capital adequacy
  - ⇨ Profitability and efficiency
  - ⇨ Macro stress-testing (combined scenario).
- Non-bank financial institutions
- Annexes:
  - ⇨ Table of dynamics of financial stability indicators.

Further aspects

- Organisational aspects:
  - ⇨ Financial stability division creation (combination of financial stability issues and macroeconomic analysis)
  - ⇨ Optimal decision – creation of the Financial Stability Department (system stability analysis and system risk management).
- Methodological aspects:
  - ⇨ Transition from financial stability monitoring to preparation and regular official release of the Financial Stability Report
  - ⇨ Development of financial stability aggregated indicators
  - ⇨ Development and wide use of stress-testing methodology
  - ⇨ Research in the financial stability field.

ASSISTING MACROPRUDENTIAL ANALYSIS WITH FINANCIAL SOUNDNESS INDICATORS AT THE NATIONAL BANK OF ROMANIA

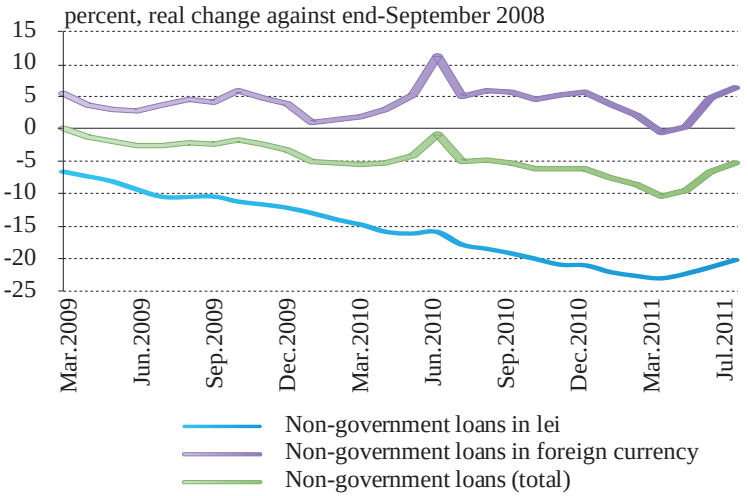
Florin Bălăuță*

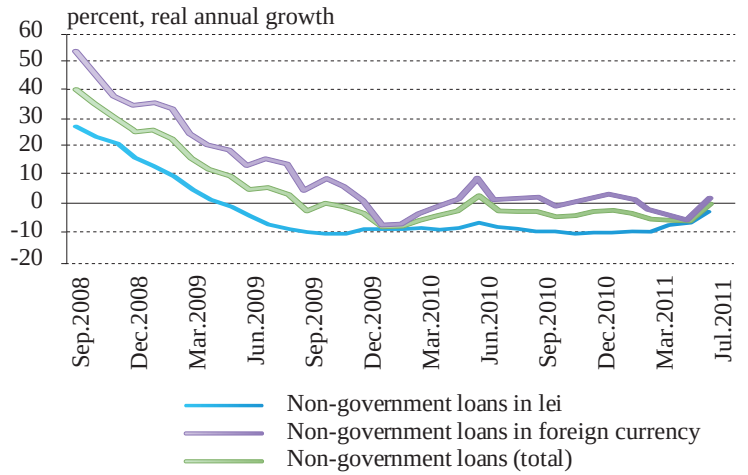
Financial soundness indicators and macroprudential analysis

- Systemic crises can arise from the exposure of a financial system to common risk factors
- Macroprudential instruments have been used to mitigate four broad categories of systemic risk:
  - ⇨ Risks generated by strong credit growth and credit-driven asset price inflation
  - ⇨ Risks arising from excessive leverage and the consequent deleveraging;
  - ⇨ Systemic liquidity risk and
  - ⇨ Risks related to large and volatile capital flows, including foreign currency lending (IMF, Macroprudential Policy: What Instruments and How to Use Them? Lessons From Country Experiences, 2011).
- The macroprudential components typically include: (i) Financial Soundness Indicators (FSIs), (ii) macroeconomic indicators, (iii) market-based data, (iv) qualitative information, and (v) structural information
- Financial Soundness Indicators (FSIs) have been developed to assist macroprudential analysis, assessing the vulnerability of the financial sector to shocks

