THE EFFECTS OF MACROPRUDENTIAL POLICY MEASURES ON REAL ECONOMY'S DYNAMICS – SIMULATIONS USING A MACRO-FINANCIAL MODEL FOR ALBANIA

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DISSERTATION

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Prof. Bruno S. Sergi

DECLARATION

I declare that this thesis represents my original job and all sentences or passages quoted from other people's work have been specifically acknowledged by clear cross-referencing to author and work. I understand that failure to do this, amounts to plagiarism and will be considered grounds for failure in this thesis and the degree examination as a whole.

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ABSTRACT

This dissertation sought to analyze and deepen one's knowledge on the theoretical and the empirical aspects of macroprudential policy regime, to highlight its unique role as a necessary element to enhance the resilience of a financial system against risks and to ensure a more stable financial intermediation.

With reference to the Albanian financial system of the past two decades, this dissertation supports the establishment of a Macroprudential policy framework in Albania. A policy that would be best fitted for a small and open economy with a simple financial system dominated by banks, where the phenomenon of procyclical behaviour should be considered as primary, but structural behavior should be taken into account as well.

Given the significant interaction between the financial sector and the macroeconomic sector, this study emphasized the high economic costs of financial crises and sought to explore to which extend macroprudential policy measures impact real economy's developments in Albania, through the Gross Domestic Product's reaction. In light of Albania's financial system composition, the level of market development and the quality of data, this dissertation finds appropriate to adopt a Macro Financial Model in order to estimate the effects of countercyclical macroprudential measures taken by the Bank of Albania on March 2013. That is, (i) the reduction of capital requirements in case of an annual growth of bank credit stock between 4 and 10 percent; (ii) the general reduction by 5 per cent of regulatory liquidity indicator as per the banks' risk profile; (iii) establishing the provision to the extent of 10 per cent for credit restructured in the phase when they are categorized as regular loans, and (iv) the effects of the combination of three above measures together on the main financial indicators and on real GDP in Albania, along a period of eight quarters.

Our analyses support that all measures implemented individually improve the main financial variables and affect positively Albania's GDP growth, although the impact of the simultaneous implementation of these three measures is higher. The implementation of macroprudential policy measures can help contribute to a stable financial intermediation by raising the resilience of the financial system against risks.

***Keywords**: macroprudential policy, systemic risk, financial stability, economy dynamics.*

***JEL** classification: C81, E5, G38*

ABSTRAKT

Ky studim kërkon të analizojë dhe të thellojë njohuritë mbi aspektin teorik dhe empirik të regjimit të politikave makroprudenciale, të nxjerrë në pah rolin e saj unik si një element i nevojshëm për të rritur rezistencën e sistemit financiar ndaj reziqeve dhe të sigurojë ndërmjetësim finaciar të qëndrueshëm.

Referuar zhvillimeve të sistemit financiar shqiptar të dy dekadave të fundit, ky studim mbështet nevojën e hartimit të kuadrit të Politikës Makroprudenciale në Shqipëri, politikë e cila duhet ti përshtatet një vendi me ekonomi të vogël dhe të hapur, me një sistem financiar të dominuar nga bankat, ku fenomeni prociklik duhet të konsiderohet prioritet, por sjellja strukturore duhet të trajtohet gjithashtu me kujdes .

Për shkak të ndërveprimit të rëndësishëm midis sektorit financiar dhe atij makroekonomik, studimi thekson rëndësinë e kostove të larta ekonomike të krizave financiare dhe kërkon të eksplorojë në c'masë masat makroprudenciale ndikojnë dinamikat e ekonomisë reale në Shqipëri, nëpërmjet reagimit të Produktit të Brendshëm Bruto. Mbështetur në strukturën e sistemit financiar shqiptar, nivelin e zhvillimit të tregjeve dhe cilësinë e të dhënave, ky studim përdor një Model Makro Financiar për Shqipërinë për të vlerësuar efektin e masave kundërciklike marrë nga Banka e Shqiërisë në Mars 2013. Këto janë (i) reduktimi i kërkesave për kapital në rast të rritjes vjetore të kredisë 4-10% nga bankat; (ii) reduktimi përgjithshëm prej 5% i kërkesës rregullatore të treguesit të likujditetit sipas profilit të rrezikut të bankave; (iii) provigjonim në masën 10% për kreditë e ristrukturuara në fazën kur ato konsiderohen si kredi të rregullta, dhe (iv) ndikimi i kombinimit të tri masave të mësipërme së bashku mbi treguesit kryesorë financiarë dhe mbi PBB në Shqipëri , gjatë një periudhe prej tetë tremujorësh.

Rezultatet e analizave tona tregojnë që masat makroprudenciale kundërciklike të implementuara individualisht përmirësojnë treguesit kryesorë financiarë, por impakti kur ato implementohen së bashku është më i lartë. Implementimi i masave makroprudenciale ndihmon në qëndrueshmërinë e ndërmjetësimit financiar, përmes rritjes së rrezistencës së sistemit financiar ndaj rreziqeve

***Fjalët kyc** : Politikat makroprudenciale, rreziku sistemik , stabilitet financiar, ekonomia reale*

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ABBREVIATIONS

BoA	Bank of Albania
MoF	Ministry of Finance
INSTAT	Albanian Institute of Statistics
EBA	European Banking Authority
WB	World Bank
IMF	International Monetary Fund
NPL	Non Performing Loans
LTV	Loan to value
DTI	Debt to income
GDP	Gross Domestic Product
NEER	Nominal Effected Exchange Rate
REER	Real Effected Exchange Rate
MPP	Macroprudential Policy
FSA	Financial Stability Authority
DIA	Deposit Insurance Authority
FSAG	Financial Stability Advisory Group
MoU	Memorandum of Understanding
CR	Credit Registry
MFM	Macro Financial Model

MEAM	Macro econometric Albanian Model
CAR	Capital Adequacy Ratio
RWA	Risky Weighted Assets
INSTAT	Albanian Institute of Statistics
NEER	Nominal Effective Exchange Rate
REER	Real Effective Exchange Rate
ALL	Albanian currency Lek
MPP	Macroprudential Policy
MoU	Memorandum of Understanding
FSAG	Financial Stability Advisory Group
CRO	Chief Risk Operations
CCB	Contingent Convertible bonds
DSGE	Dynamic Stochastic General Equilibrium Model
CDS	Credit Default Swaps
SEECBs	South East European Central Banks

" ...Over periods of prolonged prosperity, the economy transits from financial relations that make for a stable system to financial relations that make for unstable system."

Minsky

CHAPTER I

INTRODUCTION

When the last global financial crisis started, the "macroprudential policy" issue grew rapidly and attracted the attention of all academics, international standard settings institutions, central banks and supervisory agencies. Before the crisis, this issue attracted rather limited interest of the academic community; it was discussed mainly within the central banking community under the leadership of the Bank of International Settlements. Various topics relating to macroprudential considerations have lately become the center of attention of all researchers. In this process, the multiple dimensions of macroprudential policy have passed through a lot of controversial stances, but lately consensus has been reached on many aspects of such a policy. The most important consensus is that a powerful macroprudential supervisory oversight regime is necessary. All share an understanding that the existing microprudential approach focuses on ensuring the soundness of individual financial institutions (Bernanke 2010), but does not necessarily lead to a stabilization of financial system; is not able to prevent financial crisis and mitigate the effects and costs of severe financial shocks.

Consequently, more attention is now being paid to macroprudential policy as a means of stabilizing the financial system. The objective of macroprudence is to minimize systemic risks - financial risks that cause serious negative consequences not only for the financial system, but even for the broader economy, stabilize the financial system, and ensure sustainable growth in the real economy. Experience from the last global crisis shows that an internal shock can deepen through the procyclical behavior of institutions and individuals and spread to the real economy and across borders. So, the debate has been focused on identifying systemic risk and developing an appropriate response known as "macroprudential policy" - *a framework of high-end and intermediate objectives and of*

relevant tools (mainly with prudential nature) to address the risks that threaten the stability of the entire financial system. It is understood as the ability to adopt prudential measures for addressing systemic risk.

Fundamental concerns of macroprudential policy are to prevent systemic risk from forming and spreading in the financial system and, in case prevention fails, to mitigate the impacts. These two tasks reflect the two phases of the evolution of systemic risk – first it builds up (accumulates), and then it materializes, sometime abruptly. When conditions are being created for future financial stability, the primary objective must be to act preventively against growth in systemic risk in its accumulation phase. It may be rather difficult to distinguish normal cycle fluctuations and long-term trends from a dangerous financial cycle. Nevertheless, as to the build-up of systemic risk, one can be rather sure that if credit and some asset prices are going up quickly and moving away from historical norms, and both quantitative and qualitative evidence indicates excessive optimism and mispricing of risk, there is need to send out a clear warning and recommend that decision-making bodies take actions. If prevention is not sufficiently effective and a systemic risk materialization phase occurs, the macroprudential policy focus must be shifted to mitigating its impact. It will be crucial to assess the financial system's ability to withstand a particular level of tension. Stress tests of the financial system's resilience are a suitable analytical instrument for performing this task. Forward looking indicators should then ultimately be used again to detect when systemic risk has fallen below critical level and tell us when we can discontinue the anti-crisis measures and support policies.

Given the significant correlation among the financial system and the real economy, whereby the destabilization of the financial system leads to the stagnation of the real

economy and, in turn, to further destabilization of the financial system (Mishkin 2008); and given the important role of macroprudential policy to prevent further financial crisis and/or to reduce the impacts of a crisis, meaning at the same time to prevent and/or reduce the large costs on the public budget; this dissertation sought to focus on and explore this issue , by raising *the Hypothesis* :

The implementation of macroprudential measures that may have countercyclical nature affects positively the sustainability of the main financial indicators and supports economic growth in Albania.

Conventional macro stress testing fails to fully capture the interaction between the financial system and the real economy, assessing only the impact of a slowdown in the real economy on the financial system without taking into account the negative feedback loop. This research emphasizes the importance of the feedback effects and in order to evaluate the impact of financial regulations, such as macroprudential measures in Albania, it uses a macrofinancial model that incorporates the interrelation between the financial sector and the macroeconomic sector.

To help explore the main hypothesis , this study raises the following *three questions:*

1. *What is meant by "macroprudential policy" and why macroprudential policy is a necessary tool for any financial supervisory regime seeking to minimize systemic risk?* It explores the principal sources of systemic risk in financial system and discusses the unique role that macroprudential policy can play in reducing such risk.

2. *How should the concept of Macroprudential Policy and the framework for its conduct be developed in Albania?* Solutions are sought for a small and bank-based financial sector that is controlled by foreign banks, usually from EU countries. Like macroprudential institutions in other countries, the Bank of Albania (BoA) will face complex situations, since it has to comply not only with national conditions but also with international and EU rules.

3. *Which instrument is the best to measure the impact of macroprudential policy measures in main financial and economic variables?*

1.1 What is the purpose of the dissertation?

The purpose of this study is to analyze and deepen knowledge on theoretical and methodological aspects of macroprudential policy framework as a necessary policy in order to ensure financial stability and stable economic growth. Given the newness of this domain, we wanted to highlight the need for implementation at a national level of a framework for efficient and effective macroprudential regime. Secondly, we wanted to explore the appropriate macroprudential regime for Albania, considering the Albanian economic and financial context and its historic trends. The theoretical and methodological aspects are complemented by empirical research, which highlights the ultimate goal of this research by assessing the impact of macroprudential policy measures on real economy dynamics in Albania. We hope that the conclusions drawn by this research may contribute to the development of macroprudential discussion in Albania and help in formulating a successful strategy of macroprudence by policy-making.

1.2 What are the specific objectives of the dissertation?

1. To clarify the meaning of macroprudential policy regime and support the unique role of macroprudential policy for financial system stability;
2. To find solution for a reasonable Macroprudence Policy framework that best fit the Albanian economy, with a relatively small and simple bank-based financial sector that is controlled by foreign banks, mostly from EU countries.
3. To use an instrument that incorporates the strong correlation between the financial and macroeconomic sectors and enables quantitative analysis of the impact of financial regulation on economic costs.

1.3 What motivated the topic ?

This topic has been chosen for the research, because currently the macroprudential policy issue continues to be one of the hottest debates among researchers in the international financial domain. The missing role of macroprudential policy during the 2007-2008 global financial crisis, that focused on the financial system as a whole, made apparent the build-up of financial imbalances and unsustainable trends within and across the financial system; the contagion of risk through the financial system and strong feedback effects between the financial sector and the real economy. While a strong macroprudential policy regime might not have avoided the global financial crisis, the crisis would likely have been less costly if macroprudential tools had been used to increase the resilience of the financial system to internal shocks and to moderate pre-crisis exuberance in supplying credit to the financial system and real economy. Macroprudential policy is uniquely well positioned to mitigate sources of internal risks among highly interconnected financial institutions and to combat the procyclical behavior of the financial system, it is a necessary

element of any supervisory framework seeking to moderate systemic risk. It is all the above arguments that triggered and motivated the development of this dissertation.

1.4 Research methodology

The theoretical and scientific support of the research was found in literature published by researchers, foreigners and Albanian, in the banking and finance area, more specific in the professional works published by researchers of big organisms and financial institutions involved in monitoring systemic risks and in ensuring the financial stability, among which : works published by the IMF, the World Bank, the Bank for International Settlements and the committees which operate within the Basel Committee on Banking Supervision, works published by central banks and financial, banking supervisory authorities in the world, including those published by the European Central Bank. Also, in the aim of research, in the first three chapters, we used main research methods such as the analysis and synthesis methods, induction, deduction, analogy, after which in the fourth chapter in order to build the empirical study, were added as research methods the factorial and simulations analysis methods, statistical and mathematical ones. In order to achieve the econometric study, we used the micro data base for corporate credit stock in the Albanian economy, banking data for all the other variables and macroeconomic data compiled from three sources: second level banks' balance sheets, Bank of Albania and the Institute of Statistics in Albania. The empirical analysis was done by using the panel regression technique with fixed effects using the method of OLS - the least squares.

1.5 How is the dissertation structured ?

The dissertation is structured in five chapters in following way: in Chapter II a

survey of the literature pertaining to macroprudential policy definition, scope, objectives and enforceability is performed. It also examines the importance of constructing a sophisticated operational framework as a condition for efficient and effective implementation of macroprudential policy. The final section of this chapter explores in greater depth the available macro financial models that policy makers may use to identify linkages and analyze feedback loop between financial and economic stability in a country. This chapter evidences the progress, analyzes the gaps and identifies the challenges of macroprudence for the future . Chapter III focuses on the Albanian macroprudential policy approach. It starts with a description of the Albanian financial structures and their nature, as well as the legal and regulatory environment in which they operate - as prerequisites for an effective macroprudential policy regime. It also examines instruments used so far to identify, monitor and assess systemic risk, as well as methodologies used to evaluate financial stability. Lastly, this chapter provides three policy implications to be considered for the future of the Albanian macroprudential policy regime. Chapter IV uses a macro financial model for Albania – a medium size structured model- to assess and quantify the effects of macroprudential policy measures taken from the BoA on real economy dynamics in Albania. The subsequent section shows the findings and discusses the results. Chapter V provides the conclusions of the dissertation, the recommendations for future research and is followed by a list of references and annexes.

CHAPTER II

A LITERATURE REVIEW

This literature review lays out current thinking in macro prudential policy. The first section addresses the scope, objectives, and enforceability of macroprudential policy per se. The subsequent section compares macroprudential policy to other types of financial and economic policy within the purview of a national government or a central bank. In turn, the third section discusses how to measure systemic risk, how to design an effective macroprudential policy tool, and how to resolve both regulatory and information-based gaps in an effective enforcement framework (Brockmeijer et al., 2013). The final section then explores the topic in greater depth by concentrating on the available macrofinancial models through which policy makers may identify the linkages between financial and economic stability in a country.

2.1 Macroprudential Policy

The term "macroprudential policy" is recognized as regulating for preventing or treating the systemic risk. (Galati and Mossier 2011), referring to the work of (Clement 2010), point out that the term "macroprudential" can be traced back as early as late 1970s. At that time, concerns were rising about rapid growth of international lending toward developing countries. According to (Borio 2009), at the time it denoted a systemic orientation of financial supervision and regulation, mostly linked to macroeconomic developments. Public references to macroprudential policy are found in mid-1980s. (Clement 2010) illustrates this with a report by Euro-Currency Standing Committee (renamed in 1999 as Committee on Global Financial System) in 1986, focusing on innovation in international banking. (Galati and Moessner 2011) point to the speech of George Bluden in 1987, than chairman of Basel Committee on Banking Supervision (BCBS), as an illustration. It is passed some quite period, until late 1990s, when the term "macro-prudential "began to be used outside the central banking circles following the Asian crisis of 1997 (Clement 2010). A global recognition of the notion macroprudential approach was reached after the speech in October 2000 by Andrew Crockett, then General

Manager of the Bank for International Settlements, deliver in the International Conference of Banking Supervisions (Galati and Moessner 2011; Clement 2010).

The topic of macroprudential policy rapidly grew in importance in economic circles after the worldwide financial crisis of 2008, which analysts attributed to the emergence of significant sources of instability in financial markets outside the visibility of standard sources of oversight, notably in the form of changes in US regulation affecting the provision of residential mortgages (Ferguson *et al*., 2010). These regulatory changes occurred in the mid-1990s but produced an effect that would take over a decade to manifest itself (Crowe, Dell'Ariccia, Igan, & Rabanal, 2011). The result was an abrupt shifting of asset prices beyond the ability of governmental or financial institutions to control (Alberola *et al*., 2011).

2.1.1 Definition and Scope

Macroprudential policy refers to the combination of regulatory and monetary policy that links the behavior of financial markets and institutions most closely to macroeconomic stability (Alberola *et al.,* 2011; Ferguson *et al*., 2010). It is an *ex ante* mechanism of financial regulation in the sense that the primary emphasis is on " reducing the buildup of vulnerabilities" in financial markets (Claessens, Ghosh & Mihet 2014,p.19). The theory behind macroprudential policy is that real indicators of financial instability are potentially visible in an otherwise tranquil financial landscape (Brockmeijer *et al*., 2013). This theory also points in the direction of certain regulatory sources of extraordinary risk, such as legislated bankruptcy procedure (Hurtmann et al.,2014). Consequently, by attending to

these indicators, policy makers in the central bank and in government may be able to take action well prior to the point of crisis, rather than waiting until a crisis actually occurs.

The mission of macroprudential policy is accordingly superordinate to that of the central bank or the government's treasury or finance arm. That is, macroprudential policy seeks more than merely to stabilize a currency, manage inflation, or lower unemployment. In essence, by attending to the macroeconomy as a whole, its purpose is to commandeer the financial sector, in a manner of speaking, to serve as the central mechanism by which to sustain the macroeconomy (Brockmeijer *et al*., 2013). Macroprudential policy thus recognizes the need in the modern global economy to incorporate the financial sector actively in economic growth and the effort toward stability, rather than treating it as simply one of many economic sectors influenced by standard fiscostructural or monetary policy (Nier *et al*., 2013). In other words, macroprudential policy views the financial sector as a special facet of an economy, whose dynamics affect the larger economy in profound ways and therefore merit active incorporation into the larger structure of economic management.