* Financial Stability Department, National Bank of Romania

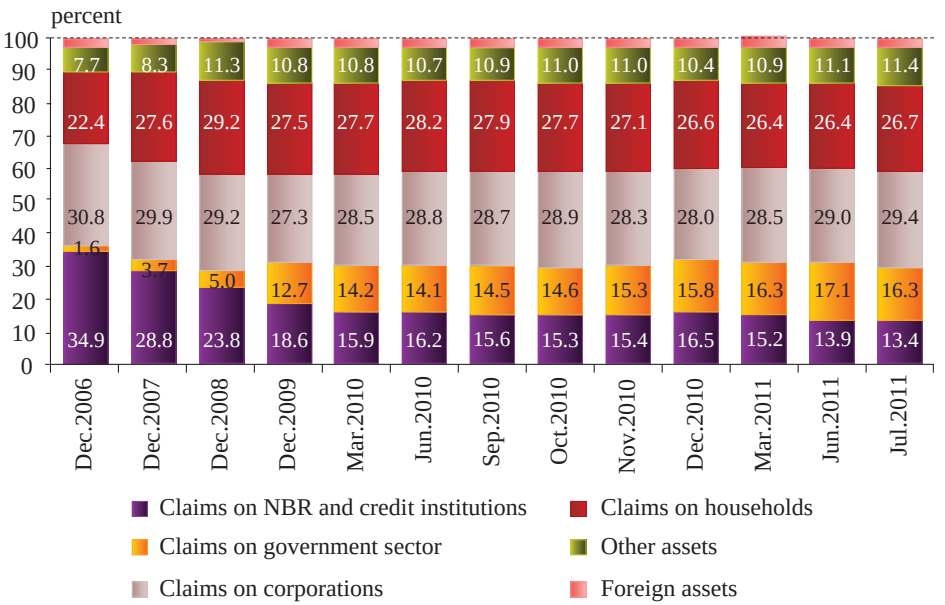
- Private sector lending decreased in the context of the global crisis and increased risk aversion.





Source: NBR

- Against the backdrop of weak demand for loans from the private sector and substantial government borrowing requirements, banks increased their exposure to the government sector.



- Net assets decreased in real terms mainly due to the contraction in the lending activity
- Loans granted to households decreased more than loans to non-financial corporations
- The amounts held with the central banks decreased due to the contraction in the financing base of banks and the reduction of the MRR

Source: NBR

- The large indebtedness level and forex exposure, as well as the decrease in the profitability and capacity of corporate earnings to cover interest and principal expenses, indicated that the major vulnerabilities that companies posed to financial stability persisted.

percent

Non-financial corporations	2007	2008	2009	2010 Q1	2010 Q2	2010 Q3	2010 Q4	2011 Q1	2011 Q2
Total debt to equity	172.6	197.3	195.6		214.8		206.1		
Return on equity	21	10.4	5.0		2.2		6.2		
Earnings to interest and principal expenses	121	71.4	29.7		19.0		36.6		
Net foreign exchange exposure to equity	29	35	38		46.8		40.6		

percent

Asset quality	2007	2008	2009	2010 Q1	2010 Q2	2010 Q3	2010 Q4	2011 Q1	2011 Q2
Non-performing loans net of provisions to capital	5.3	10.7	11.3	12.6	14.5	16.3	15.7	15.7	16.5
Non-performing loans to total gross loans	2.6	2.7	7.9	9.1	10.2	11.7	11.9	12.7	13.3

Note: FSIs compiled using individual data. Data from non-financial corporations are available semiannually.
Source: NBR

- The large indebtedness level, a major vulnerability of the household sector, entered a slightly decreasing trend, but remained at a level requiring close monitoring.

percent

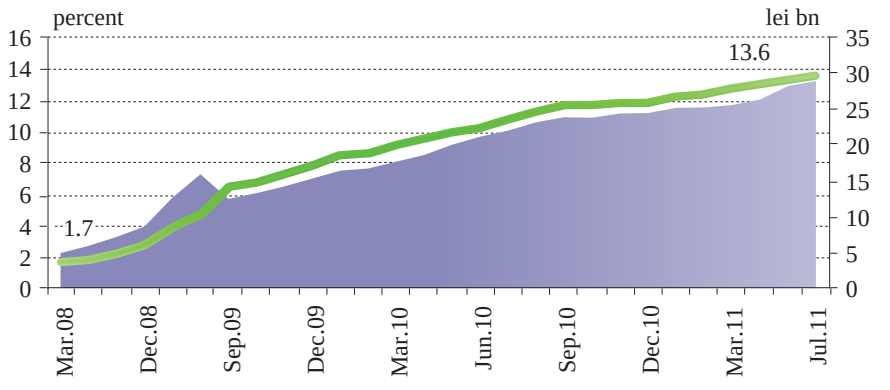
Households	2007	2008	2009	2010 Q1	2010 Q2	2010 Q3	2010 Q4	2011 Q1	2011 Q2
Household debt to GDP				19.8	20.8	20.2	19.9	18.7	19.1
Household debt service and principal payments to income				22.5	22.2	22.0	21.8	21.5	20.9