2.1.2 Objectives and tools

The premise of macroprudential policy is that financial stability *per se* is necessary for sustaining economic growth and minimizing the potential for economic shocks. In this sense, financial stability refers to a pattern of behavior in the financial sector that is free of abrupt shifts in asset prices or concentrations of risk. The primary objective of macroprudential policy is thus to minimize the potential for financial instability to take root in an economy (Brockmeijer et al., 2013). To support this objective, macroprudential policy seeks to adhere closely to empirical research to identify leading indicators of financial

instability in advance of financial crises. Given the tentative nature of much of the research concerning the financial sector, this ancillary objective must necessarily accommodate the prospect of shifting policy positions as new research emerges (Lim, Krznar, Lipinsky, Otani, & Wu, 2013). It also implies placing substantial weight in the insights and experience of the central bank and the established institutions of government to provide the expert judgment necessary to fill gaps in the research and thereby provide a basis for policy in the absence of empirical support where needed (Ferguson et al., 2010).

The research on macroprudential policy is at infancy, given its recent gain in importance and difficulties to conceptualize financial stability and systemic risk; the lack of proven models on the interaction between macroeconomy and financial system; and the weak consensus on the relationship between micro- and macroprudential policies. Nevertheless, it is widely accepted that macroprudential policy is aiming at reducing systemic risk to achieve financial stability, although there is only broad consensus o the later. (De Band and Hartmann 2000) stress that understanding the systemic risk is important to understanding the financial crisis and develop financial and monetary policies supporting the stability of the financial system. (Galati and Moessner 2011) identify two school of thought: *the first*, defines financial stability in terms of resilience of the financial system to external shocks, *and second*, connects it to resilience to endogenous risks, that is, originating within the financial system. (Caruana 2010) shows the definition of Bank for International Settlements on the macroprudential policy as "the use of prudential tools with the explicit objective of promoting the stability of the financial system as a whole, not necessarily of the individual institutions within it". Regarding the specific goals of macroprudential policy, some see it mainly related with the need to limit risks and

macroeconomic costs to systemic crisis. (Crockett 2000; Borio and Drehman 2009) reduce procyclicality (Brunnermeier *et al.,* 2009), and maintain addressing the interlinkages between equate levels of financial intermediation. (Caruana 2010) describes the objective of macroprudential policy as "to reduce systemic risk by explicitly addressing the interlinkages between, and common exposures of, all financial institutions, and the procyclicality of the financial system". (Galati and Moessner 2011) refer to the definition given by (Peroti and Suarez 2009) that view the macroprudential policy as aiming to discourage individual banks strategies which cause systemic risk, a negative externality of the financial system. (Hanson *et al.,* 2010) view macroprudential policy as aiming to control the social costs of a generalized reduction of assets in the financial system. To better gauge the meaning and scope of macroprudential policy, (Borio 2009) suggests comparing it with micro-prudential approach to regulation and supervision, in terms of policy objectives, focus and characterization of risk. He refers to his previous work (Borio, 2003) and summarized the differences in the following table:

Figure 1 *The macroprudential and microprudential perspectives compared*

	Macroprudential	**Microprudential**
Proximate objective	limit financial system-wide distress	limit distress of individual institutions
Ultimate objective	Avoid output (GDP) costs	Consumer(investors/depositors) protection
Characterisation Of risk	seen as dependent on collective behaviour ("endogenous")	Seen as independent of individual agents' behaviour ("exogenous)
Correlations and common Exposures across institutions	Important	irrelevant
Calibrations of prudential controls	in terms of system wide risk:top-down	In terms of risks of individual Institutions; bottom-up

Source : Borio2003

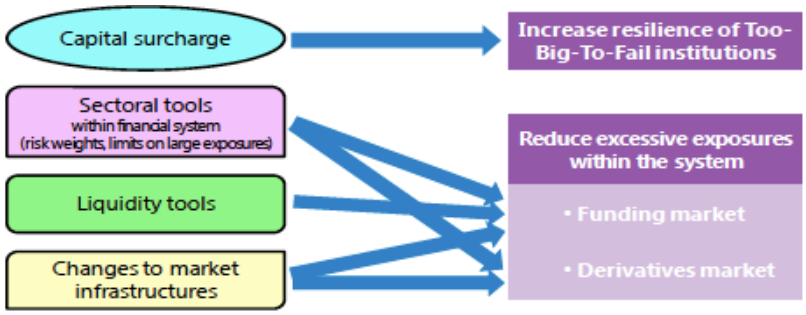
(Liebeg and Posch 2011) point out that macroprudential regulation and supervision fills the gap between micro-prudential regulation and supervision of individual institutions and macroeconomic policy, while there is also some overlap and sometimes instances of conflict.

In similarity to systemic risk that it must address, the macroprudential approach is given two dimensions. One is related with how risk evolves over time, also known as *"the time dimension"* (Borio 2009; Liebeg and Posch, 2011) or "cyclical-dimension" (Berntsson and Molin, 2012). This is also known as the "pro-cyclicality" of the financial system and calls for building up cushions in good times to compensate for (to stabilize) difficulties in bad times. (Borio 2009) point out that here the feedback effects among the financial system and the real economy, are of the essence. The other is related with how risk is distributed within the financial system at any point in time, also known as *"cross-sectional dimension"* (Borio, 2009; Liebeg and Posch, 2011) or "structural-dimension" (Berntsson and Molin, 2012). In this dimension, the focus is on common/similar exposures within the financial system and interconnections between the financial institutions. In this instance, prudential tools must be designed to address the contribution of any institution in the aggregate risk. (Clement 2010) argues that until the recent financial crisis, the focus was on the time dimension of the policy approach, discussing about the bank capital standards for the financial system's pro-cyclicality. Following the crisis, importance has also been given to the cross-sectional dimension of the policy, with more attention for the management of the systemically important institutions and the "too-big-to fail" problem.

Regarding the macroprudential tools, the discussion is also on-going. (Galati and Moessner 2011) point out that there have been investigated a range of possible

macroprudential measures, without identifying a primary instrument or a standard taxonomy of instruments. (Weistroffer 2012) state that macroprudential tools (measures) are mainly derivations of microprudential tools that incorporate a system-wide perspective. In addition, one has to consider other macroeconomic tools that support financial stability. In fact, (Borio and Shim 2007), and (Caruana 2010), argue that prudential policies are not enough to achieve financial stability and that fiscal and monetary policies can help to mitigate the build-up of financial imbalances.

Figure 2 *Mapping tools to objective : structural dimension*



Source: IMF

Macroprudential measures can be classified in various ways, which can also be overlapping (Galati and Moessner, 2011). One important distinction among them is linked with the two dimensions of the systemic risk, that is its time dimension and cross-sectional dimension. Some of the macroprudential tools linked with the time dimension feature, capturing the evolution of risk over time and targeting its procyclicality, include the countercyclical capital requirements, forward-looking statistical provisioning, practices related with valuation of collateral and maximum loan-to-value (LTV) ratios. Shin (2009) finds an important contribution of countercyclical capital requirements for banks, in moderating the fluctuations in their leverage and size of balance sheet. Discussing the loan-loss provisioning, various authors have noticed its pro-cyclical behaviour, being lower at

times of credit booms and rising at times of distress (Borio *et al.*, 2001). Hence, referring to the case of Spain, Shin (2009) finds that forward-looking statistical provisioning, through its direct impact on capital, can reduce the lending ability of the bank during the capital buoyancy. Some of the macroprudential tools linked with the cross-sectional dimension focus on systemic risk arising by similar or common exposures arising from banks' balance sheet interlinkages. (Galati and Moessner 2011) find out that those measures target the bank's capital and/or the amount of short-term debt in relation to bank's total liabilities. These vulnerabilities spillover to the rest of the system through credit chains, payment and settlement systems or bank runs which are triggered also by the asymmetric information and the inability to distinguish solvent from insolvent institutions (Galati and Moessner, 2011). More specific macroprudential tools in this case, are those known as net stable funding ratio and liquidity coverage ratio (BIS, BCBS, 2010), targeting the maturity structure of banks' balance sheets.

Another distinction of macroprudential tools is whether they are applied based on rules or discretion (Borio and Shim 2007). By making an analogy to monetary policymaking, rule-based macroprudential tools can offer accountability, transparency and efficacy (Galati and Moessner, 2011). On the other hand, discretion-based tools can prove to be time-inconsistent. Referring to the work of (Goodhart 2004), (Galati and Moessner 2011) find that loan loss provisions, capital requirements and surcharges, or loan-to-value ratios can be designed in a rule-based way. As examples of discretionary tools (Galati and Moessner 2011) mention supervisory reviews or warnings, in the form of speeches or reports targeting the build-up of risk in the system.

Another distinction between macroprudential tools is whether they represent quantity or price restrictions. Examples of price restrictive tools are measures that act as a "tax" on variable margins, i.e. on the difference between liquid assets and short-term liabilities. Examples of quantity restrictive tools include the net funding ratio of a bank (BIS, BCBS, 2009). (Perotti and Suarez 2011) find that such tools may be used to target different incentives for risk creation.

Their analysis suggests that combining "price" and "quantity" macroprudential tools may be desirable to better manage systemic risk externalities and control risk's appetite of banks. (Galati and Moessner 2011) confirm that some studies make another classification of macroprudential tools, in the context of industrial or emerging market countries. Interestingly, they find that some emerging market countries have been using macroprudential tools, without calling them by this name (McCauley, 2009, as referred by Galati and Moessner, 2011).

Accountability

Clearly, macroprudential policy requires effective mechanisms through which to enact actual adjustments in the financial sector, a requirement that has significant implications for enforcement. On this matter, the research emphasizes the need for clear accountability in terms of designating specific macroprudential roles to the central bank or specific entities of the government (Brockmeijer et al., 2013). However, the particular structure adopted by a given country may vary in terms of which entities must formulate or implement policy decisions (Lim et al., 2013). This proposition is axiomatic, given the practical and political difficulties inherent in suggesting obtrusive methods of enforcement. In some countries, cooperation among the central bank, the government's financial arm,

and perhaps other entities may constitute the centerpiece of effective policy, through the mechanism of an outside agency that recommends or enforces the necessary decisions. Moreover, it is incorrect to assume that the freest financial markets lie necessarily within those countries with a history of promoting free markets, because financial protectionism has strongly affected the financial sector in both the United States and the United Kingdom (Rose & Wieladek, 2014).Where outside agencies exist, these may consist of members of the affected agencies or independent parties, depending on the realities of the local political system. In other countries, the central bank itself may set all necessary policy and enforce it through regulatory mechanisms. The choice may depend on the relative efficiency of the entities in question in achieving needed degrees of complementarity or effectiveness at managing policy independently (*e.g.*, when the central bank must manage policy unilaterally), without conflating political objectives with economic ones. Importantly, these differences create large discrepancies in the effectiveness of specific macroprudential tools across countries with distinct structures in place (Claessens et al., 2014).

2.1.3 Implementation issues

There are several challenges to apply in practice the macroprudential approach, or macroprudential instruments. Following the difficulties with the definition and measurements of systemic risk, as well as of objectives of the macroprudential policy, *the challenge* remains to select the proper macroprudential tools, to calibrate them and operate in context of the existing monetary and prudential framework.

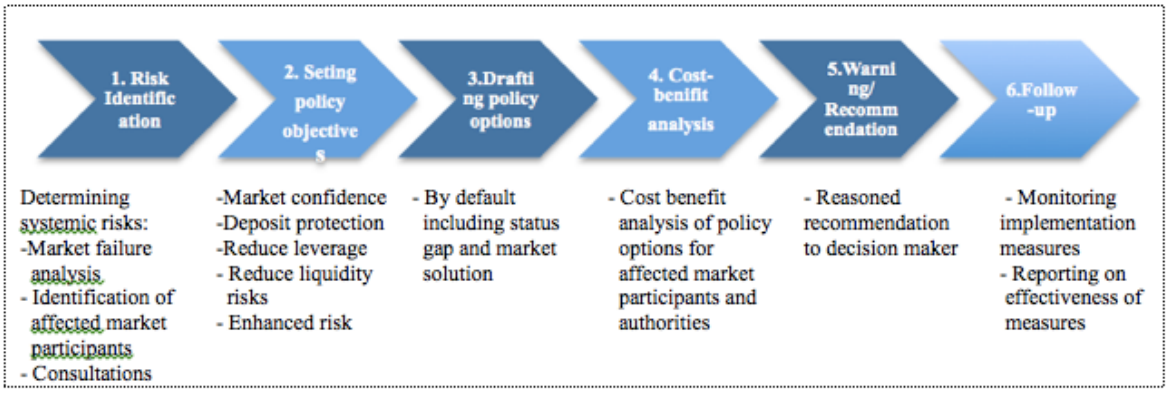
Regarding the macroprudential instruments, (CGFS2012) highlighted three high-level criteria, which are key in the selection and application of macroprudential instruments from a practical perspective. These include: (i) the ability to determine the appropriate

timing for the activation or de-activation of the instruments; (ii) the effectiveness of the instrument in achieving the stated policy objectives; and (iii) the efficiency of the instrument in terms of a cost benefit assessment.

(CGSF 2012) has also identified a set of nine questions that can guide the practical selection and application of the macroprudential instruments. These questions are: 1) to what extent are vulnerabilities, building up or crystallizing; 2) how (un)certain is the risk assessment; 3) is there a robust link between changes in the instrument and the stated policy objective; 4) how are expectations affected; 5) what is the scope for leakages and arbitrage; 6) how quickly and easily can an instrument be implemented; 7) what are the costs of applying a macroprudential instrument; 8) how uncertain are the effects of the policy instrument; 9) what is the optimal mix of tools to address a given vulnerability.

Overall, (Liebeg and Posch 2011) suggest that the macroprudential regulation and supervision, as well as the application of macroprudential instruments, should go through an impact assessment process as shown in the following figure:

Figure 3: *Macroprudential Regulation and Supervision: Impact Assessment Process*



Source : Liebeg and Posch, 2011

Another challenge in macroprudential policy implementation is how to combine/harmonize it with monetary policy. (Caruana2010) highlights that a monetary policy aimed at achieving stability of consumer prices, is not sufficient to ensure financial and economic stability, as there is not enough focus on the "risk-taking" channel of monetary transmission. In this regard, (Caruana2010) suggests for monetary policy to be symmetric and proactively respond to boom and bust phases of financial and economic cycles. This includes leaning against the build-up of financial imbalances during the boom phase. (Blanchard *et al.,* 2010) acknowledges the debate whether the monetary policy main instrument, namely the interest rate, could be used to deal with excess leverage, excessive risk taking, or apparent deviations of asset prices from fundamentals. (Blanchard *et al.,* 2010) admit that the interest rate can be used as above, but the results are likely to be poor and associated with an important economic cost in terms of output gap. Instead, (Blanchard et al., 2010) suggest the use of macroprudential tools like changes in capital adequacy ratios, regulatory liquidity ratios or loan to value ratios, in order to deal with excessive risk taking by banks. Also (Hochnick 2013) believes that macroprudential policy is better suited to managing financial imbalances than monetary policy. If monetary and macroprudential need to combine, than this requires giving a macroeconomic dimension to the regulatory and prudential framework, making it more sophisticated. (Blanchard *et al* 2010) argue that the challenge is to find a trade-off between such a system, which is fine-tuned to each marginal change in systemic risk, with an approach based on simple-to-communicate triggers and easy-to implement rules.

Until before the crisis, there seemed to be a trend to separate monetary policy from banking regulation, in terms of institutional set-up. Central Banks were in charge of

monetary policy, while regulation and supervision of the financial system, was more and more given to a separate institution. This separation would strengthen the ability of the central bank to effectively and implement its monetary policy, and be fully accountable for that. (Blanchard *et al* (2010) suggest that the crisis showed the flaws of this institutional set-up, in terms of lack of effective communication among agencies. In addition, the central bank is the best candidate for macroprudential regulation, as they monitor closely the macroeconomic developments, have advanced independence and expertise, and already serve as banking supervisors in some countries (Blanchard et al.,2010); (Liebeg and Posch,2011; Jochnick, 2013).

2.1.4 Macroprudential Power, Assignment, and Mandate

When they are the product of empirically based research and deliberation among experts in the field, macroprudential recommendations may be highly accurate. However, there must be a concomitant power of enforcement (Brockmeijer et al., 2013). This is a delicate matter, because it suggests the prospect of enforcing policy for the good of the society, implying an enforcement power vulnerable to political interests under certain circumstances. While conventional recommendations suggest separating this enforcement capacity from political motivations, such as by keeping it outside the ordinary executive function, it is up to each country to adopt an effectual structure to implement macroprudential policy (Lim et al., 2013). There exists no persuasive evidence to date that any particular structure is superior to any other, except that the macroprudential structure should fit within the broader political and historical framework of the country in question, and it must successfully insulate the design and enforcement of macroprudential policy from political interests.

Macroprudential supervisory authority could be charged to a single supervisor. Alternatively, a number of supervisors could be nominated to take into account macroprudential concerns as part of their individual mandates and given access to macroprudential tools. Although apparently is good to spread macroprudential authority among many supervisors in this way, as a practical matter, it would be very difficult for multiple supervisors to coordinate the the use of macroprudential tools. Moreover, disagreements would certainly arise among supervisors, who would naturally view macroprudential policy concerns from different perspective. So, it is preferable that macroprudential authority be trusted in one supervisor. (G30, 2010) The single macroprudential supervisor could be either an existing institution, such as a country's macroeconomic or prudential supervisor, or a specialized systemic risk supervisor. There are several strong arguments in favor of granting this macroprudential supervisory authority to a country's central bank or appointing a new macroprudential supervisory or committee within a country's central bank. *First,* in most countries, the central bank has traditionally had at least implicit responsibility for ensuring financial stability. *Second*, monetary policy, the principal responsibility of the central bank, complements macroprudential policy in significant ways. Specifically, credit and liquidity—the primary concerns of a macroprudential supervisor—are closely related to the inflation and price concerns of macroeconomic supervisors. *Third,* the similarities between monetary and macroprudential policy, mean that central banks already possess much of the expertise and institutional capacity required to implement macroprudential policy, and the institutional reputation required to effect such policy. In particular, in most jurisdictions, only the central bank can act as a lender of last resort. *Finally,* and as discussed below, the relative independence that

typically characterizes a central bank's relationship with a country's political authorities will be necessary in order for a macroprudential supervisor to be viewed as credible. However , there are arguments against the deployment of macro-prudential supervisory authority, the Central Bank of the country**.** Although closely related, monetary and macroprudential policy are ultimately specific. In point of fact, recent experience shows that monetary policy authorities can be successful at maintaining price stability even while developments in the credit markets push the financial system toward crisis. Moreover, placing the central bank in charge of both monetary and macroprudential policy could encourage the central bank to rely on the tools of monetary policy to effect macroprudential policy, and vice versa, resulting in inferior outcomes in both spheres. However, this conflict could be minimized or avoided if the supervisor's mandate were made sufficiently specific, and if the monetary policy as opposed to macroprudential policy were made sufficiently distinct, accountable, and transparent. If, because of these arguments or other concerns, macroprudential supervisory authority is not imposed with a country's central bank, it is critical that the central bank still play a key role in the macroprudential supervisory regime.