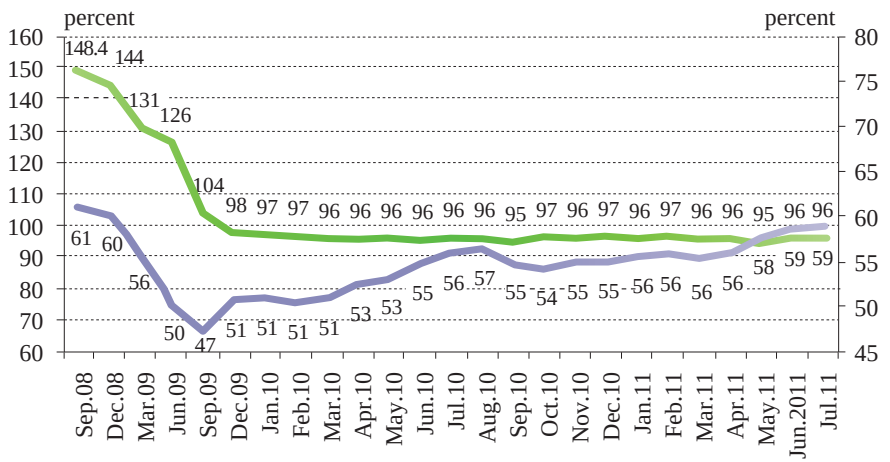
percent

Asset quality	2007	2008	2009	2010 Q1	2010 Q2	2010 Q3	2010 Q4	2011 Q1	2011 Q2
Non-performing loans net of provisions to capital	5.3	10.7	11.3	12.6	14.5	16.3	15.7	15.7	16.5
Non-performing loans to total gross loans	2.6	2.7	7.9	9.1	10.2	11.7	11.9	12.7	13.3

Source: NBR

- During 2011, the loan portfolio continued to deteriorate, but at a slower pace. At end-June 2011, the degree of coverage of non-performing loans remained at 96 percent, as in 2010.





Source: NBR

- Despite the deterioration of the loan portfolio, the solvency ratios remained at a comfortable level, due to consistent recapitalizations performed by the banks' shareholders.

percent

Asset quality	2007	2008	2009	2010 Q1	2010 Q2	2010 Q3	2010 Q4	2011 Q1	2011 Q2
Non-performing loans net of provisions to capital	5.3	10.7	11.3	12.6	14.5	16.3	15.7	15.7	16.5
Non-performing loans to total gross loans	2.6	2.7	7.9	9.1	10.2	11.7	11.9	12.7	13.3