Table 1: *Who should run MPP?*

New (Ad hoc) Agency	**Cons** - May lack both credibility and leverage over supervisors and central banks who will take relevant decisions
Central Bank	**Pros** - leading role in macroeconimic surveliance and interpretation on aggregate risks, because it has the data and skills to make system-wide analyses. - expertize in market inteligence gathering from its market participation roles - indipendence which anables it to impose policy intervention that are unpopular in short term **Cons :** - possible conflict with Monetary Policy function - it possesses only a few of MMP tools, such as reserve requirements, most of the toolkit is with the bank regulator => cooperation with other agencies is required

Joint Commity (CentralBank;Bank Regulator, Market Regulator	**Pros** - the three agencies are the primary sources of information for MPP **Con** - cordination problems

2.2 Relation with Other Policies

Macroprudential policy differs from monetary policies, microprudential policies, and fiscostructural policies principally by attending to the *nexus* between the stability of the national economy and that of the financial sector (Brockmeijer et al., 2013). By comparison, microprudential policy attends to the *nexus* between an individual financial firm's viability and its current financial policies, so it is conceivable to contemplate a disjunction between microprudential and macroprudential policy. For their part, monetary and fiscostructural policies attend to economic stability alone, from opposite perspectives, and they may adopt contradictory positions if there is a lack of mutual coordination (Lim et al., 2011). Thus, macroprudential policy is discernible as a potential uniting apparatus harmonizing monetary and fiscostructural policies (Brockmeijer et al., 2013).

Figure 4 *Relationship between macropudential and other policies*

2.2.1 Monetary Policy

Monetary policy seeks primarily to manage economic stability by managing the money supply of a country (Roger & Vlcek, 2012). In this regard, the main concern is inflation. To manage inflation, the central bank in an open economy will occasionally adjust bank interest rates, while otherwise buying and selling government securities as a way to participate in the economy indirectly (Alberola et al., 2011). Whether accomplished through the lowering of interest rates or the purchase of government securities, inflationary measures may be necessary sometimes to induce spending and increase the provision of credit (Roger & Vlcek, 2012). They may also be necessary to encourage private-sector competition, which suffers under conditions of deflation due to declining purchasing power on the part of new business enterprises. Conversely, raising interest rates and selling government securities constitute deflationary measures, which are often necessary to slow the rate of spending, lest a sustained rate of spending produce demand that exceeds the economy's productive capacity.

2.2.2 Microprudential Policy

Microprudential policy consists of the ability of regulators to review the financial status of private lenders and require adjustments if the available data suggest overexposure, based on a defined set of financial criteria (Brockmeijer et al., 2013). Microprudential policy thus assesses primarily risk, suggesting a concern with the probability of a firm's inability to make good on its commitments. For example, in an open economy, it is standard policy in private banks to hold a portion of deposits on reserve. The reserve ratio is definable by the central bank, which seeks to ensure that there is no substantial threat that private depositors will demand their deposits in such overwhelming fashion over such a

short time as to outstrip the bank's actual holdings (Baghestani, 2010). This is entirely a probabilistic calculation, weighed against the likelihood that a given proportion of depositors will demand their holdings simultaneously. In the United States, the ratio is 30% among small banks and 10% among the larger ones, meaning those with key roles as financial mediators between the Federal Reserve and common banks. Approaching the ratio naturally induces a bank to request an injection of funds from the Federal Reserve, without which mechanism the ratios would logically need to be substantially higher.

Meanwhile, however, the bank must also manage its own financial assets, beyond that reserve complement, through wise investment. Under certain circumstances, a bank may lose so much in an unwise set of investments as to threaten its viability, as occurred during the crisis of US-based savings-and-loan institutions in the late 1980s. To help reduce such a threat, macroprudential policy may conceivably guide microprudential policy to set an exposure limit on outside financial investments. The effect of regulatory pressure in the case of US-based savings-and-loan institutions at that time was the pressure to increase ratios of high-risk to low-risk investments among the institutions (Papagianis & Gupta, 2012). This level of high-risk investment included a substantial quantity of mortgage loans to consumers in the lower and middle classes (Crowe, Dell'Ariccia, Igan, & Rabanal, 2011). It was therefore extremely vulnerable to rising interest rates, so the coincidence of tightening monetary policy in 1979 created a chain reaction in these institutions, resulting eventually in creative accounting methods to compensate. These dynamics preceded the collapse of about one-third of all such institutions starting in 1986, a fact that demonstrates the same kind of lag effect that was visible in the events leading to the 2008 recession in retrospect.

2.2.3 Fiscostructural Policies

Lastly, fiscostructural policies refer to the involvement of the executive branch of government in direct spending and taxation in the economy (Brockmeijer et al., 2013). In the absence of compensatory monetary policy, increases in governmental spending foment greater demand on goods and services, thereby theoretically helping private companies remain viable and maintain their workforces. This dynamic occurs by first benefiting governmental contractors, after which the latter naturally demand goods and services from the remaining economy. The effect is similar to that of increasing inflation, especially if the government pursues this policy through deficit spending. Thus, it has the capacity to increase credit and encourage competition in the private sector, by keeping the economy away from any deflationary spirals (Roger & Vlcek, 2012). Conversely, taxation draws money out of the economy and creates an effect that is similar to reducing the money supply, rather than increasing it. It is therefore more reasonable to increase taxation during strong economic growth, to help slow such growth to keep it from placing excessive demand on the productive capacity of the economy.

As noted previously, fiscal policy may contradict monetary policy at certain times, unless there is a mechanism to enable coordination between the executive branch of the government and the central bank (Brockmeijer et al., 2013). For example, the central bank will react to signs of excessive demand in the economy by raising interest rates and selling government securities. These policies seek to slow the economy and give the private sector a chance to expand capacity accordingly. If the government simultaneously reacts to the same phenomenon, the result is an increase in taxation. If both entities act simultaneously, the result may be out of balance, hence the Tinbergen principle, which states that policy

makers should dedicate only one economic tool to each macroeconomic objective under consideration (Alberola, Trucharte, & Vega, 2011).

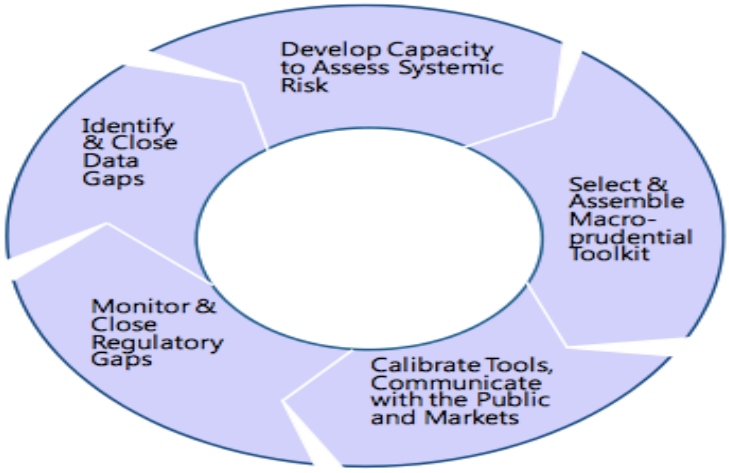
Nevertheless, merely balancing the respective roles of monetary policy through the central bank and fiscal policy through the financial arm of the executive branch is misleading, because these two entities are dissimilar in terms of the relative rapidity of their impact on resolving an impending financial crisis. On the question of the role of the central bank in macroprudential policy, the research suggests that it is crucial (Lim et al., 2013). Still, there is a risk inherent in allocating to the central bank the primary duty to undertake macroprudential policy, namely, that of overemphasizing the role of monetary policy in the overarching policy framework. While arguments exist as to the wisdom of managing an economy primarily through the monetary mechanism, the entire macroprudential process may unravel if it loses sight of the need to manage the regulatory and data collection process as well. Indeed, persuasive arguments exist that regulatory changes with a goal of promoting social policy were singularly responsible for the mounting of conflicting forces on financial institutions in both the savings-and-loan crisis of the 1980s and the more recent financial crisis in the United States (Sowell, 2009). Therefore, the prospect of laying on the central bank the responsibility to correct such regulatory missteps is inherently inefficient. Instead, macroprudential policy must exist in a superordinate position to the role of both the central bank and the regulatory function, while nevertheless relying on the central bank as the proximate source of policy implementation for rapid reaction.

2.3 Operational framework of Macroprudential Policy

The effective operationalization of macroprudential policy requires mechanisms through which to detect and assess systemic risk and a coherent philosophy around which

to build an advisement and enforcement apparatus through which to enact policy (Brockmeijer et al., 2013). On this basis, the system then requires careful calibration of the components of that apparatus, an ability to resolve regulatory gaps and continue monitoring regulatory developments over time, and an analogous ability to close information gaps (Nier et al., 2013). Within this structure, the importance of substantial empirical research to support the edifice is self-evident. This is because the macroprudential structure philosophically relies on empirical substantiation to support each selected tool, as well as because enforcing policy without an associated empirical justification can often cause greater harm, rather than softening the impact of macrofinancial dynamics (Lim et al., 2013). Meanwhile, the presence of an empirical justification may serve to unite otherwise disparate policy overtures.

Figure 5 : *Steps to operationalizing MMP*



Source IMF staff

2.3.1 Assessing Systemic Risk

The assessment of systemic risk is the starting point of an effective macroprudential model. This process requires the balanced incorporation of results from empirical studies

and technical experience from within the financial sector (Brockmeijer et al., 2013). The need for the latter is a product of the fact that much of the necessary empirical research remains to emerge in the literature, but the need for implementing effective macroprudential policy invites no delay in creating that much of the edifice that is currently knowable. It is in the nature of statistical studies to withhold judgment on a causal linkage if the strength of the relationship falls short of statistical significance. However, when working with complex data, notably those that describe macrofinancial or macroeconomic phenomena, it is often feasible to establish causal linkages with confidence even where statistical significance based on assumptions of random selection is lacking (Peres, Jackson, & Somers, 2003). This is because the complexity of the implicit variables underlying each economic datum causes the variance of that datum to converge more tightly around a given point to reflect greater stability than would otherwise occur in a truly random sample of any kind. Nevertheless, it is up to experienced practitioners in the field to determine when this is the case.

The specific targets of assessment upon which macroprudential policy will rely include:

(a) rapid increases in credit and related drivers of instability at the macroeconomic level;

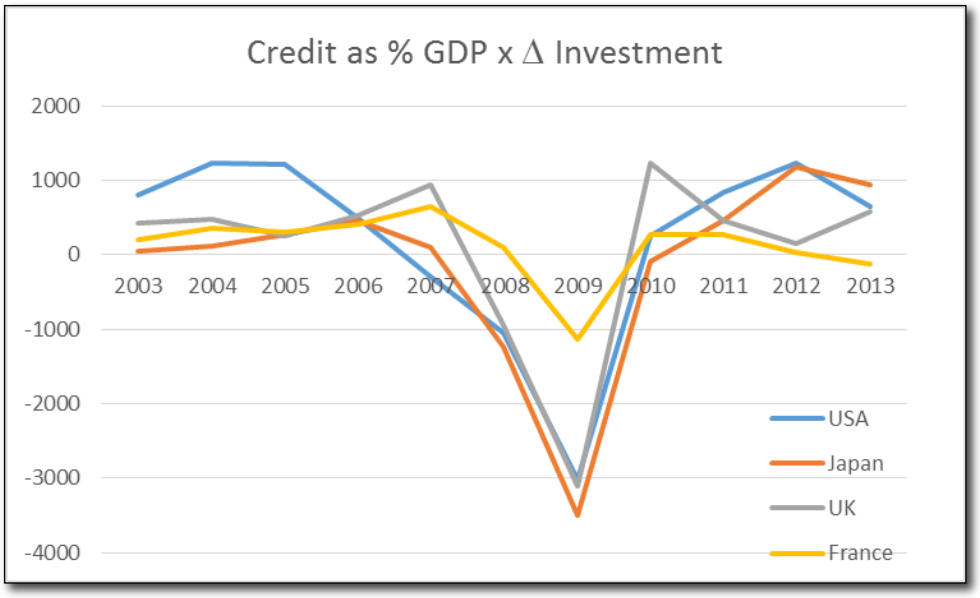
(b) the locations of financial flows between the financial and nonfinancial economic sectors; and

(c) the structure and composition of the financial sector itself (Brockmeijer et al., 2013).

Of these, the observation that a rapid increase in credit is a major source of instability benefits from the most comprehensive research base (Lim et al., 2013). In this sense, it is necessary to compare credit growth against GDP growth or the long-term GDP

trendline. However, multiplying credit growth by investment growth may afford a clearer predictor. As Figure 6 seems to show, evidence of an imminent financial crisis was clearly available by the end of 2006 in US data, while its effects would become visible in Japan in 2007 and other major economies thereafter.

Figure 6 : *Credit as % GDP × Δ investment (data from IMF and OECD).*



The introduction of new varieties of financial products may often offset the equilibrium of the financial system in unexpected ways. Brockmeijer et al. (2013) have cited the credit default swap (CDS) as an important example. The CDS tool dates only from 1994, so it constitutes a relatively recent innovation and thus exemplifies how open the landscape of the financial sector is to new financial tools with unpredictable effects on the financial system. In essence, the CDS consists of an agreement that provides a remedy in the case of a credit default, thus significantly changing the risk-reward profile of a credit instrument. More generally, any financial tool that upsets the transparency of the risk-

reward equation has the potential for shifting risk concentrations across financial holdings (Wilson, Rose, & Pinfold, 2012). When such shifting occurs on a large scale, such as occurred with CDS instruments, it becomes very difficult to measure the true risk profile of large segments of asset classes. Consequently, insofar as it is achievable, it is necessary to map the linkages among asset classes in the financial system, to enable tracking the effects of any new instrument on other parts of the financial system.

Meanwhile, the overarching challenge affecting both the mapping process and that of identifying the presence and behavior of specific linkages is the lack of data necessary to draw empirical conclusions (Brockmeijer et al., 2013). Were the financial system to persist over time with a fixed, known array of instruments and regulatory mechanisms, the task of mapping the system and identifying the linkages would still be difficult, but sheer time would provide the opportunity both to capture the necessary data and to identify what data to seek. However, both the available financial tools and the prevalent regulations continue to change over time. This fact obstructs any goal of achieving saturation in the matter of data collection, but a macroprudential system demands constant data collection coupled with the constant search for new types of data to discover. Given the fact that desired types and quantities of data will therefore remain unattainable, regardless of the how much progress occurs in this regard, it will be necessary to overlay that much of a stable, mapped structure that is achievable with empirically generated models of financial dynamics from academic sources (Brockmeijer et al., 2013). In turn, academic institutions must assist with simulations and analyses of large-scale data sources.

Furthermore, completion of data analysis and data simulations, with qualitative insights from the dynamics of the financial system remains to be a very important part of

macro-prudential structure (Lim et al., 2013). Expert judgment can legitimately complement data analysis by incorporating intuitions derived from experience into the process. In this sense, experience is more than merely a justification for applying personal feelings to the analytical process. On the contrary, subjective judgment of experts in the field constitutes the synthesis of decades of efforts to understand and act in the way how the financial system functions effectively (Steinberg *et al.,* 2008). This judgment arguably functions as effectively as would a computerized model of the financial system based on longitudinal data. Where the computerized model benefits from precision, it relies on actual data to make its predictions; yet all data contain error. By comparison, where the expert in the field lacks the ability to recall specific data with precision, he benefits from an ability to distinguish between meaningful trends and mere noise in the system. Qualitative judgment of this kind is especially important for heralding a need for action when slowly developing trends create an illusion of tranquility. Experts in many cases adjudicate increased pressure in certain circumstances, regardless of illusion(Brockmeijer et al., 2013). By contrast, rapidly changing indicators are often sufficient for triggering a response to keep a system from imploding, but they provide relatively little lead-time. Consequently, an optimal gauge of when to take action to forestall a crisis is a combination of data-driven indicators and expert judgment.

In general, long-term forecasting weakness of current predictive models turns out to be a major gap in order for variables to be suitable for tracking (Brockmeijer et al., 2013). Among such measures, credit-to-GDP ratios and asset valuation models appear to be strongest, but much more work is necessary before these or other available measures can rise to a level of serving as lucid benchmarks (Nier et al., 2013). Pending such

developments, policy makers will have no choice but to adopt heuristic thresholds using the best available data, even if conclusive models have yet to emerge to incorporate such data with precision. The sticking point is that most such models will serve as predictors of the likelihood of a crisis, rather than simply the degree of deviation from equilibrium. If credit grows too rapidly, for example, while other indicators remain at a steady state, the probability of a sudden shift in risk concentrations across the financial sector grows (Brockmeijer et al., 2013). When the shift occurs, a crisis may result. Similarly, if real-estate prices grow too rapidly, an analogous shift may result. When both trends occur in tandem, the probability of an impending crisis may grow geometrically, as a product of the individual probabilities associated with independent effects.

Regarding specific measures under consideration among international observers, Basel III considered several, including the credit-to-GDP ratio, but also including bank profitability indices, real-estate prices, GDP growth *per se*, and credit growth *per se* (Christensen, Meh, & Moran, 2011). Of these, analysts found the extent to which credit-to-GDP deviated from the long-term trend to be the strongest predictor of an impending financial crisis (Nier et al., 2013). To compute the credit-to-GDP ratio, it is necessary to devise a weighted measure of all types of credit instruments available in the financial sector. This aspect of the measure is especially important, because changes in regulatory regime may induce financial institutions to shift risk across components of the financial sector and thus potentially escape the purview of current financial measures. Any credit-gauging function that fails to incorporate the entire financial sector will therefore be subject to unpredictable noise in the variable.

According to the recommendations under Basel III, the observation of a given degree of deviation from the long-term trend in the credit-to-GDP ratio should trigger activation of a CCB facility (Gatzert & Wesker, 2012). To calculate the long-term credit-to-GDP ratio, the recommendation is to use a smoothing function equivalent to approximately 250 times the smoothness of a standard business cycle calculation, based on the observation that credit cycles are considerably longer than business cycles (Nier et al., 2013). The maximum recommended CCB is equivalent to 2.5% of an institution's weighted assets, and the precise CCB amount should be proportional to the degree of deviation between actual credit-to-GDP growth and the long-term trend (Nier et al., 2013). Releasing the CCB requires a different calculus, however, because the business cycle will generally end prior to the credit cycle. Nevertheless, this question demands further research before it is feasible to adopt this criterion as clear a triggering rule as is evidently available in the case of imposing the CCB based on the credit-to-GDP ratio (Nier et al., 2013).

2.3.2 Design and Calibration of Macroprudential Tools

At present, while it seems feasible to advocate the inclusion of certain specific devices in a complete "toolkit" for conducting macroprudential policy, the task of identifying the optimal combination of resources remains elusive (Brockmeijer et al., 2013, p. 19). Moreover, it appears for the moment that different countries will need to assemble different kinds of instruments to fit their respective conditions. This observation admittedly provides rather vague guidance for the practical task of creating an effective macroprudential policy framework, but it legitimately reflects the shortage of knowledge in the field that prevails today. Nevertheless, the consensus among experts is to consider a broad range of potential tools at first in any new system, under the assumption that the

admixture of several tools with a singular aim will provide cross-validation for individual tools (Nier et al., 2013). Eventually, one supposes, certain tools may wane in importance compared to others, given the expected variety in terms of efficiency and results. Another consideration in this regard is that the rapidly building nature of crisis conditions, as was evident in the 2008 recession, implies a need to take extraordinary precautions while setting up a macroprudential framework (Lim et al., 2013).

Three categories of tools merit consideration for purpose of addressing rapidly emergent threats in the system. These include countercyclical buffers, mechanisms for containing sectoral risk, and mechanisms for containing liquidity risk (Brockmeijer et al., 2013). Countercyclical capital buffers (CCBs) consist of capital resources that are ready to deploy to ease pressure arising from a lack of capital in the supply of certain economic needs (Hartmann et al., 2014; Nier et al., 2013). For example, central banks may supply commercial banks with currency in response to signs that account holders are suddenly trying to liquidate their accounts too rapidly. Thus, CCBs are specifically helpful to the goal of shock resistance. They are also a formal provision of Basel III, so future scenarios involving the rapid growth of credit to GDP may benefit from this new device (Christensen et al., 2011). However, empirical research has shown that CCB tools have had little significant impact on softening the effects of a financial crisis (Claessens et al., 2014).

Given their formalized nature under Basel III, CCBs merit further exploration in this context (Gatzert & Wesker, 2012). The idea is to promote and facilitate a mechanism for raising and lowering a supplemental reserve requirement in banks based on economic cycles, rather than proceeding under the traditional assumption that a fixed reserve ratio is sufficient for all times and circumstances (Nier et al., 2013). The natural alternative would

be simply to advocate for higher reserve ratios. However, this approach would be inefficient, because reserve ratio requirements already remove a defined proportion of bank holdings from profitable use. By extension, simply increasing the reserve ratio would do no less than remove a larger complement of resources from productive use, thus undermining economic growth in general. To be sure, Basel III does indeed also advocate a supplemental reserve requirement, above that mandated by national banking laws or the mandates of the central bank, known as the "conservation buffer" (Nier et al., 2013, p. 4).

By comparison, sectorial tools work differently, by directly limiting the buildup of harmful ratios within individual subcomponents of the financial sector. These may include capital requirements, such as what already occurs in the form of the reserve ratio by which commercial banks function, or regulatory limits in the form of loan to value (LTV) or debt to income (DTI) (Claessens et al., 2014). Economic exigency may justify adjusting these ratios to reduce the degree of measurable risk in individual purchases of collateral-secured assets based on credit criteria (Brockmeijer et al., 2013). When such potential conflicts are present, there is an inevitable disjunction between political and macroprudential policy (Papagianis & Gupta, 2012). It indicates a self-evident need for an active interchange between political and macroprudential policy makers (Ferguson et al., 2010).

Structures for managing liquidity-based risk may help control the rapid growth of credit and overexposure to funding shocks simultaneously (Brockmeijer et al., 2013). In contrast to certain large-scale initiatives to increase market liquidity and thus promote the provision of credit, the most notable example being the establishment of the Federal National Mortgage Association (FNMA) in the United States in 1938 (Sowell, 2009), liquidity tools would seek to reduce liquidity as a way to encumber the market (Crowe et

al., 2011). Prospective mortgage recipients would thus encounter certain constraints on the part of their lenders, which cause the latter to insist on up-front cash deposits to justify the approval of mortgages. A prominent feature of liquidity controls is a mechanism for limiting how much contractually anticipated income is usable for funding a new mortgage, as opposed to undedicated income on hand (Crowe et al., 2011). Indeed, liquidity in the US housing market in the late 1990s had risen to such unprecedented levels that it was feasible for banks to approve mortgages with no money down and even often offer a positive cash return from the transaction itself (Papagianis & Gupta, 2012). As in the case of sectorial tools, extraordinary liquidity was the result of financial arbitrage to circumvent constraints imposed through political regulation. As discussed previously, political regulation had forced banks to find ways to approve mortgages for uncreditworthy customers (Crowe et al., 2011). To enable this kind of distortion of the natural market mechanisms, banks needed extraordinary liquidity, which they achieved through the mechanism of federal mortgage purchases (*i.e.*, FNMA originally, supplemented later by other government-sponsored enterprises or GSEs). In this way, the system was sustainable for a matter of years, but it would inevitably lead to an ability on the part of GSEs to continue to purchase new mortgages, hence an irreconcilable disjunction between credit growth and housing price growth (Crowe et al., 2011).

2.3.3 Monitoring and Closing Regulatory Gaps

Regulatory gaps at the boundary between the economic and political function may be the most challenging aspect of macroprudential policy. Managing this boundary problem is difficult, precisely because the enforcement mechanisms for regulatory compliance reside primarily in the hands of legal authorities, rather than agencies responsible for

economic oversight (Brockmeijer et al., 2013). In short, legislated structures on the financial sector designed to promote desirable social ends inevitably create distortions in asset valuation and risk calculation, to which the financial sector naturally responds using whatever alternative mechanisms are available. Indeed the invention of novel financial tools, such as collateralized mortgage obligations (CMOs) in the United States during the most recent crisis, occurs primarily in response to changes in the regulatory regime that would cause the profitability of financial institutions to suffer if no such freedom of maneuver were available (Crowe et al., 2011).

Nevertheless, it is difficult to contemplate ways to integrate the legislative process into the macroprudential apparatus, short of imposing new kinds of review processes onto the lawmaking function. Even so, legislation is sovereign in nature, so macroprudential structures must perforce employ a combination of persuasive engagement with the political function and ready themselves to deploy stringent countermeasures to counterproductive policy. In the United States, for example, the Community Reinvestment Act of 1977 created a justification for incorporating a social-responsibility mission into standard financial oversight, but the legislation itself provided no clues as to how the political process might later base key changes in regulation on it (Sowell, 2009). The key changes contributing to the 2008 financial crisis occurred in 1995, when US bank regulators adopted quantitative criteria as benchmarks against which to judge whether individual financial institutions were providing a substantial proportion of their mortgages to lower-income customer segments (Crowe et al., 2011). Shortly prior to this change, in 1992, the FNMA and Federal Home Loan Mortgage Corporation (FHLMC, the other mortgage-oriented GSE) added a component to their respective mission statements to promote affordable

housing. The latter would result in a rapid increase in mortgage purchases and the illusion of endless liquidity, which radically reduced apprehensions of risk and in turn instigated mortgage approvals to uncreditworthy customers in extraordinary frequency (Papagianis & Gupta, 2012).

The combined result was to force banks to approve substantial proportions of all loans to customers with marginal creditworthiness (the subprime mortgage market), or face penalties by regulators for those that failed to comply with this dictate (Crowe et al., 2011). With the assurance of GSE assistance in purchasing large numbers of new mortgages, the task for the affected banks was easier than it would have been, but even the GSEs inevitably encountered limits in their absorptive capacity. Consequently, banks had to devise novel ways of configuring mortgage assets to commingle conventional mortgages with subprime mortgages (Crowe et al., 2011). While asset prices rose, this commingling created no self-evident problem for risk calculation, but as individual mortgages failed within these commingled asset instruments, they began to produce a cascade effect, which increasingly obscured their real value. In essence, greater risk entered the risk calculation itself. Under these circumstances, it would have been insufficient for an empowered macroprudential authority to work through the legislative process as a remedy, because the legislation had come into existence over two decades prior to the regulatory changes that produced the noted deleterious effects. Moreover, the financial crisis resulting from this harmful juxtaposition of law and regulation would take another decade to develop.

Short of available proactive measures, a macroprudential authority would have had to address the issue by reacting to leading indicators of the impending crisis. Assuming that it was knowable at the time to judge an impending emergency based on the rapid rise in

credit-to-GDP and the concomitant rise in mortgage prices, a macroprudential authority would have had to intervene directly in the financial system, rather than work through political authorities (Rose & Wieladek, 2014). Using sectorial tools, it might have forced banks to rely on core financial resources to approve new loans, while perhaps complementing those measures with LTV and DTI restrictions (Ferguson et al., 2010). Indeed, as recent research has shown, the most effective tools for restraining the growth of the credit-to-GDP ratio is indeed the range of available mechanisms of this kind (Claessens et al., 2014). However, while LTV restrictions would have pushed customers toward purchases of houses more in line with their real ability to pay, DTI restrictions would have conflicted diametrically with the goals of the Community Reinvestment Act (Wong, Fong, Li, & Choi, 2011). In this case, therefore, macroprudential policy would have run aground against the political process, with the predictable result that the legislative process itself might have responded by curtailing the macroprudential authority's ability to enforce policy at all.

In effect, the solution to the housing boom in the United States during the first decade of the new millennium was immediately available, in the form of LTVs and DTIs (Ferguson et al., 2010). The US Congress could have implemented these devices without substantial difficulty in the wake of early hearings on the seriousness of the impending financial crisis, which occurred under the aegis of a manifest political desire to exonerate the GSEs, thereby creating the illusion of an utter absence of any cause for concern. Thus, in this case, the political process was antithetical to such a solution, despite warning from both the central bank and the executive branch of the government that a financial collapse was imminent. For its part, the Federal Reserve had only enough power to try to persuade

the Congress to act, for there was no solution available to it at the time, short of drastically raising interest rates.

2.3.4 Closing Data and Information Gaps

Disregarding the difficulties inherent in managing macroprudential policy as a process separate from that of legislation or regulation, the most critical *lacunae* in emergent models of macroprudential policy involve data and information gaps (Brockmeijer et al., 2013). In this discussion, data refer to the economic and financial variables that may play a part in helping determine relative levels of equilibrium or disequilibrium among the components of the financial sector, while information refers to the established causal linkages among those variables, as well as between them and certain predictable contingencies. Sufficiency of data and information may provide a basis for the persuasion of political agents to construe regulatory criteria in a functional way, rather than to misdirect legislative action in a direction that undermines the integrity of the financial sector. Nevertheless, this area of concern is also the most problematic at present. It is difficult to declare with confidence any substantial set of macroprudential tools precisely because the empirical process has yet to produce reliable information. This is the product of the inherent complexity of financial dynamics in the mature world economy, rather than any unwillingness on the part of financial researchers to identify it. Basic economic and financial models demonstrate viability across changes in regulatory regimes and economic phases of growth in a country, but such consistency quickly erodes as soon as the models become slightly more specific, such as in testing the assumptions underlying wage stickiness in a Keynesian model. Thus, changes in regulatory regime, financial norms, and

the composition of productive sectors all constantly strain the ability of specific economic or financial models to retain their predictive power.

Beyond simply the question of changes in the financial landscape, there also remain problems in data collection in many developing countries, whose economies are vulnerable to shocks experienced in the larger economies (Nier et al., 2013). To remedy these gaps, an obvious solution is to enable nongovernmental organizations (NGOs) to assist in such processes. However, doing so often requires substantial overhauling of current systems, including the high-level computerization of systems that currently depend largely on paper records. As Brockmeijer et al. (2013) have specified, even where substantial data are readily available in electronic form in certain countries, there remains a need for greater "granularity," or detail amenable to precise computations at the level of region, financial sector, and cross-border transactions (p. 26). The goal of achieving data sufficiency from many countries will reasonably require a concerted effort among leading countries, as a separate process from the adoption of macroprudential measures in those countries in which there is greater data availability. Engineering such changes on a global scale will demand considerable financial resources (Lim et al., 2013). Hence, the pursuit of any goal to manage a macroprudential world infrastructure will be quite costly, even before considering the potential benefits that may eventually accrue from a consistent process of data collection across countries.

2.4 Macrofinancial Models

Macrofinancial models prior to the recent financial crisis, called dynamic-stochastic general-equilibrium (DGSE) models, generally reflected the assumption of the classical conditions of perfect competition, perfect information, and ready availability of

mechanisms in the financial system for arbitraging risk efficiently (Roger & Vlcek, 2012). Major sources of such models have included the Bank of Canada, Bank of England, European Central Bank, Nippon Ginkō, Sveriges Riksbank, and US Federal Reserve. The macrofinancial models that have emerged since the crisis reflect a shift in assumptions, as they now universally attempt to incorporate imperfections in the behavior of financial markets, sometimes into classical models, and sometimes into novel structures. Major sources of such models so far have included Banca d'Italia, Banco de España, Bank of Canada, Bank of England, Banque de France, European Central Bank, Hrvatska Narodna Banka, Reserve Bank of New Zealand, Sveriges Riksbank, and US Federal Reserve (Roger & Vlcek, 2012).

2.4.1 Theoretical Research

The theoretical research in macroprudential policy follows the pattern of macrofinancial models, particularly on the matter of the abrupt shift in composition between the periods before and after the 2008 recession. All relevant trends in this research have consisted of a search for parsimonious approaches to incorporating market imperfections into DSGE models of various kinds, featuring information asymmetry, risk concentration, and implicit risk buildup over the course of a business cycle. Nonlinear effects have been especially challenging to model, because they are inherently probabilistic in nature, rather than amenable to trend-like representations (Hartmann et al., 2014). The business cycle effect has been an important part of post-recession models, notably in the estimation of implicit risk as a function of a given stage in business cycle longevity. Models have attempted to address price stability, credit, liquidity, and risk valuation. Arbitrage strategies have been difficult to predict, hence difficult to model. Meanwhile, the

Tinbergen principle also affects policy choices by advocating, as a matter of philosophy, the adoption of a single policy solution in response to each policy challenge. In this regard, the most commonly suggested policy solution has considered of specific levels of capital requirements. The nature of competition and transparency has also been a common topic of discussion (Wilson et al., 2012).

Bianchi (2010) argued that macroprudential policy must primarily seek to constrain the accumulation of excessive risk exposure in financial institutions and other organizations that are heavily dependent on debt financing. His argument focuses on credit dynamics. In essence, high levels of credit are virtually inert as long as the economy is free of rapid changes in asset prices. In contrast, once asset prices begin to shift rapidly, the amount of credit outstanding magnifies any changes in risk exposure that occur. Similarly, Crowe et al. (2011) emphasized that the major determinant of the seriousness of a financial collapse was a function of the source of funding behind the prior economic expansion. Given the high asset valuations of residential real estate, the most serious financial collapses naturally follow those recessions that follow steep increases in housing prices (Funke & Paetz, 2012).

Farhi and Tirole (2012) identified the strategic complementarity of risk exposure choices as strongly inducing intervention by governments or central banks. Strategic complementary refers to the pattern among financial institutions of pursuing more than one high-risk financing choice simultaneously. This occurs because it is financially disadvantageous to restrain one's own risk appetite when surrounded by other financial institutions that are rapidly consuming high-risk options. Thus, the natural forces of

competition induce financial institutions to compete with one another in the consumption of risk. Risk avoidance under these conditions represents a financial cost.

Cristensen et al. (2011) examined countercyclical capital-ratio requirements, using a computer simulation of financial dynamics under various conditions. Countercyclical capital-ratio requirements refer to the imposition by the central bank of a capital buffer, to supplement the standard reserve ratio, which the central bank may require to increase during periods of financial stress to make up for falling asset prices and the consequent effect on bank balance sheets. While such a requirement is indeed helpful to mitigate the impact of macrofinancial shocks, the matter of determining its optimal magnitude depends on both the calculated reach of externalities from the shock and the specific policy-making behavior of the central bank (Bush & Prieto,2014).

Crowe et al. (2011) examined LTV regulation, based on an observation of the impact of rapidly falling asset prices on bank balance sheets and the consequent shrinkage of available credit. For example, the recession that occurred at the end of the millennium was the product of excessive exuberance over the potential value of Internet-based companies and the consequent rush to invest heavily in Internet company stocks. Because this investment was largely the result of actual investment capital in the private sector, rather than consisting of stock purchases on margin, the rapid economic acceleration that resulted rested on a relatively small proportion of credit, as opposed to capital. Accordingly, Crowe et al. (2011) concluded that fixing credit strictly to asset values would ensure a rise in capital alongside any rise in credit, presumably to produce a relatively mild effect, no more serious than the end-of-millennium recession.

In turn, Funke and Paetz (2012) tested Crowe et al.'s (2011) observations in the specific example of the Hong Kong Monetary Authority (HKMA), arguing that a simple rule to increase the LTV ratio upon attainment of each 4% level of property price inflation serves as an effective countercyclical measure for most asset price inflation. Funke and Paetz (2012) have called this type of countercyclical measure a use of "time-varying LTV ratios," to indicate that different periods will feature different regulatory ratios of this kind (p. 2). Therefore, this type of LTV ratio features no automatic adjustment due simply to the passage of time during a business cycle, contrary to the policy practiced in Spain over the past decade on capital-reserve ratios (Alberola et al., 2011).

Trends in macrofinancial policy have clearly shifted in the direction of macroprudential policy. Regardless of specific measures or recommendations that may develop from ongoing empirical and simulated studies, the general trajectory of policy making among capitalistically oriented economies is already generally to adopt macroprudential policies, especially in terms of adjusting the capital requirements of financial institutions and endeavoring to dampen the relative liquidity of alternative sources of credit (Aiyar, Calomiris, & Wieladek, 2012).

Nonlinear effects are visible during periods of financial instability due to changes in the basic regimes by which financial institutions judge lending criteria (Hartmann et al., 2014). In the recent recession, three aspects of a change in the prevailing regime included a constrained supply of credit, a similarly constrained demand for credit, and the fragmentation of prior risk-sharing structures linking households to the rest of the economy (Hartmann et al., 2014). Among these forces, the role of bank credit is most important.

Business cycle effects in macroprudential models consists of treating the given stage of progression through a business cycle as an exogenous variable that distorts risk calculations. Views from the perspective of the most recent economic shocks, a consensus is now emerging that the sheer length of an expansion cycle may introduce frailties in an economic system that will ultimately manifest themselves in the form of extraordinary shocks to the system (Alberola et al.,2011). During an economic expansion without any sign of excessive risk in any particular segment, monetary policy maintains a steady countenance. The absence of signs of obvious instability induces observers to believe that the economy is devoid of weaknesses. Yet if instability exists in undetectable forms, this stance only means that those sources of instability will continue to build until the resulting shock takes all parties by surprise.