percent

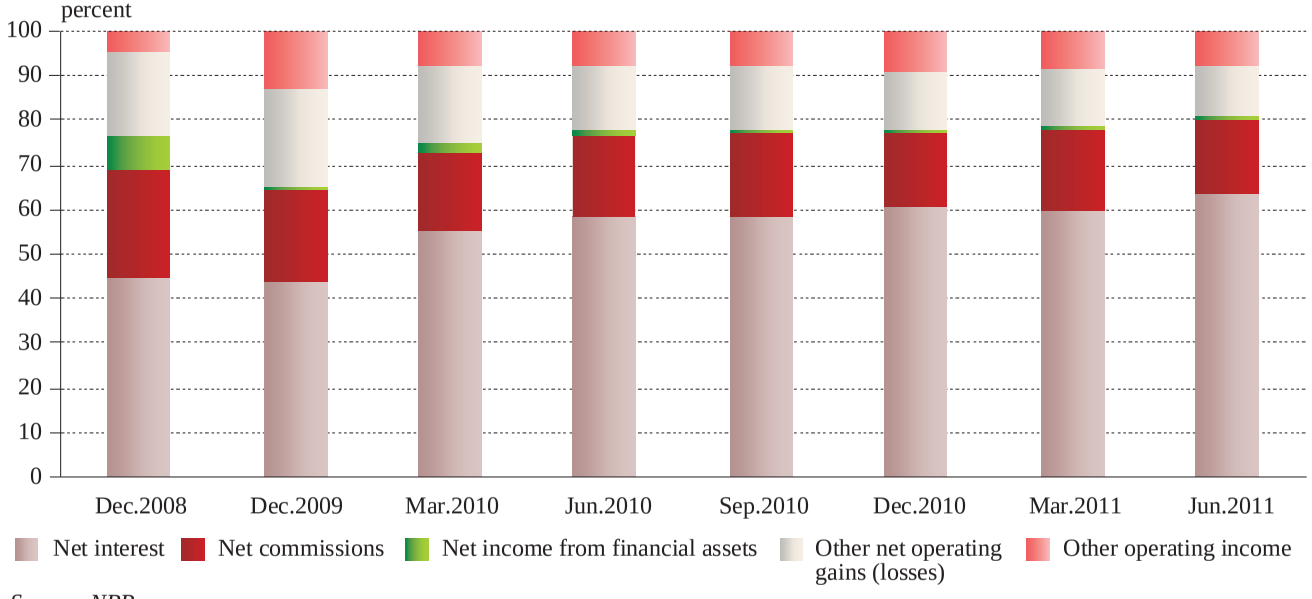
Capital adequacy	2007	2008	2009	2010 Q1	2010 Q2	2010 Q3	2010 Q4	2011 Q1	2011 Q2
Regulatory capital to risk-weighted assets	13.8	13.8	14.7	15.0	14.3	14.6	15.0	14.9	14.2
Regulatory Tier 1 capital to risk-weighted assets	10.6	11.8	13.4	14.2	13.4	13.8	14.2	14.5	13.6
Capital to assets	10.7	9.0	8.6	9.5	9.1	9.2	8.9	9.4	9.0

Source: NBR

- Net interest income and operational revenues showed negative growth, net interest income increasing its share in operational revenues.

percent

Earnings and profitability	2007	2008	2009	2010 Q1	2010 Q2	2010 Q3	2010 Q4	2011 Q1	2011 Q2
Interest margin to gross income	45.2	44.8	44.1	55.7	58.2	58.7	60.6	59.8	63.7

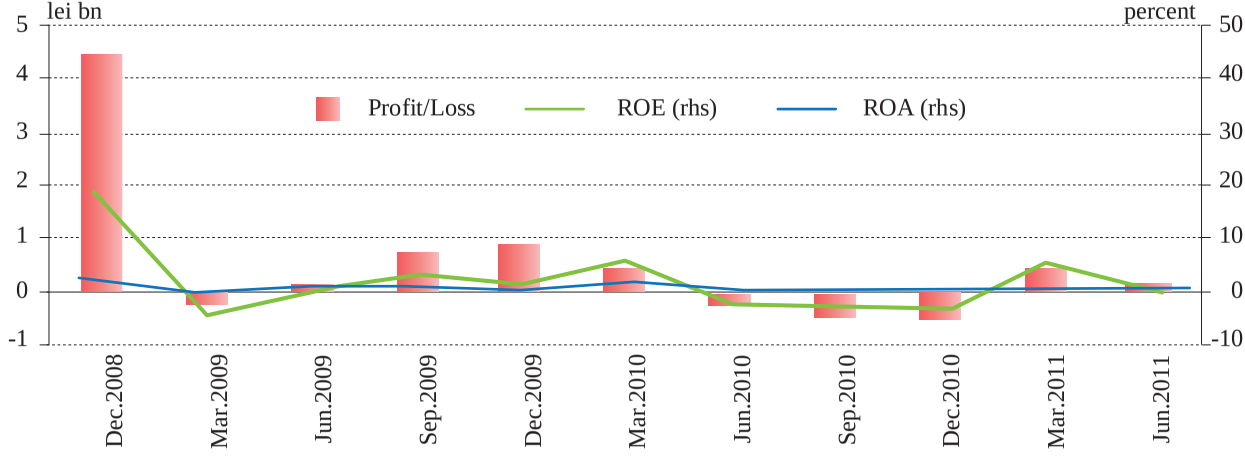


Source: NBR

- The increased provisions, the ongoing financial disintermediation and the lower appetite for risk impacted the financial results of banks.

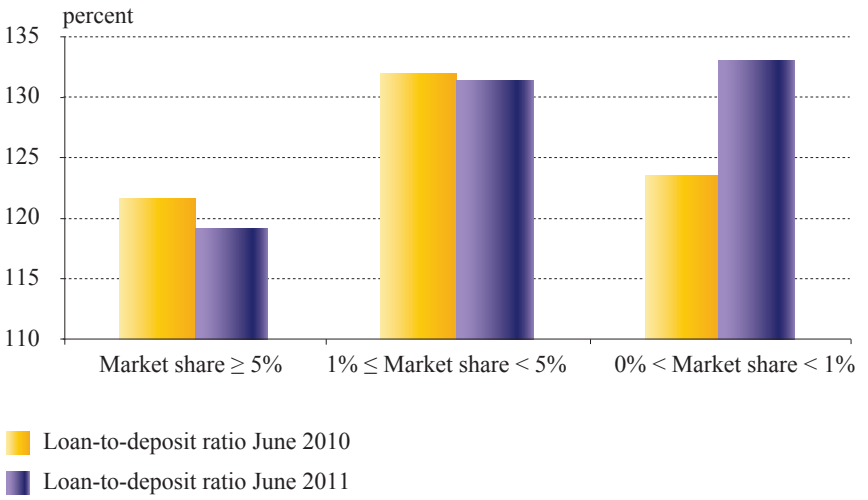
percent

Earnings and Profitability	2007	2008	2009	2010 Q1	2010 Q2	2010 Q3	2010 Q4	2011 Q1	2011 Q2
Return on assets	1.2	1.6	0.2	0.5	-0.1	-0.2	-0.2	0.5	0.1
Return on equity	10.5	17.0	2.9	6.0	-1.6	-2.1	-1.7	5.0	0.6
Interest margin to gross income	45.2	44.8	44.1	55.7	58.2	58.7	60.6	59.8	63.7
Non-interest expenses to gross income	65.8	55.7	63.9	56.5	59.2	58.6	64.9	65.6	67.5

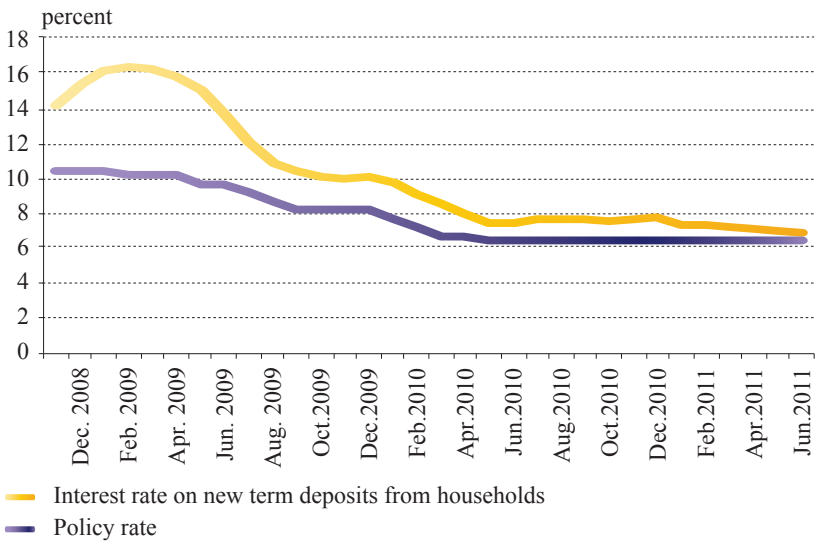


Source: NBR

- The disequilibrium between non-government loans and deposits became smaller, in the context of a larger reduction of loan growth as compared to the dynamics of deposits, pointing to an ongoing financial disintermediation.