Moreover, short-term stability may hide long-term sources of instability. Accordingly, in the long-run scenario, macroeconomic stability, notably the maintenance of a stable price level, has always supported the strength and stability of the macrofinancial structure (Alberola et al., 2011). However, in the short run, there are often conflicting pressures between macroeconomic and macrofinancial dynamics. This is because, even where prices appear to be stable, emergent imbalances in financial markets can cause an economic crisis. As Alberola et al. (2011) have stated, "Price stability should therefore be seen as a necessary but not a sufficient condition for financial stability" (p. 10). By implication, this observation suggests that risk concentrations may shift in an economy without a concomitant shift in prices.

On the matter of theory, there is a significant difference, notably in the wake of the recent financial crisis, between rapidly rising asset prices *per se* and rapidly rising asset

prices that have detached from fundamental valuation models (Alberola et al., 2011). In the former case, rapidly rising asset prices may simply reflect rapid adjustments to the true, underlying basis for asset valuation, toward which the market may be converging. In the latter case, rapidly rising asset values suggest an exogenous effect on the market, unexplained by objectively calculable asset values. Under this kind of circumstance, economists have long differed over whether monetary policy might constitute a valid mechanism of correction, because uncertainties often remain over whether objective indices of asset valuation reasonably capture the full range of information available to the market (Bianchi, 2010). After the recent financial crisis, however, economists have mostly converged on the reasonableness of central-bank action under this condition, even if such action may rely on faulty computations (Alberola *et al*., 2011). Instead, the onus of responsibility for the central bank has shifted to the matter of improving the accuracy of empirical models, rather than maintaining a bias in every instance against reacting to changes in asset prices.

However, given the effect of ordinary microeconomic or supply-demand dynamics on asset prices, the availability of credit has a direct effect on these prices. Under conditions of perfect liquidity, asset prices should converge on the innate value of assets, but liquidity dynamics actually appear to evolve over the course of a business cycle, rather than merely reflecting random fluctuation. Thus, insofar as substitute sources of credit exist in any economy with equivalent liquidity, adjustments to credit availability as a means of macroprudential policy will be ineffectual (Aiyar et al., 2012). Meanwhile, if financial institutions experience pressure to resist granting loans, such as occurs immediately in the wake of a financial crisis due to disaster myopia (Alberola et al., 2011), this resistance

directly affects the available of credit, despite the availability of capital. Thus, unless adjustments to capital requirements in financial institutions have an effect on loan supply, they will serve no purpose in any macroprudential-policy regime (Aiyar et al., 2012).

Probably the most important economic distortion affecting asset prices is risk valuation. Given its inherently probabilistic nature, there is no straightforward way to calculate risk accurately. The complexity of risk models requires certain assumptions about the stability of the causal dynamics underlying risk, but these causal dynamics actually change in conjunction with changing macroeconomic premises. For example, the probability of default for a mortgage holder with a given DTI ratio will rise as an indirect product of inflation, unemployment rates, and changes in legislation that increase the cost of employee benefits to individual employees (Crowe *et al.,* 2011). While the tributary forces seem sufficiently comprehensible to incorporate into a risk valuation algorithm, both their interaction and their nonlinear effects have confounded risk models under conditions of rapid change in financial markets.

The inability of markets to valuate risk accurately under certain conditions appears to be the primary cause of the kind of market failure that occurred in the most recent recession (Alberola *et al*., 2011). One of the essential assumptions of economic models is perfect information. Under most circumstances, information about basic economic attributes, such as price or risk, tends to improve as participants in the market share information. However, certain kinds of forces have a direct bearing on information and may thereby distort assessments of both fundamentals and risk, causing a divergence. One of those forces is disaster myopia, which arguably occurred during the extensive growth period that preceded the turn of the millennium (Alberola *et al.,* 2011). Specifically, as the

memory of the most recent disaster regresses into the past, market participants begin to confuse the absence of disaster with the certainty of stability. This tendency is a product of the natural propensity for people to underestimate risk in the absence of disaster and overestimate risk in the presence of disaster. In effect, market participants' risk calculations thus rise in the immediate wake of disaster and fall with greater distance from disaster.

It would therefore be preferable to identify a tool that might more directly serve as a basis for recalculating risk based on economic criteria related to the nature of the business cycle. To be sure, the result may be a microprudential tool, rather than a macroprudential one, which is contrary to the tenor of today's discussions regarding the generic inadequacy of microprudential solutions (Alberola *et al*., 2011). Nevertheless, it may be appropriate to consider such solutions on the example of how certain industries currently judge commodity values. Commodity values on the futures market are a product of actual contracts for the respective commodities, made against projected needs rather than current needs (Yang, 2004). These futures guide decisions at certain points in the value chain, such as in the case of fuel retailers that adjust their posted fuel prices daily. Prices therefore follow risk calculations, which in turn are visible in futures trading. An analogous solution in the case of credit risk may similarly involve the provision of a way to arbitrage credit risk without inadvertently concealing it, which may occur in the case of CDS instruments. In essence, a published measure of the cost of risk, adjusted beyond the effects of the aggregate decisions of financial institutions to reflect changes in the business cycle, might provide the basis for macroprudential policy (Alberola et al., 2011).

While CDS instruments might seem simply to shift risk between parties, a lack of transparency in their usage will cause analysts to miscalculate actual risk associated with

specific loan obligations (Wilson et al., 2012). The CMO is an even more complex instrument, because it seeks to mitigate risk by aggregating secured debts across a range of risk valuations as a way to inject sufficient liquidity into high-risk debts to enable effective trading in financial markets (Papagianis & Gupta, 2012). Both of these tools are examples of financial arbitrage in the broad sense, because they reflect the creativity of financial institutions to invent new risk-shifting or risk-mitigation tools to circumvent legal constraints to financial trade, such as those that ultimately triggered the financial crises of the late 1980s and the past decade. Thus, financial arbitrage operates in response to exogenous constraints to maintain as much liquidity as is possible in financial markets, but the complexity of the associated instruments may also be a significant cause of market failure. Thus, macroprudential leakages refer to the potential for various kinds of arbitrage to circumvent restrictions placed on financial institutions to help maintain stability in an economy (Aiyar et al., 2012).

Potential sources of macroprudential leakage in response to a system of adjusting capital requirements against risk-weighted assets in domestic financial institutions include increased lending by foreign banks operating in the same financial environment, greater use of capital markets as an alternative source of investment capital, and greater exploitation of transnational lending as a solution (Aiyar et al., 2012). Among these alternatives, the proximity of foreign bank subsidiaries in the same market renders their exploitation the most likely source of leakage in response to macroprudential restrictions on financial institutions' lending rates. Moreover, as Aiyar et al. (2012) have found, alternative sources of lending stay within the same economic sector as the institutions from which credit seekers have withdrawn.

The multivariate complexity of the tools of financial arbitrage in the context of risk valuation reflect a broader fact of macroeconomic policy, namely, that combining corrective tools invites dynamic risk that too easily undermines the economic transparency necessary to inform market participants to enact proper correctives (Wilson et al., 2012). Accordingly, the Tinbergen principle states that policy makers should dedicate only one policy tool to each objective of economic policy (Alberola et al., 2011). This is because economic tools sometimes function in parallel with respect to one another, but they also sometimes function at cross-purposes. Changes in macroeconomic variables can thus cause the harmony between effects to shift to contradiction. Moreover, one may argue that creative forms of financial arbitrage violate the premises on which the Tinbergen principle rests.

Nevertheless, Lim *et al*. (2011) have endeavored to contradict the Tinbergen rule, arguing that a single macroprudential measure is often insufficient. They have cites specific advantages to employing multiple policy measures for a given target outcome. *First*, the use of multiple policy measures may enable a country to manage with the same level of risk using mutually equilibrating measures. *Second*, the use of multiple policy measures can reduce the latitude that individual financial institutions have for evading regulation, essentially reducing the range of possible arbitrage in reaction to changes in governmental policy. *Third*, the use of multiple policy measures can help maintain an ability to preserve the overall efficacy of policy tools by creating conditions in which one tool often substitutes for another in responding to each source of risks.

Insofar as periods of rapid economic expansion increase the incidence of credit risk, which follows an increase in the value ascribed to collateral coupled with a decrease in loan

approval standards, it is clear that exogenous economic forces that have a direct effect on both asset prices and risk routinely fall outside the domain of measurement (Alberola et al., 2011). Consequently, macroprudential policy may reasonably adopt substitutes for such changes in valuation based on empirical observations and in some manner funnel the resulting figures into decision criteria in the financial sector. Following the Tinbergen principle, however, certain obvious ways to do this, such as interest rate adjustments by the central bank, are unavailable. Rather, the solution should involve the imposition of a new tool, rather than the usurpation of a tool that already serves a clear macroeconomic purpose (Yang, 2004). The system adopted first by the British and subsequently by the world financial community at Basel III, involving dynamic capital-reserve requirements, is one possibility, but this particular solution merely reinforces bank liquidity, rather than directly addressing effective valuation errors (Christensen *et al*., 2011). Insofar as credit continues to become easier to acquire as the business cycle progresses, dynamic capital-reserve tools will reduce the risk that banks will suffer due to defaults, but defaults will continue and possibly even increase in frequency (Van Vliet & Blitz, 2011).

In the context of requirements, Basel I recommended the imposition of an 8% capital requirement on risk-weighted assets in financial institutions out of concern for the effects of the kind experienced in the late 1980s in the form of the savings-and-loan crisis in the United States (Aiyar *et al.,* 2012). The United Kingdom's adoption of varying capital requirements was a supplement to the Basel I regime, in response to British policy makers' belief that it was necessary to adjust liquidity criteria based on broader macroeconomic considerations as well (Llewellyn, 2001). In practice, the British system of varying capital requirements resulted in a minimum of 8% additional capital against total risk-weighted

assets, consistent with Basel I, to a maximum of 23% additional capital (Aiyar et al., 2012). To be sure, this system essentially applied microprudential policy to forestall macroeconomic risk, but by setting the trigger to respond to macroeconomic criteria, the British system effectively applied a limited variety of macroprudential policy as an epiphenomenon of its microprudential regime.

On the matter of how large to make a dynamic provision of the kind used in Spain during the first decade of the current millennium, it is impossible to set a size that fully offsets loan losses (Alberola et al., 2011). Nevertheless, exceeding the amount necessary creates a contrary risk of distorting the economic cycle altogether. Thus, the calculation of the optimal size of a dynamic provision necessarily anticipates falling short of that size that would be theoretically sufficient to offset loan losses completely (Van Vliet & Blitz, 2011). By necessity, therefore, the business cycle will inevitable run its course with some level of shock at the end. The role of a dynamic provision of this kind will merely soften the blow, to permit more rapid revaluation of assets and reassessment of conditions on the other side of the event (Alberola et al., 2011).

Moreover, a concern exists over whether overcapitalization of banks may lead to excesses in total loan disbursements, hence feeding procyclicality by indirectly softening credit criteria (Buch & Prieto, 2014). If this concern is valid, then supplementing capital requirements to forestall the loss of liquidity may only exacerbate the procyclical forces that currently lead to substantial economic shock. Indeed, the greater the available capital buffer, the greater is the volume of loan disbursements, according to empirical data (Bush & Prieto, 2014). Contrarily, however, even though loan disbursements grow in tandem with capital reserves, the pattern of bank loan approvals tends to be less procyclical under these

conditions (Bush & Prieto, 2014). Contrarily, however, even though loan disbursements grow in tandem with capital reserves, the pattern of bank loan approvals tends to be less procyclical under these conditions (Bush & Prieto, 2014).

Under the theoretical conditions of perfect competition among banks and other financial institutions viewed as lenders, all banks will charge interest at the same rate as their cost of capital (Rose & Wieladek, 2014). Realistically, financial institutions function as monopolistically competitive institutions, so their rates of interest exceed those of their respective costs of capital (Roger & Vlcek, 2012). However, the extent of the monopolistic element of this competition changes over the course of a business cycle. As the business cycle progresses, sources of lending generally become more numerous, decreasing capital concentrations across the financial sector. The effect of this tendency is to cause interest rates on loans to converge with the cost of capital. This phenomenon may explain the drive toward the subprime market, in which greater numbers of institutions have participated in recent years, and which seems to have helped precipitate the recent financial crisis. Thus, as greater proportions of bank lending come to consist of this higher-risk segment, the weighted mean interest rate that banks can charge for their loans will likewise increase further beyond the cost of capital, thereby helping to compensate for the increasing competition. However, this tendency simultaneously exacerbates the total risk exposure assumed by the same institutions.

2.4.2 Empirical Research

Compared to the theoretical research in macroprudential policy, empirical research has proved difficult to undertake and has therefore tended to emphasize certain observable

phenomena at the expense of others. Toward addressing significant empirical findings in a way that highlights both strong and weak areas in this sense, this section will methodically review the same facets of macroprudential research as just discussed in the theoretical literature. Accordingly, this section will address business cycle effects, price stability, credit, liquidity, risk valuation, arbitrage, capital requirements, and transparency.

Aiyar et al. (2012) examined the effect of the time-varying minimum capital requirement introduced by the Bank of England after Basel I, notably in terms of the degree of regulatory arbitrage that resulted from introducing the regulations. Potential sources of macroprudential leakage in response to a system of adjusting capital requirements against risk-weighted assets in domestic financial institutions include increased lending by foreign banks operating in the same financial environment, greater use of capital markets as an alternative source of investment capital, and greater exploitation of transnational lending as a solution (Aiyar et al., 2012). Moreover, as Aiyar et al. (2012) have found, alternative sources of lending stay within the same economic sector as the institutions from which credit seekers have withdrawn.

While CDS instruments might seem simply to shift risk between parties, a lack of transparency in their usage will cause analysts to miscalculate actual risk associated with specific loan obligations (Wilson et al., 2012). The CMO is an even more complex instrument, because it seeks to mitigate risk by aggregating secured debts across a range of risk valuations as a way to inject sufficient liquidity into high-risk debts to enable effective trading in financial markets (Papagianis & Gupta, 2012). Thus, macroprudential leakages refer to the potential for various kinds of arbitrage to circumvent restrictions placed on financial institutions to help maintain stability in an economy (Aiyar et al., 2012).

Alberola et al. (2011) examined the practice of dynamic provisioning in Spain after the end-of-millennium recession. In this context, business cycle effects in macroprudential models consist of treating the given stage of progression through a business cycle as an exogenous variable that distorts risk calculations. Viewed from the perspective of the most recent economic shocks, a consensus is now emerging that the sheer length of an expansion cycle may introduce frailties in an economic system that will ultimately manifest themselves in the form of extraordinary shocks to the system (Alberola et al., 2011). During an economic expansion without any sign of excessive risk in any particular segment, monetary policy maintains a steady countenance. The absence of signs of obvious instability induces observers to believe that the economy is devoid of weaknesses.

Moreover, short-term stability may hide long-term sources of instability. Accordingly, in the long-run scenario, macroeconomic stability, notably the maintenance of a stable price level, has always supported the strength and stability of the macrofinancial structure (Alberola et al., 2011). However, in the short run, there are often conflicting pressures between macroeconomic and macrofinancial dynamics. This is because, even where prices appear to be stable, emergent imbalances in financial markets can cause an economic crisis. As Alberola et al. (2011) have stated, "Price stability should therefore be seen as a necessary but not a sufficient condition for financial stability" (p. 10). By implication, this observation suggests that risk concentrations may shift in an economy without a concomitant shift in prices.

Anticipating the work of (Funke & Paetz 2012), as previously discussed, (Wong et al. 2011) examined Hong Kong's use of LTV regulatory thresholds, in terms of property price inflation. Their research highlights the quasi-mirroring characterized by 90-day

delinquency ratio in home mortgages, compared to price index for luxury properties, between mid-1999, when the end-of-millennium drop in property prices hit bottom, and mid-2003, when property prices began to rise again. This temporary rise in the delinquency ratio was indeed the result of an excessively steep rise in property asset prices in 1997. However, no similar rise in property prices occurred in the subsequent decade, even during the worldwide recession. Moreover, the 90-day delinquency ratio remained very low during the latter period.

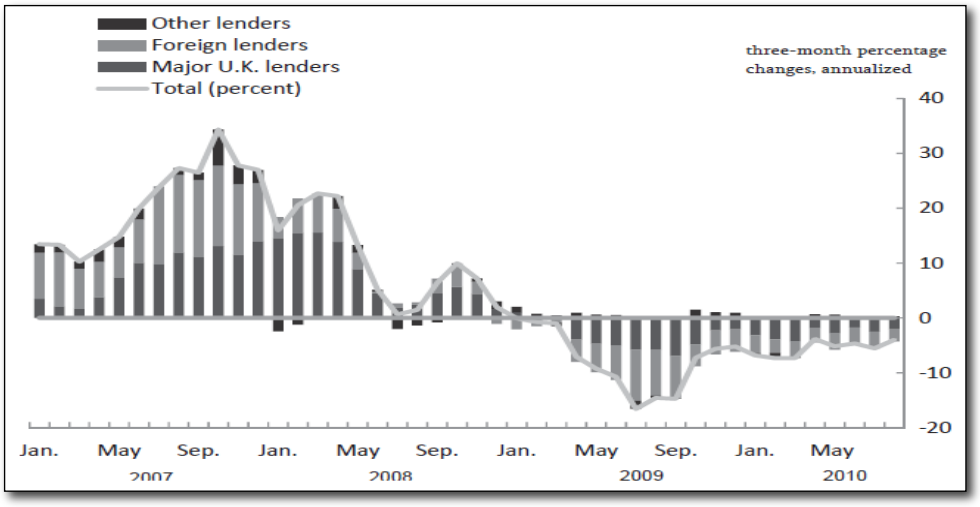
In addition to the foregoing studies of singular macroprudential tools for specific targets, some studies have focused on the use of more than one tool simultaneously for this purpose, in apparent violation of the Tinbergen principle (Alberola et al., 2011). These have included most notably the studies of (Angelini, Neri, & Panetta 2011), focusing on interaction effects between macroprudential and monetary policy, and (Goodhart, Kashyap, Tsomocos, and Vardoulakis 2012), focusing on interaction effects among a broader set of macroprudential and macroeconomic policy tools.

(Angelini et al.'s 2011) assessment of the effects of mixing a countercyclical capital requirement with LTV restrictions demonstrated that supplementing ordinary macroeconomic tools with a macroprudential LTV restriction produces a modest benefit over the role of the central bank alone. However, this situation poses a risk in times of relative economic calm, because macroprudential policies may conflict with the imperatives of the central bank. However, under conditions of severe financial distress, this admixture appears to represent a substantial benefit. Thus, the authors concluded that the role of the central bank should be to collaborate with macroprudential policy makers during times of financial distress, while acting independently overall during times of relative calm.

By comparison, Goodhart et al.'s (2012) study compared LTV restrictions, financial haircuts in repurchase agreements, standard capital ratio requirements, ratio requirements for liquidity coverage, and dynamic provisioning. In this case, the hypothetical positioning of a shadow bank, to complement standard banks, provided a way to reason through the increased liquidity that would result and to compare the aforementioned tools of macroprudential policy against the full dynamic. While the authors' illustration had the goal of building intuition about the subject matter, a significant feature was the consideration of multiple tools operating simultaneously, in violation of the Tinbergen principle (Alberola et al., 2011). On this measure, a significant limitation of the study was the lack of data that showing where nonlinear interactions might occur.