Source: NBR

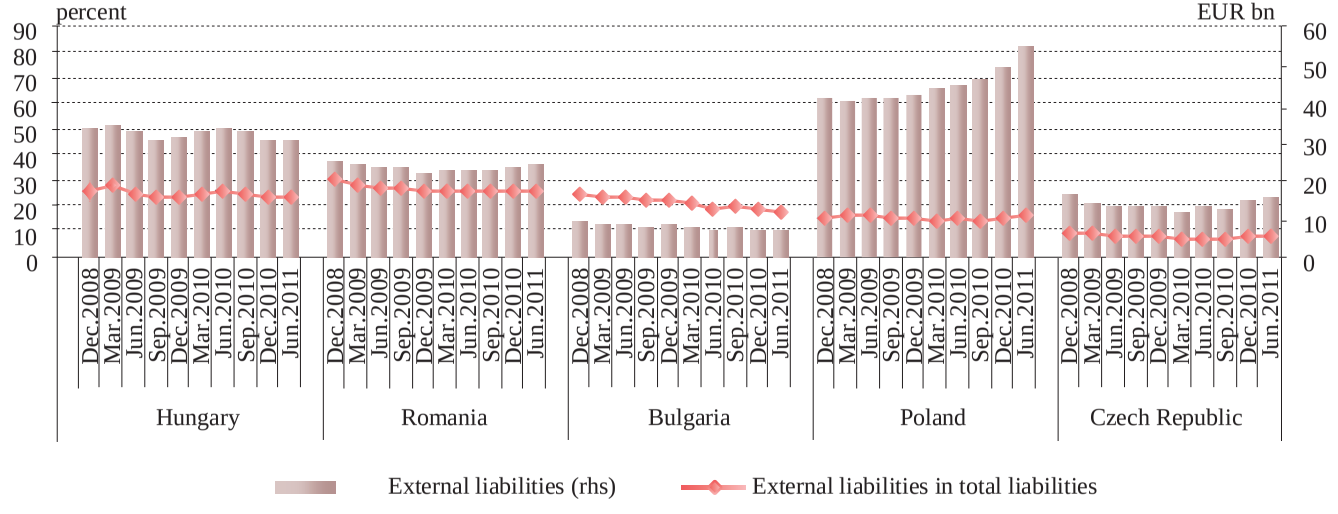


Source: NBR

- The external financing remained above the regional average, but this vulnerability is mitigated by the medium- and long-term tenure of the funds supplied by mother banks to their Romanian subsidiaries.

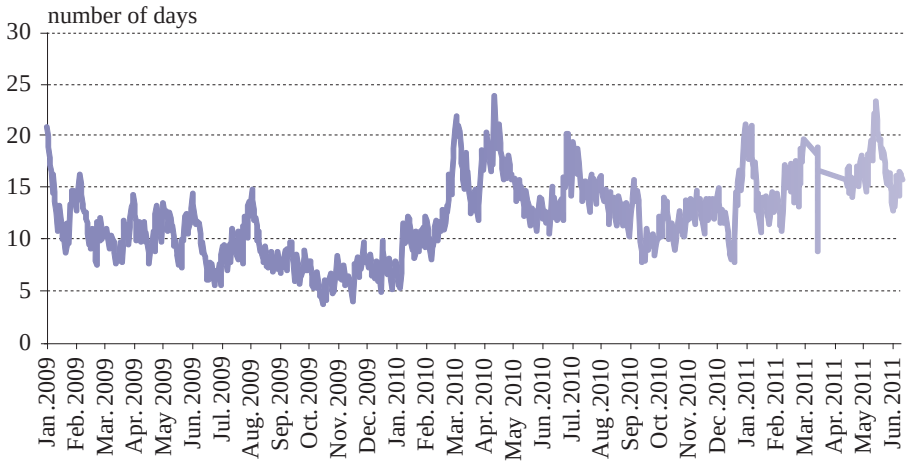
percent

Liquidity	2007	2008	2009	2010 Q1	2010 Q2	2010 Q3	2010 Q4	2011 Q1	2011 Q2
Liquid assets to total assets	48.5	47.1	57.5	58.7	59.2	59.3	60.0	58.8	58.7
Liquid assets to short-term liabilities	170.6	230.5	132.0	150.0	146.7	148.7	142.2	151.8	143.5



Source: central banks

- The average maturity of funds from the Romanian interbank market was increasing.



Source: NBR

How vulnerable is the Romanian banking system to shocks as seen through the performance of FSIs?

- Credit risk remains our banking sector's major vulnerability; during 2011, the loan portfolio continued to deteriorate, but at a slower pace. At end-June 2011, the degree of coverage of non-performing loans remained at 96 percent, as in 2010
- Despite the deterioration of the loan portfolio, the solvency ratios remained at a comfortable level, due to consistent recapitalizations performed by the banks' shareholders
- The increased provisions impacted the financial results of banks. At end-June 2011, the banking system entered positive territory, the operational profit, even if smaller year on year, covering diminishing provision expenses

- The disequilibrium between non-government loans and deposits became smaller, in the context of a larger reduction of loan growth as compared to the dynamics of deposits, pointing to an ongoing financial disintermediation
- The external financing remained above the regional average, but this vulnerability is mitigated by the medium- and long-term tenure of the funds supplied by mother banks to their Romanian subsidiaries.

What role for the FSIs in the macroprudential analysis?

- Rojas-Suarez (2001) provides evidence that the traditional CAMELS system has limitations in predicting bank failure and needs to be complemented by other indicators
- However, "while different indicators have performed differently during the financial crisis in terms of providing warning signals across countries, they nonetheless have proved to be helpful complements of the financial stability analysis toolkit available to countries" (IMF, Issues Paper prepared for the Reference Group Meeting of Experts, 2011).

THE NBR'S MACROPRUDENTIAL TOOLKIT

Horațiu Lovin*

Macroprudential toolkit objectives

- To mitigate or dampen financial system procyclicality
  - ⇨ During economic expansions, the financial system tends to become highly exposed to aggregate risk; therefore, sufficient buffers must be built in good times
- To limit systemic or system-wide financial risk
  - ⇨ To address exposures, risk concentrations and interdependencies that are a source of contagion and spillover risks that may jeopardize the functioning of the financial system as a whole.

Pre-crisis toolkit

- Caps on LTV (loan-to-value ratios)
  - ⇨ 2003 – 2007: introduction of a 75 percent ceiling to slow down the credit growth rate
  - ⇨ 2007 – present: creditors are allowed to establish the LTV in their internal regulations (subject to NBR validation)
- Caps on DTI (debt-to-income ratios)
  - ⇨ 2004 – 2005: introduction of an indebtedness ceiling for individuals of 30 percent (for consumer credit) and 35 percent (for mortgage loans) of net monthly income of the borrowers and his/her family
  - ⇨ 2005 – 2007: slightly amended regulation by setting the overall debt service ceiling to maximum 40 percent of net monthly income of the borrower and 35 percent for real estate and mortgage loans

* Financial Stability Department, National Bank of Romania

- Caps on DTI (debt-to-income ratios)
  - ⇨ 2007 – 2008: moving to a risk-based approach (creditors were allowed to establish their own maximum level of indebtedness for each client's category, subject to prior approval of the supervisory authority); previous DTI caps must be applied before approval
  - ⇨ 2008 – present: regulation amended by considering exchange rate risk and interest rate risk in establishing the appropriate maximum DTI level
- Caps on net open currency positions in order to limit exchange rate risk (1992 – present); currently, the figures are 10 percent of the bank's own funds for maximum individual adjusted foreign exchange position and 20 percent of the bank's own funds for the total foreign exchange position
- Caps on foreign currency lending:
  - ⇨ 2005 – 2006: aggregate exposure from FX loans to unhedged borrowers limited to 300 percent of the credit institution's own funds
  - ⇨ 2007 – present: credit institutions to implement internal lending norms that assess indebtedness ceiling (subject to prior approval of the supervisory authority)
- Establish a minimum level of 1 for the liquidity indicator (as a ratio between liquid assets and liabilities); the ratio applies to both aggregate and individual maturity buckets, therefore the regulation limits also the asset-liability maturity mismatch (2001 – present).

Crisis toolkit (*Vienna Initiative* 2009)

- A valuable support to maintain financial stability and confidence in the market during the recent financial turmoil was the commitment under the European Bank Coordination Initiative (*Vienna Initiative*, supported by the European Commission, the IMF and the EBRD - Romania was the pilot country) of the parent banks that own the nine largest foreign subsidiaries in Romania (with a market share of 70 percent of total bank assets):
  - ⇨ To appropriately capitalize subsidiaries
  - ⇨ To maintain their broad group-level exposure to the country for the tenor of the program with the IMF and the EU. During 2009 and 2010, the global exposure of these banks in Romania was maintained almost at the same level of March 2009, representing the reference level
  - ⇨ Moreover, the IMF Stand-By Arrangement stipulated for the NBR to adopt restrictions on bank profit distribution on a case-by-case basis (Law No. 270/2009).