The rapid rise in lending that precedes an economic shock is visible in the pattern of growth in British lending from 2007 to 2010 (Figure 4). Of interest is the fact that growth continued even after the onset of the crisis and only began to decline in early 2009. A significant part of the reason for this continued growth was central-bank intervention, consisting of capital injections to maintain liquidity under the threat of a shrinkage of credit (Rose & Wieladek, 2014). A rapid decline in the availability of credit had been responsible for the Great Depression of the 1930s, so government and central-bank observers saw the provision of capital at a level necessary to reduce credit shock as imperative in the wake of the recent crisis (Brunnermeier, 2009)

Figure 7. *Growth rate pattern of lending to British banks*



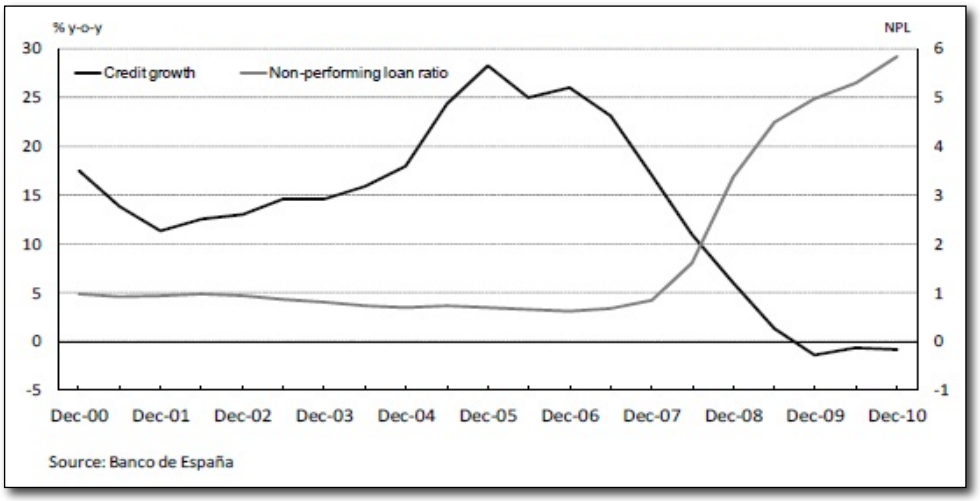
Source (Rose & Wieladek, 2014, p. 2129)

The ability of central banks to determine the origins of a given rapid rise in asset prices, or "bubble," is crucial to the question of possible intervention (Alberola et al., 2011, p. 13). When the stock price bubble of turn of the millennium occurred in the United States, the origin of the phenomenon lay outside the financial sector. Consequently, there was no compelling basis for the central bank to react until the bubble burst, whereupon it would move rapidly to adjust interest rates to ease the fallout (Alberola et al., 2011). However, in this case, after lowering interest rates to unprecedented levels, the central bank kept them exceedingly low, sacrificing flexibility to respond to the housing crisis (Hartmann et al., 2014). Consequently, the interest rate mechanism would be unavailable to manage the fallout from the more serious boom-and-bust cycle less than a decade later. Yet the housing boom would probably have proceeded more gradually had the central bank raised interest rates in a calculated way after the effects of the prior recession had passed. Instead, in the wake of the more recent global recession, the central bank had to resort to massive levels of

securities purchases to create as much of a desired effect as possible.At present, there is no way to predict what the longitudinal after-effects will be from that quantitative easing, but the inflation of the money supply that it entailed would have resulted in uncontrollable inflation at other times in history (Alberola et al., 2011).

On the matter of credit, one of the most reliable predictors of an imminent financial crisis would seem to be a rapid rise in credit as a function of GDP (Brockmeijer et al., 2013). As Figure 8 shows, this variable proved to be a strong predictor in the case of Spain. Indeed, a sharp increase in credit growth, as a percentage of GDP, preceded an abrupt drop as early as mid-2006. Credit availability then dropped precipitously well in advance of the rise in the ratio of non-performing loans. Alternatively, one may notice an unsustainable gap between the level of credit growth and the ratio of non-performing loans.

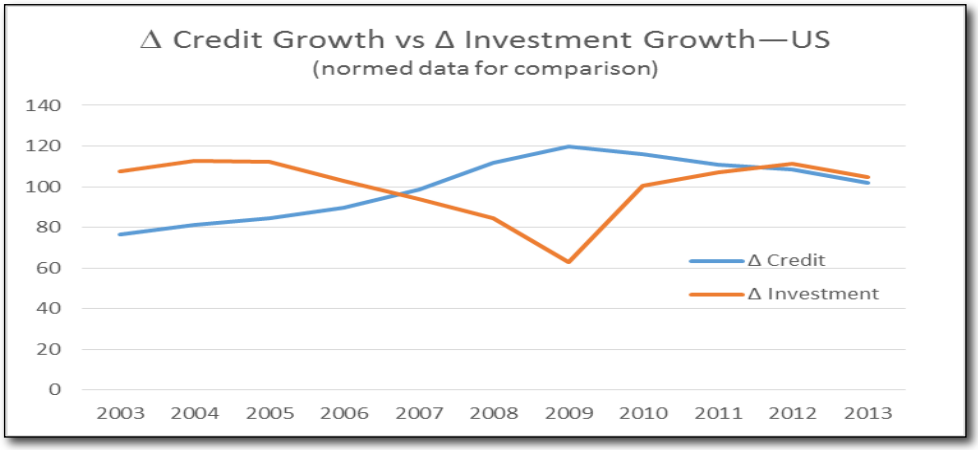
Figure 8. *Ratio of credit growth to non-performing loans*



Source (Alberola et al., 2011, p. 19)

As Figure 9 shows, however, the rise of credit *per se* may be a weaker predictor than the combination of the change in credit growth and the change in investment growth. Although credit level and investment level tend to correlate positively, the changes in growth levels (*i.e.*, the derivatives of the growth curves) only seem to correlate positively when the economy is stable. In fact, using annualized data, one can see evidence by the end of 2006 of an impending crisis, in the form of a negative change in investment growth coupled with a positive change in credit growth. After this trend continued into the subsequent year, the collapse occurred. By implication, one might devise a tool reflecting the ratio between the change in credit growth and the change in investment growth as a measure of macrofinancial instability, although the specific dynamics at issue may be dependent on the country's unique financial regime.

Figure 9. *Change in credit growth vs. Δ investment growth—US*



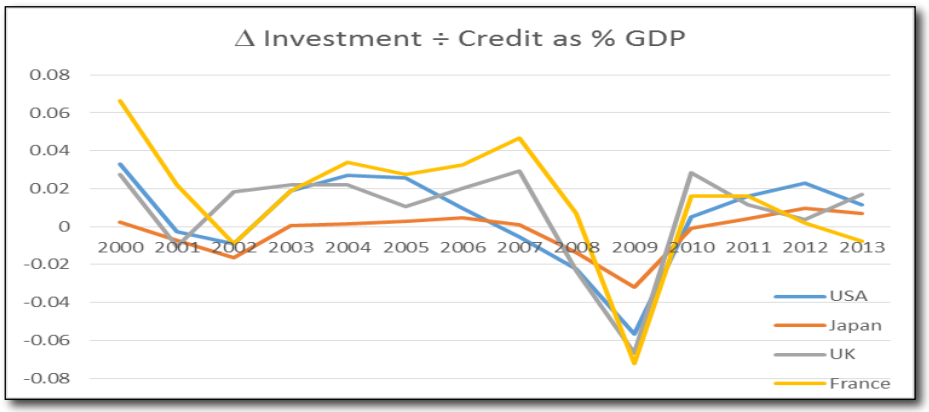
Source *from OECD and IMF data*

In addition, however, during the recent financial crisis, cross-border lending dropped precipitously, in advance of other kinds of lending and to a greater degree (Rose & Wieladek, 2014) (Figure 7, previously). Thus, the first sign of a broadly weakening financial condition may be the phenomenon of financial retrenchment on a national level.

To explain this phenomenon, one would have to argue that the relative cost of credit across national boundaries has risen. Yet, it is virtually impossible for all sources of foreign credit suddenly to become more expensive, unless the sources of domestic credit have suddenly become cheaper, while total investment remains constant. Moreover, as depicted in Figure 2, the critical point in this regard appears to arrive in January 2008, according to UK data. This would seem to be too late to constitute an effective macroprudential predictor.

Indeed, this situation corresponds precisely to one wherein investment has leveled off, as depicted in Figure 6 (above). At the same time, the availability of credit has increased, whether due to decreases in credit cost or increases in liquidity. Either way, the result on the matter of credit is steep credit growth, as depicted again in Figure 6. Consequently, an inverse correlation between investment growth and credit growth may serve as an empirical substitute for a rapid decline in cross-border lending. Accordingly, Figure 7 shows change in investment divided by change in credit by year for four countries, suggesting that the rapid fall in the United States preceded the exogenous shocks to Japan, the United Kingdom, and France by two years.

Figure 10. *Change in investment ÷ credit as % GDP—comparison*



Source *from OECD and IMF data*

On the matter of liquidity, notably for major assets, some countries have established GSEs as an artificial mechanism focusing on enhancing financial institutions' ability to sell mortgages (Sowell, 2009; Wong et al., 2011). For its part, prior to its reversion to Chinese governmental authority, Hong Kong set up the Hong Kong Mortgage Corporation (HKMC) with a trifold mission to provide liquidity for the housing market, encourage home ownership, and facilitate the growth of the Hong Kong market in mortgage-backed securities (Wong et al., 2011). This GSE thus mirrored the analogous role of the FNMA in the United States and potentially produced identical distortions affecting the information feedback mechanism of standard risk analysis. The European Union also began working on such a project prior to the recent recession, in the form of the European Mortgage Finance Agency (EMFA) (Thomas, 2004). Canada's analog is the Canada Mortgage and Housing Corporation (CMHC), which dates from 1944. In Malaysia, the analog is Cagamas Berhad, established in 1986 (Thomas, 2004).

Especially applicable to the role of GSEs in injecting liquidity into mortgage markets is the question of collateral. Indeed, the value of collateral is unstable, but tends to grow in tandem with business cycle progression, while actual loan approval standards tend to soften (Alberola et al., 2011). This is another aspect of effective miscalculations of risk, or the effects of information imperfection in the marketplace. If the progression of the business cycle tends to inflate the value of collateral, then it is certain that that value will decline abruptly in the wake of an economic shock. These forces are among those that account for empirical studies that have demonstrated a positive association between the growth of credit and the rise of credit risk (Alberola et al., 2011). The rise in the loan default rate, which empirical research has demonstrated to occur as predicted by this

scenario, only occurs during rapid credit growth, rather than during periods of moderate credit growth (Alberola et al., 2011).

Loan loss provisions based on national computations associated with business cycle progression may therefore be useful as countercyclical measures. As an example, the system of loan loss provisions used in Spain for the past decade involves a requirement that each financial institution calculate and account for loan impairment (Alberola et al., 2011). Loan impairment assessment refers to calculations of loss probabilities before losses have actually occurred, based on empirical decision models provided by the central bank. Using a simple formula that adjusts the actual credit risk calculation based on an external parameter with macroeconomic origins, the result is effectively a risk valuation that reflects greater risk, *ceteris paribus*, as the business cycle progresses. In turn, this calculation affects loan approval criteria. In Spain, it is incumbent on every bank to use these calculations in their routine practice (Alberola et al., 2011). Thus, this particular policy, construed as a macroprudential tool that operates directly through individual financial institutions, involves a type of central-bank regulation of the financial sector.

On the matter of financial arbitrage, for every 1% of decline in lending by financial institutions due to varying capital requirements, there is a 3% increase in lending on the part of foreign financial institutions falling outside the regulatory regime in the same country (Aiyar *et al.,* 2012). Because foreign financial institutions in the economy constitute only one of several possible sources of alternative credit or capital, it is possible that leakage fully makes up for changes in capital requirements, if one considers the alternatives of capital markets and transnational sources of credit. Nevertheless, as (Aiyar *et al.,* 2012) have opined, the aggregate effect of leakages through all alternative sources may

only be as great as 32% of the aggregate reduction in credit utilization caused by a change in minimum capital requirements in an advanced economy.

Perhaps a simpler macroprudential tool than loan impairment provisions is variable capital requirements, based on measurable economic triggers or as a function of business cycle progression. The premier example of this kind of tool is one adopted by the Financial Services Authority (FSA) in the UK in the 1990s, namely, a variable capital requirement on UK banks and UK subsidiaries of foreign banks (Aiyar et al., 2012). This variable capital requirement relies on economic triggers to indicate when to adjust capital ratios. In fact, Aiyar et al. (2012) found the system of varying capital requirements based on risk-weighted assets in financial institutions, as applied in the United Kingdom from 1998 to 2007, to reveal a substantially magnified effect. Specifically, after controlling for exogenous variables, a change of just 1% in capital requirements produced a change of between 6% and 9% in actual lending. The operation of varying capital requirements thus behaves in a manner similar to a standard money multiplier.

By comparison, as demonstrated in the Spanish experience, dynamic loan loss provisions provided a steady supplement to general loan loss provisions (Alberola et al., 2011). Otherwise, general provisions remained low during most of the period prior to the economic shock of early 2008 and rose rapidly to stem losses at the onset of the recession. Conversely, dynamic loan loss provisions declined according to their natural exhaustion as a critical resource expended to maintain bank solvency as loan losses rose rapidly (Van Vliet & Blitz, 2011). As the chart indicates, general loan loss provisions are procyclical in nature, while dynamic loan loss provisions are countercyclical and therefore effective as a

way to soften the impact of recessionary conditions (Alberola et al., 2011; Hartmann et al., 2014).

These seemingly contradictory findings may be a product of a difference between capital reserves *per se* and capital reserve requirements. Specifically, while capital reserves promote lending, reserve requirements tend to induce banks to pull back on lending (Bush & Prieto, 2014). This contrary behavior would logically be a consequence of the inaccessibility of required reserves, compared to greater capitalization alone. While most studies have investigated short-run effects from greater capitalization and greater capital requirements, a study of long-run implications in Germany has shown a convergence between the effects of capitalization *per se* and the effects of capital requirements (Bush & Prieto, 2014). In the short run, banks reduce their loan volume in reaction to increasing capital requirements, but they generally increase their long-run capital reserves beyond the level mandated by the central bank (Bush & Prieto, 2014).

Beyond merely taking into account an adjusted risk criterion in approving loans, the Spanish system further requires banks to publish their actual loan impairment calculations using the central bank's approved method (Alberola et al., 2011). This transparency provision has a direct effect on investors, who thereby make their own investment choices efficiently across competing financial institutions (Wilson et al., 2012). Consequently, even if certain banks relax lending criteria outside the parameters of these calculations, they recognize the risk that they will incur if they happen to accommodate too much exposure, in the form of falling investment. In essence, this effect is a function of the transparency provision, but the calculation also improves that transparency by revealing how much risk exposure a financial institution has assumed.

Lastly, the combination of nationalization of banks and capital injections from the central bank (*cf.* the United Kingdom and United States, respectively) constitute a form of "financial protectionism," which may have contributed to the recent financial crisis in unapparent ways (Rose & Wieladek, 2014, p. 2128). In the case of the United States, capital injections on a large scale first occurred at the onset of the crisis. In the case of the United Kingdom, nationalization of British banks caused a drop in the share of foreign banks' total lending comprised of British banks by 11% (Rose & Wieladek, 2014). Meanwhile, however, no perceptible change occurred in the lending practices of British banks *per se* after this change.

In summary, most of the empirical literature has sought to identify evidence of the predictive power of certain variables to signal an impending crisis with sufficient advanced notice to permit some kind of macroprudential response. Other literature has looked for practical ways to predict the natural progression of changes in asset prices or risk valuations over the course of a business cycle. In the latter case, the utility of such findings is that it may be feasible to apply national substitutes for presumed changes in these variables based on how long the business cycle has progressed, as a corrective measure for financial institutions to report their risk-weighted assets in a more realistic way than is possible based solely on visible measures. Moreover, specific strategies, such as the British adoption of a dynamic capital reserve and the Spanish adoption of a national corrective for risk valuations based on business cycle progression, appear first to emerge as part of actual national strategies in specific instances, after which it becomes possible to assess their effectiveness and recommend them to central banks overall. Given this pattern, it would therefore appear most feasible to promote certain macroprudential policies within

individual nations, rather than to the world financial community as a whole, with the expectation of greater ease of adoption, as well as a greater likelihood of assessing feasibility for other countries.

2.4.3 Comperative analysis of SEECBs on financial stability monitoring

Central Banks in South Eastern Europe (SEECBs) are mandated to ensure financial stability of their respective countries. The Central Banks fulfill this duty by addressing macroprudential policy including macroprudential supervision and implementation of macroprudential policy tools. The main practical approaches of the macroprudential supervision are monitoring of financial stability indicators and providing stress-testing exercises. Since the financial systems in South Eastern Europe are often at rather early stages of development, compared to developed countries, traditional banking business dominates the systems. As a result, the stress-testing exercises first of all involve banks and inform the macroprudential policy makers about the needed policy adjustments, which are mostly banking sector oriented. As in the case of monetary policy, it is important that the stress tests of banking systems are sufficiently forward-looking to take into account the transmission lags of macroprudential policy and the effectiveness of its instruments.

The predominant stress test methodology in use by most central banks and financial institutions is static, measuring the effect of an adverse scenario that impact the banks' financial statements and accordingly estimates the number of undercapitalized banks and needs for re-capitalization. Nevertheless, this methodology does not consider for several important facts: (1) some risk factors (the interest rate risk; exchange rate risk) spread at much higher pace than other risk factors, as the credit risk ones; (2) the existence of second

round effects, as the banks and the macroprudential policy react to the adverse event – banks adjust the lending and deposit rates and credit standards while the macroprudential supervision might adjust reserve and liquidity requirements, risk-weights and provisioning requirements; (3) following this reactions, there would be significant mutual reaction into the real economy (impact on credit growth, GDP growth, inflation, the exchange rate, and the risk premium). The latter will then impact on financial conditions of banks in a dynamic stress test.

The problematic issue that items of financial statements did not react at the same time is obviously overcome by setting a relatively long time horizon (a year or two) for the analysis. The Czech Central Bank attempts to capture the dynamics by replacing yearly with quarterly calculations. Predictions of banks' balance sheets and income statements are computed dynamically, with each quarter's initial values based on the previous quarterly projection in the 2010 stress test exercise (CrNB, 2010). The models of all other SEECBs are static so far, and none of the SEECBs considers reaction functions of the banking sector and the macroprudential policy, and the implied second-round effects on the real economy in their stress tests.

There is a need to account for all the shortcomings deriving from the static characteristic of the dominant stress tests. Haldane (2009) emphasizes that the common static stress evaluations should be the starting point, not the end point.