Further toolkit extension: Basel III standards

- Basel III standards will increase resilience of individual financial institutions and will reduce spillovers from failures
- Basel III standards will enhance financial system stability, extending macroprudential toolkit available for central banks:
  - ⇨ Raising the quality of the capital base by increasing the regulatory equity requirement (common stock and retained earnings) and the required ratio of Tier 1 equity (own capital and hybrid instruments), as well as by introducing stricter eligibility criteria for the instruments that may be taken into consideration upon determining Tier 1 equity
  - ⇨ Introducing countercyclical capital buffer (the buffer is designed to be accumulated during periods when systemic risks build up and to be used when risks materialise)
  - ⇨ Supplementing the risk-based capital requirement with a leverage ratio

- Enhancing risk coverage, with a focus on the risks highlighted by the crisis, such as trading book exposures, counterparty credit risk (CCR), securitisation exposures and securitisation positions
- Introducing global liquidity standards aiming to ensure short-term (30 days) resilience to shocks/liquidity disruptions and to address longer-term (1 year) structural liquidity mismatches.

Conclusions

- The impact assessment of the NBR's macroprudential toolkit:
  - ⇨ Limited efficiency in the pre-crisis period; motivation: liberalized capital account, possibility of regulatory arbitrage within the EU, accelerated convergence to European financial system, basis effect (low financial intermediation at the onset of credit growth)
  - ⇨ High efficiency in crisis period when it preserved financial system stability
- The NBR's macroprudential toolkit is expected to be extended as Basel III standards will become effective in the EU.

CLOSING REMARKS

Joseph Crowley*

Thank you everyone for coming here.

I think it has been a very useful event. We have had a lot of very good presentations. I think the topic was a very good one. It is a topic that is evolving and I think it is very useful to have everyone come here and share their experiences, discuss what they are doing and what has worked for them. Everyone should keep in mind that the things we have said here we may not be saying next year if we talk about macroprudential measures, so please keep following the research and what people's findings are. It has been a very enjoyable event.

We are very grateful for the hospitality of the NBR. We must acknowledge that they have done most of the work for the logistics of arranging this event and it is very much appreciated by us and hopefully by everyone.

And it's not over yet, we still have food and tourism. And tonight we are going to see the George Enescu House. It is not quite as big as Peleş Castle, but it is still very nice.

And we have a couple of events tomorrow on our way to Bucharest and thank you all for coming. It is a difficult time to come and I hope you all enjoyed it.

* Senior economist, International Monetary Fund

CLOSING REMARKS

Cristian Popa*

Let me echo Joe's comments and thank you all for being here, it was very good having the seminar again. We actually are at a point where we have a mini-anniversary, it's been the fifth instalment of this exercise. So already there is a bit of a tradition built in and I hope we can continue with it for the next few years at least.

That being said I don't presume to be able to draw conclusions on the intellectual side, but we are guaranteed fifteen minutes of fame and I don't feel I've used mine up yet. So let me point not two things that we've managed to solve, but two things we should reflect on for the future.

From the first day I think there was a discussion about the institutional framework that continued throughout. And it seems to me that we don't know exactly where to place this new "baby". But it looks very much like the good parent would be the central bank in many cases, because of a certain reputation being built up, because of independence being less of a concern, because of the heavy bank-centric continental models that we have in many of the countries represented around this room which guarantee some kind of prominence. Even if you have separate supervisors, the central bank can still exert a gentle moral suasion in a kind of leading role. So that is one thing.

The second thing we haven't solved is how this sits with monetary policy. I have a great hope that the challenge will be to integrate them, but that they actually point in the same direction for most of the time. That's not a guarantee though. So we have to look at this in much more detail and with greater care.

The third is in terms of instruments. We have heard today, for example, from Joe, Heiko, Ferhan and Christian to different degrees and in different ways that the toolkit should be diverse, it should be flexible, you shouldn't have hang-ups about any of the instruments, and you should basically try to react to events as they unfold, and not adhere to anything rigid in terms of prescriptions. But more than that I think it would be presumptuous to say. Essentially it is about knitting together a vast variety of instruments and about, as we found out during the pre-crisis

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times, staying one step ahead of the market, while not being inconsistent with your previous effort. Now that sounds very nice as you say it, but it is much more difficult to do in practice because innovation is not something that comes easily when you are trying to be consistent to avoid claims that you're trying to distort the market and to avoid any kind of restrictions on capital flows as a problem.

That would be pretty much it from me. I think that this is more or less for all of us a good learning exercise and there is a lot more we don't know than we do know. So with that note of humility that I hope I have struck, let me again thank all of you for your presence and for your contributions, and thank the IMF for their substantial contribution to this ongoing event and for the technical assistance they have been so kind and proficient in giving us on stress testing and especially on liquidity stress testing more recently. And let me welcome you to the events tonight, we are leaving at 17.30 for the Enescu House. I hope that you will enjoy the violin recital!