The main challenges for the SEECBs emphasize the need to address problems with data reliability, consideration of quantitative microprudential indicators in macroprudential stress tests, explicit incorporation of dynamics in stress test to include reaction functions of

banks and macroprudential policy, institutionalization of macroprudential policy responses to alarming stress-test results and use of the top-down and bottom-up stress test results in supervisory communication, and cooperation of macroprudential and microprudential supervision and information exchange for better cross-border supervision of international banking groups.

Table 2 : *SEECB's stress testing characteristic*

Central Bank	**Macro Scenarios**	**Risk Factors**	**Risk Exposures**	**Outcome Indicators**	**Static/ Dynamic**
Bank of Albania	*Baseline scenario*: macro-model and IMF forecast *Adverse scenario:* judgmental approach	*Credit risk:* aggregated data NPLs estimation. *Market risk:* interest rate, exchange rate ; *Liquidity risk:* withdrawal of deposits *Contagion risk:* not addressed	*Credit risk:* EAD – the non- defaulted portfolio *Market risk:* net interest income; net open foreign currency positions *Liquidity risk:* deposits *Contagion risk:* not addressed	*Credit and Market risks(joint impact):* CAR *Liquidity risk:* number of days the banking system can withstand the deposit withdrawal	Static
Central Bank of Bosnia& Herzegovina	*Baseline and adverse scenarios*: IMF guidelines	*Credit risk:* NPLs from aggregate estimation *Market risk:* interest rate *Liquidity risk*: withdrawal of various types of deposits *Contagion risk:* not addressed	*Credit risk:* EAD – the non- defaulted portfolio *Market risk*: net interest income *Liquidity risk*: deposits (the largest deposits) *Contagion risk:* not addressed	*Credit and Market risks (joint impact):* EL and CAR; assumptions for income and RWA *Liquidity risk*: number of days the banking system can withstand the deposit withdrawal	Static

Croatian National Bank	*Baseline and adverse scenarios:* structural macro-model and expert judgment.	*Credit risk:* aggregated data NPLs estimation; PDs from transition matrixes. *Market risk:* interest rate, exchange rate *Liquidity risk:* not addressed Contagion risk: not addressed	*Credit risk:* EAD – the non- defaulted portfolio. *Market risk*: net interest income, the value of securities' holding; net open foreign currency positions	*Credit and Market risks (joint impact):* EL and CAR; model and assumption for income and assumption for RWA	Dynamic elements – quarterly projections.
National Bank of Serbia	*Baseline and adverse scenarios:* IMF guidelines	*Credit risk:* aggregated data NPLs estimation. *Market risk:* exchange rate *Liquidity risk:* not addressed *Contagion risk:* not addressed	*Credit risk:* EAD – the non- defaulted portfolio *Market risk*: net open foreign currency positions	*Credit and Market risks (joint impact):* EL and CAR; assumptions for income and RWA	Static
Central Bank of Montenegro	*Baseline and adverse scenarios:* judgmental combination of internal projections with the IMF guidelines	*Credit risk:* aggregated data NPLs estimation. *Market risk:* interest rate, exchange rate *Liquidity risk:* withdrawal of various types of deposits *Contagion risk:* not addressed	*Credit risk:* EAD – the non- defaulted portfolio; portfolio concentration *Market risk*: net interest income, the value of securities' holding; net open foreign currency positions *Liquidity risk*: deposits (largest depositors)	*Credit and Market risks (joint impact):* EL and CAR; assumptions for income and RWA	Static
Central Bank of the Republic of Kosovo	*Baseline and adverse scenarios:* judgmental approach	*Credit risk:* ad-hoc shock in NPL *Market risk:* interest rate, exchange rate *Liquidity risk:* withdrawal of various types	*Credit risk:* EAD – the non- defaulted portfolio; portfolio concentration *Market risk*: net interest income, the	*Credit and Market risks:* EL and CAR; assumptions for income and RWA	Static

		of deposits	value of securities' holding; net open foreign currency positions *Liquidity risk*: deposits (largest depositors)		
National Bank of the Republic of Macedonia	*Baseline and adverse scenarios:* judgmental approach	*Credit risk:* increase in classified loans *Market risk:* interest rate, exchange rate Liquidity risk: withdrawal of deposits Contagion risk: not addressed	*Credit risk:* EAD – the non- defaulted portfolio *Market risk*: net interest income, the value of securities' holding; net open foreign currency positions Liquidity risk: deposits	*Credit and Market risks(joint impact):* EL and CAR; assumptions for income and RWA	Static
Czech National Bank	*Baseline and adverse scenarios:* structural macro-model	*Credit risk:* PDs estimates for four loan portfolios; estimated LGDs *Market risk:* interest rate, exchange rate, equity prices *Liquidity risk:* idiosyncratic and market shocks – bank run, drawdown of credit facilities, uncollectibility of some short-term claims, and decrease in the value of securities *Contagion risk: b*anks' ELs from the interbank	*Credit risk:* EAD – the non- defaulted portfolio; portfolio concentration *Market risk*: net interest income, the value of securities' holding; net open foreign currency positions *Contagion risk:* not addressed *Liquidity risk:* deposits, credit lines, short-term claims on banks and other clients, *Contagion risk:* banks'	*Credit and Market risks (joint impact):* EL and CAR; model estimation of income, assumption for RWA *Liquidity risk:* bank- specific liquidity gaps *Contagion risk:* total losses due to interbank exposure	Dynamic elements – quarterly projections.

		exposure that are high enough to lead to a reduction in their CAR	net interbank exposures		

Source : World Bank, 2014

CHAPTER III

Albanian Macroprudential Policy Approach

For setting a national macroprudential policy framework, the structure of the local financial sector and the most significant experiences are the most important factors. This chapter will try to highlight the specific macroprudential approach for Albania, the progress and challenges made in defining and building an appropriate macroprudential policy, to account for system-wide or systemic risk. It also includes the progress in developing the main methodologies, and identifies the more appropriate approaches given the Albanian financial system features. It starts with a short description of the financial system structure and its characteristics, as an important topic to design a macro-prudential framework that best suits to the national context. The subsequent section gives an overview of the main macrofinancial developments in Albania, before and after the global financial crisis. The third section gives an overview on banking system latest developments, the main risks that the system is facing and explaining reasons that caused that situation. In turn, the next section treats Macroprudential framework in Albania focusing in three main policy implications: (i)enhancement of methodologies for measuring systemic risk; (ii) improving in internal organization of the BoA ; and (iii) improving macroeconomic policy and environment. The fifth section explains Institutional arrangements for the conduct of Macroprudential Policy, institutional responsibility for macroprudential oversight and the associated governance, accountability, and coordination arrangements. It also explains instruments used to monitor and assess systemic risks, as well as methodologies to evaluate Financial Stability. The next section describes in chronological sequence measures taken from the Bank of Albania to preserve financial stability, before and after crisis. The final section explores the essence of the package of macroprudential measures taken from Bank of Albania, the reasons that motivated it and banking system's benefits.

3.1 Albanian Financial System features

3.1.1 Albanian Financial System Structure

The Albanian financial system is bank-based, similar to those in many other European countries. It consists of banks, non-bank financial institutions, savings and loan associations, insurance companies, private supplementary pension funds and investment funds. As of the end 2014, the depth of financial intermediation ratio, measured by the total assets of the financial sector in per cent of Albania's Gross Domestic Product (GDP) was steadily increasing, reaching 99,3%. The banking sector made of 16 banks, dominates the financial system, insofar its assets by 1.253 billion lek represent 90,3% of the financial system assets and 89,6% of country's GDP (FSR of BoA June 2014) .

Hence, the identification and risks assessments that source from banking sector activity is very important in the context of financial stability. The relevance of the non-bank financial sector is very limited, thus its contribution to systemic risk is apparently minimal.

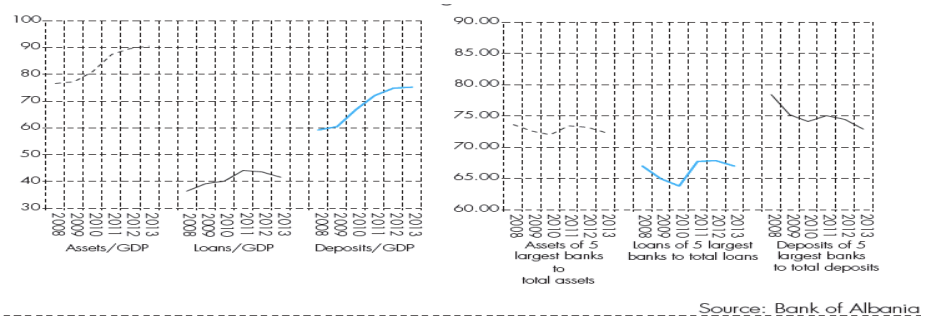
Table 3 *Financial system segments as a percentage of GDP, in years*

Licensing and Supervisory Authority	Financial System	2008	2009	2010	2011	2012	2013	June 2014
Bank of Albania	Banking Sector	76.7	77.5	80.9	84.7	89.6	90.5	89.6
	Non-bank institutions	1.7	2.2	2.7	2.5	2.7	2.5	2.6
	SLAs and their Unions	0.7	0.8	0.8	0.7	0.8	0.8	0.7
Albanian Financial Supervisory Authority	Insurance companies	1.4	1.5	1.4	1.5	1.6	1.6	1.6
	Pension funds	-	0.01	0.01	0.01	0.02	0.03	0.04
	Investment funds					1.21	3.7	4.7

Source: Bank of Albania, Albanian Financial Supervisory Authority.

As of the end June 2014, banking sector is exposed to other segments of financial system only 1% of the total assets or 7% of capital. These low level of exposure to other non-bank financial segments, limit direct financial risk that might be transmitted through inter-sectorial relations. On the other hand, the exposure of non-bank financial segments to banking sector is in considerable level that means high sensitivity of them by the performance of banking sector. The banking activity continues to show *high concentration*. Out of all banks, the six biggest ones account for 75% of total banking sector assets. Around 90% of total assets of the banking sector are held by foreign banks, currently all operating in "subsidiary" legal form. All banks participate in the interbank market.

Figure 11 *Financial intermediation and concentration of Albanian Banking Sector*



Around 82% of banks' liabilities are composed of public deposits, and roughly 50% of their assets are represented by loans to businesses and households. In terms of currency composition, the ratio of loan to deposits, either in domestic currency or in foreign currency, is significantly lower than 1. Regulatory requirements require banks to hold minimum risk-weighted capital at the level of 12 % , minimum liquidity ratios in domestic currency and the two main foreign currencies , have maximum exposure levels to related parties in terms of regulatory capital . Governance principles require for any bank operating in Albania to have the Board of Directors, the Executive Managements, and various committees.

Bank of Albania is the central bank and plays the role of the regulator of the banking sector. From 2005, BoA manages the public infrastructure of the payment systems in the domestic currency. The central bank also provides clearing and settlement facilities for institutional transactions in the primary and secondary market of government debt securities. Hence, the functioning of the payment system is considered as with a very low risk. There are no securities of private debt traded in the capital market in Albania, and hence, the banking sector provides the main source of finance for the needs of real economy agents.

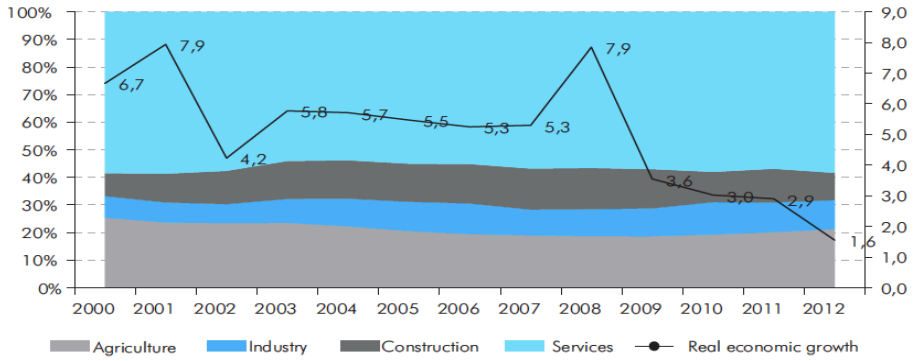
From this description, the banking sector, the payment system and the clearing and settlement for government debt securities, appear to be the most critical parts of the financial system in Albania. The focus should be on banks, which dominate the financial system and are part of foreign banking groups. Although the business model of banks is fairly traditional, based on deposits and loans, and their exposure to wholesale financing and sophisticated investments is quite limited, one has to consider other existing risk

channels and possible risk built-up in the future. Hence there is a need to develop Macroprudential Policy responses and tools in a preemptive way.

3.1.2 Macrofinancial developments

During the period 2000-2008 , Albanian economy has performed with a steady economic growth , average 6.1% and continue to perform well until in the wake of financial crisis in 2008 with 7.5% in real terms. The crisis impact was reflected in coming years, where the economy was raised by only 3.5% in 2009. Economic activity was slowed down in 2011 by 2.9 % in average, and in 2013 was grown with minimum historic level of 0.44%.

Figure 12 *: Contribution of economic sectors to real GDP growth*



Source: Instat

The structure of the economy has been changed following these economic developments. During 2000-2008 is evidence the flowering of construction sector, contributing by 13.8% in value added of 2008, while service sector contributed with 51.1% during period 2000-2008. Agriculture sector contribution is slow down in average 20.3% , meanwhile industrial sector continue to give a low contribute 8.1% . The starting of financial crisis has impacted negatively the construction sector, so its contribution into real

economic growth is reduced considerably, while service sector is extended in sustainable way .

Inflation rate, since 2000 until 2013 is fluctuating in interval 2-4% , in the line of targeted band of 3% (+/- 1%) of the Bank of Albania. After financial crisis, the average rate of inflation rose to about 3.5% in 2010 and 2011, from 2.2% in 2009, mainly caused by high level price of import . The low economic growth during 2012 and 2013 , mainly because of low level of consume and investments , reduces average inflation rate in 2% .

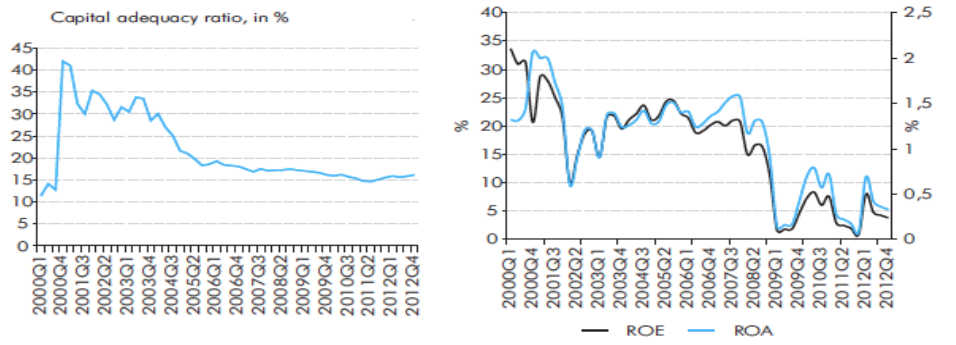
Developments of exchange rate, discussed in terms of Nominal Effective Exchange Rate (NEER) and Real Effective Exchange Rate (REER), walked through the same line with macroeconomic developments during crisis period, as well as during normal times. Developments of exchange rate has been stabilized after 2001, when Albanian currency was gradually strengthened, until financial crisis was started. During 2009-2010, NEER and REER were depreciated, while the markets were stabilized, putting foreign exchange in a new equilibrium during development years .

Historically, the developments in financial sector reflect the main macroeconomic developments. When the communist regime was fall, is was established the two levels bank structure in 1992 through the " On the Bank of Albania " law and " On Banks in Republic of Albania" law. The privatization of the Savings Bank in 2004, it was accompanied with different structure reforms even because some other foreign commercial new banks entered in market, so the financial deepening through banking sector was made more inherent.

The performance of financial system was stable; banking sector is good capitalized and has generated profits. Bank Capital indicator for the system during the period 2000-

2008 have been average 24% , two times higher then minimum threshold regulator defined by the Bank of Albania 12% . After the global financial crisis, the Capital Adequacy Rate (CAR) has been reduced in 15% showing a good capitalization of banking sector . In terms of the profits, banking sector is characterized by positive profits during 2000-2013. It is evidenced the decline in profits from own assets, as well as from own funds mainly after last financial crisis.

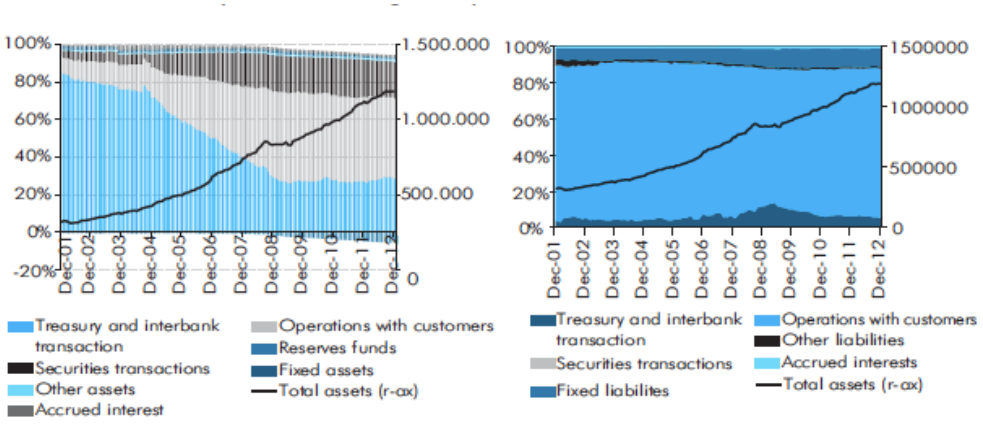
Figure 13 *: Capital Adequacy Rate and Profitability of banks*



Source: Bank of Albania.

System Bank's assets and liabilities have been expanded during 2000-2013 , but after 2008 until 2013 this expanded have been in slower terms.

Figure 14 : *Decomposition of total assets and liabilities of banking system during the period 2001-2012*

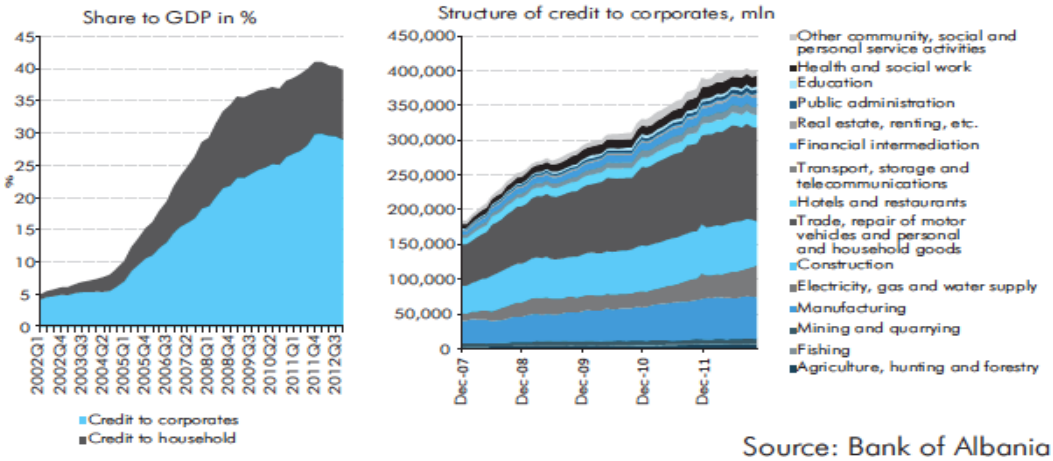


Source: Bank of Albania.

The item which has contributed in lower expansion pace of assets, is “transaction with clients ”, item that presents the lending of banking sectors to resident and non-resident subjects without including calculating interests. Deposits of the banking sector remain the main financial source of assets and made up about 83% of the total of liabilities. Regardless the financial crisis, deposits continue to contribute positively in the system.

The Lending activity in Albania started to be increased with quick pace after 2004. As of the end of 2013, total loan consisted in 45% of GDP. The beginning of financial crisis had a big impact on the growing of the credit. The annual rise rates suffered marked slowdown with 1.5% for the loan to business and with 0.43% for the loan to households, in the end of 2013.

Figure 15 *Credit performance in Albania*



Source: Bank of Albania.

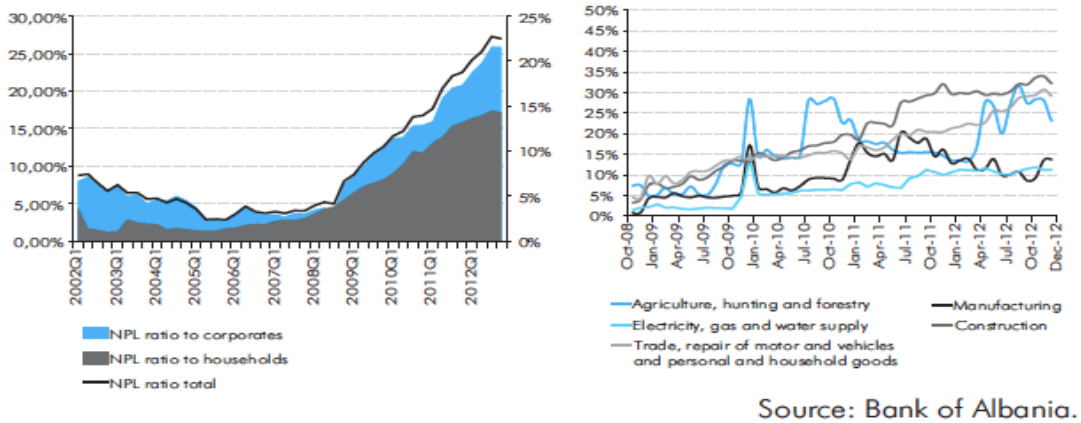
As regards the structure of loans to businesses, the sectors more financed from banking system have been trade, construction and elaborated industry /(manufacturing). After 2009, the lending to the construction sector was inherent slowdown with a grow rate of 6.3%, compering with 43.2% in 2008. The share of construction’s loan to total one arrived at 15 % in the end of 2013, from 21% in the end of 2008. Trade and production

sectors have been grown their weight to total business loan, while agricultural and electric energy have been more attractive for loans.

The financial crisis had a significant impact on non-performance loan indicator. The quality of the loan is worsted, from a low level of 6.6% in the end of 2008, in 24.9% in the end of 2014. Such a reality reflects the situation of the business non-performance loans stock, which was grown quickly. On the other hand, the quality of household loans was worsted too, albeit to a lower pace, accompanied with negative developments in their borrower activity.

Referring the main sectors of the economy, construction sector has marked higher pace of non-performance loan growth, arriving at 30% in 2013 , from 7.6% in the end of 2008. Trading sector featured (appeared) high level of non-performance loans, while the sector of furniture with electric energy, gas and water, which has been financed in last years, is performing well.

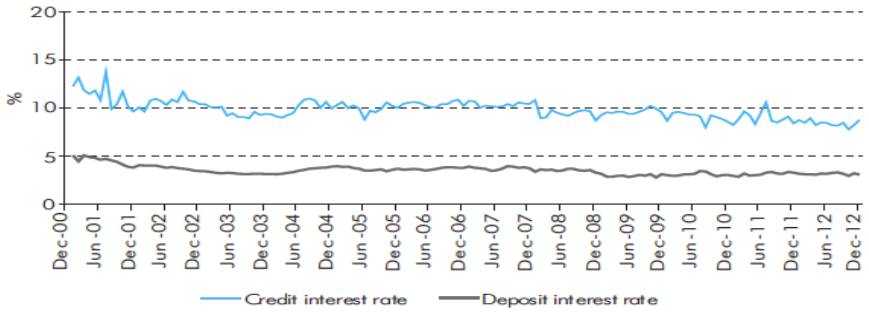
Figure 16 *Non-performing loan ratio by different agents (left) and sectors(right) in the economy*



Source: Bank of Albania.

The financial intermediation cost presents a very important element of financial development. Although it is difficult to evaluate these costs, the margins of banking interest rates have been used as a good indicator. Regardless the downward trends of interest rates for loans and deposits, their margins have not follow the same trend. As of the end of 2000, margins of interest rate arrived up to 5.94%, then have been grown due to low level of deposit interest rate during 2004-2005 period. After 2008, the margins of interest rates were extended due to higher cost of the loan, which was declined only during the first part of 2012. However, during that period, the margin of interest rate was about 5.1% until the end of 2012.

Figure 17 *Interest rate performance in Albania*



Source: Bank of Albania.

Thanks to above mentioned features of the Albanian banking sector, the consequences of the crisis in 2008-2009 were relatively contained, and banking sector was able to provide credit throughout without major disturbances. Prudent regulations and monetary conditions were the key ingredients of the macroprudential policy toolkit. At the same time, the fact that monetary policy and banking supervision have always been the responsibilities of the central bank proved to be rather important.

3.1.3 Banking system latest developments

The banking systems' assets as per the end of 2014H1 accounted for ALL 1.253 billion extended by 4.1% in annual terms, from 6.1% a year before. The capital adequacy ratio remains at satisfactory levels, at 17.96%, above the minimum threshold of 12%, increasing by 1.76% compered to a year earlier. The profitability indicators of the banking system remain in positive territory: the banking sector's net profits were about Lek 5.4 billion, compered with 1.5 billion leke in previous year; the annualized return on average assets (ROA) was 0.54% and return on average equity (ROE) stood at 6.4%, as the end-2014H1. During 2014H1 the bank lending was contracted by 2.2% y.o.y and banking loan accounted for about 41.5% of GDP . This growth rate lower compared to the growth registered during the same period one year ago (1.01%). The non-performing loans indicator reached 24.2%, increasing by 1.7% compared to the end of 2013. The liquidity situation of the banking system is stable, with the loans to deposit ratio standing at 54.7%, with a slight decrease of 0.8 percent compared to December 2013. The ratio of liquid assets to short term liabilities stood at 33.8%. Despite the moderate economic activity, bank deposits increased at 3.%, from 4.7% in previous year. The share of non-performing loans in private business loan portfolio expanded by 1.8 percentage points to 27.7%, while in household loan portfolio it improved slightly by 0.5 percentage points to 16.7%. During the year, non-performing loans continued downgrading into loss loans, NPL coverage by provisions has historically been more then 50%, and presently it is at approximately 62%.

Most problematic risk of the banking system is the risk of credit.

Non-performing loans (NPL) in Albania is the sum of loans categorized as Substandard, Doubtful or Lost, or summarized as the loans past due for more than 90 days. For such

definition, only the gross value of the loans is considered, no deduction of provisions, no reduction of the loan value with the collateral value is considered. NPL ratio is calculated as the ratio between the gross value of NPL and the gross value of the entire loan portfolio. Hence, *the definition can be considered as a prudential one* . Compering this definition with the definition on NPLs recently by European Banking Authority (EBA), they very much compliant to each other and aim at a prudent approach.

The reasons that causes such increase of NPL ratio may mainly be explained by the following:

The effect of the international financial crisis. The run on deposits due to rumors from the international market has led banks to revise their business plans and reduce the lending pace. The behavior has given pro-cyclical effects on the borrowers' situation spread in time. That reduced the liquidities available for businesses and also bestowed a structural effect on the NPL ratio.

The local economy felt the effects of the international financial crisis leading businesses and individual to a reduced paying capability. The deeper the effect were transmitted to the local economy the higher was the level of past due obligation. On the other hand, the economic operators reduced their demand for loans due to non-optimistic expectations, thus lessened or postponed their investment or consumption plans. Thus the much lower demand, and the tightened credit standards applied to the existing demand, has a further impact on the level of NPL ratio.

Exchange rate volatility, which is theoretically expected to impact the NPLs in foreign currency, might have had an impact (not qualified) seen in the difference of trends

of NPL ratio for foreign currency loan and domestic currency loans. The difference in trends showed up in the middle of 2010, but from 2012 the pace of growth of foreign currency NPL ratio seem to be comparable to the domestic currency one.

Collateral execution has not served as cushion for reducing the NPL level so far. The difficulties out of the bureaucracy have produced an execution process, which lasts around 630 days in average. On one hand, it obliges banks to engage large efforts and human resources on the process, and on the other hand it fails to deliver a proper message to borrowers on their responsibilities for repaying bank dues. The collateral execution process has produced a collection ratio of 20%, from which 65% is collection of physical assets.

Restructuring as one of the efficient tools to smoothen the individual borrowers' performance and the economy in more general terms has been successful enough to sidestep the accumulation of nonperforming loans so far, the restructured loans make up for around 10.6% of total loan portfolio and their recovery rate is only 13.7%. The methods used by banks for restructuring have been limited to some extend. To address such concerns, BoA has initiated cooperation with WB for a project on NPL enhancement through the assistance of an company of international experience, FINSAC.

3.2 Macroprudential Policy Approach in Albania

3.2.1 Policy implications

There is a broad consensus in central bank community that the objective of financial stability is to achieve continuously a level of stability in the provision of financial services (i.e lending, payments' execution, insurance) which will support the economy in attaining

maximum sustainable economic growth. The BoA defines *financial stability* as a situation where the financial system operates with no serious failures or undesirable impacts on the present and future developments of the economy as a whole, while showing a high degree of resilience to shocks. The core element of BoA financial stability framework is financial stability analysis, studying potential sources of systemic risk arising from the links between vulnerabilities in the financial system and potential shocks coming from various sector of the economy, financial markets and macroeconomic developments. An important element of financial stability policy is macroprudential orientation of BoA financial stability policies and the need to design macroprudential policy. The objective of a macroprudential policy approach in the BIS tradition is to limit systemic risk, i.e. the risk of episodes of financial distress with significant losses in terms of real output for the economy as a whole. This definition falls within the macroeconomic tradition and implicitly involves monetary and fiscal policies as drivers of the financial cycle. The spectrum of issues to be considering when determining macroprudential policies approach is vast, but there is a need to undertake this process in Albania in a sustained mode and establish the right framework and priorities.

The primary distinguishing feature of macroprudential policy is that unlike traditional microprudential regulation and supervision (focused on the resilience of individual financial institutions to mostly exogenous events) it focuses on the stability of the system as a whole. It primarily monitors endogenous processes in which financial institutions that may seem individually sound (or that may take individually sound actions[1])

[1] Hanson et al. (2011) explain the difference between the micro view and the macro view by pointing out that asset shrinkage can be a sound method of adjustment for a bank that is weak for idiosyncratic reasons. By shrinking its assets, the bank transfers its business to stronger players in the market. However, if the whole banking sector is weak for systemic reasons, collective attempts to shed assets will damage not only the sector itself, but also the real economy via credit-crunch and fire-sale effects on asset prices.

can get into a situation of systemic instability through common behavior and mutual interaction. Even if all banks are individually reasonably diversified, their balance sheets can be highly exposed to the same sources of risk, associated usually with macroeconomic developments. This calls for looking at the system from a systemic perspective, not from the perspective of its isolated parts. (Hanson et al. 2011) describe a microprudential approach as one which is partial-equilibrium in its conception, while a macroprudential approach is one in which general-equilibrium effects are recognized. Therefore, "true" macroprudential policy instruments are those, which are explicitly focused on the financial system as a whole and on the endogenous processes going on within it. Other measures that can be used to a certain extent to support financial stability and can also have macroprudential aspects include microprudential regulatory and supervisory instruments and monetary, fiscal and tax policy tools. The two perspectives are complementary.

The macroprudential policy objective is to prevent systemic risk from forming and spreading in the financial system and thereby reduce the probability of occurrence of financial crises with large real output losses for the entire economy [2]. By suppressing channels of formation and spread of systemic risk, macroprudential policy should therefore act primarily preventively against signs of financial instability in the future and secondarily at least to mitigate their impacts if prevention does not succeed. The object of macroprudential policy is systemic risk, which has two main dimensions. The time (cyclical, conjuncture, dynamic) dimension reflects the build-up and manifestation of systemic risk over time. The source of this dimension is procyclicality in the behavior of

[2] Reinhart and Rogoff (2009) document that systemic crises have a long-term negative impact on economic activity. In such crises, GDP contracts for a period of around two years on average and returns to its original trend only after four years.

financial institutions contributing to the formation of unbalanced financial trends, which sometimes slip out of the control of institutions themselves or their regulators (see, for example, Brunnermeier et al., 2009 or Borio and Drehmann, 2009a). Systemic risk of this type manifests itself primarily as correlated exposures to the same macroeconomic factors across financial institutions.

The second dimension of systemic risk is cross-sectional (structural) and reflects the existence and distribution of systemic risk at any given moment in time. The source of this dimension is mutual and chained exposures among financial institutions. Such institutions can underestimate the potential impact of their own activities on the risk of the financial network as a whole, thereby creating negative externalities for other parts of the system. The time and cross-sectional dimensions to a large extent evolve jointly and so cannot be strictly separated. Shin (2010) argues that increased systemic risk from interconnectedness of banks is a corollary of excessive asset growth and a macroprudential policy framework must therefore address excessive asset dynamics and fragility of bank liabilities. In a growth phase of the financial cycle, rapid credit growth is accompanied by a growing exposure of a large number of banks to the same sectors (usually the property market) and by increasing interconnectedness in meeting the growing need for balance sheet liquidity. Financial institutions become exposed to the same concentration risk on both the asset and liability side. This makes them vulnerable to the same types of shocks and makes the system as a whole fragile. When a shock comes, banks face problems with funding, their lending is tightened and all market participants try to sell their assets at the same time, which creates a downward spiral in both the financial and the real sectors. The time dimension shows up in the degree of solvency, while the cross-sectional dimension

manifests itself in the quality of financial institutions' balance sheet liquidity. However, solvency and liquidity are also interconnected, as liquidity problems often transform quite quickly into insolvency. From the general perspective, and given the character of the Albanian economy and its financial system as mentioned above, the time dimension of systemic risk can be regarded as more important. Empirical analysis of the history of financial crises reveals that the credit cycle – whose primary features are changes in credit growth and in the level of debt of economic agents – usually lies at the heart of systemic financial crises with strong negative impacts on output. The 1997crisis in the Albania, the 2007–2009 global crisis and the subsequent euro area crisis were all of this nature. However, the cross-sectional dimension and the role of sectors other than banks should not be underestimated either. Especially in a small open economy, connections between institutions in the domestic economy and their links with the international economy can both be sources of contagion. While acknowledging the greater importance of the time dimension, the approach to macroprudential policy must therefore cover both dimensions.

Given the aforementioned characteristics of systemic risk, *macroprudential policy* can be defined as the application of a set of prudential tools that are calibrated and assigned to target sources of systemic risk. These are tools that have the potential to (i) increase preventively the resilience of the system, in the systemic risk accumulation phase, against the risk of emergence of financial instability in the future by creating capital and liquidity buffers, by limiting procyclicality[3] in the behavior of the financial system or by containing risks that individual financial institutions may create for the system as a whole, (ii) mitigate

[3] Procyclicality of the financial system means its ability to magnify swings in the economic cycle through lending and other activities of financial institutions as a result of feedback between macroeconomic developments and the financial system.

the impacts, in the systemic risk materialization phase, of previously accumulated risks if prevention fails.

The discussion and proposed changes to the international financial regulatory reforms is following with special attention from all countries, but the practical adoption of the proposed changes should be guided by the objective to achieve higher convergence with international standards, it should be determined by the characteristics of national or regional financial system and its developments objectives. Moreover, focusing only in achieving better regulation of the financial industry, without addressing at the same time other important and probably an sustainable economic developments in the fiscal and monetary policies, represents an asymmetric approach that does not appropriately address financial stability risks.

Macro prudential framework in Albania should be developed focusing in three main policy directions: *first*, enhancement of systemic risk measuring methodologies and improvements in the legal supervisory framework, in order to prevent rising sensitivity from potential sources of systemic risk in the financial system; *second,* the improvements in internal organization of the Bank of Albania, as "designated" macroprudential authority , and its cooperation with other authorities; and *thirdly* , improvements in macroeconomic policy and environment .

The first policy direction

Methodologies applied so far from the Bank of Albania, such as Financial Stability Map, Financial Stability Index, The methodology to identify systemically important financial institutions , Methodology to assess Financial Systemic risk , the Survey on

Bank Perception on main systemic risks, which are focusing in identification and measurement of financial systemic risks , could serve as solid platform to develop future research for other methodologies that provide a more consolidated view on systemic risk and allow for building a risk universe in the financial system and possibly , economic environment. In the future, the efforts should be focus on developing models that analyze the overall relationship between the financial system and macroeconomic context. These models should investigate the impact of assumed changes in Gross Domestic Product, exchange rates, inflation , in banks quantity and quality of lending, capital , net interest income and vice-versa. Banking sector should become an important player in this process, engaging through the implementation of the bottom-up stress testing technique. This work could benefit from the existing financial macroeconomic model in the Bank of Albania.

Banking sector in Albania is sustainable, good capitalized, liquid and able to generate profits, even it is functioning in very fragile national and global context. This is because the banks in Albania have a traditional business model and a lack of excessive leverage. Regardless that, the legal and regulatory framework can be further improved from the macroprudential perspective, than means that legal and regulatory framework, as well as supervisory practices should be focused on the risk of banking activity and institutions, and have clear definitions and requirements that allow for some flexibility in decision making. In practice, in many cases this means that certain regulations may contain requirements that apply (or become void) automatically, avoiding the need for (possibly inconsistent) interpretations on a case-by-case basis from supervisors and the banking industry. The right of supervisors to judge and decide on particular issues, or that of the bank to express its position should be inviolable, but those must be supported by analysis

and quantitative indicators, increasing transparency as well as the quality of discussion and decision making.

Macroprudential approach, differently from micro prudential one, where supervisory regulation are the same for all financial institutions , should undergo tighter regulation and supervision for systemically important financial institutions , proportionate to the impact they give in systemic risk or financial stability of a specific market segment or the country in general. Requirements for banks/institutions with systemic importance may include quantitative indicators on issues such as the minimum level and the quality of the capital, the composition of liquid assets, minimum level of liquidity ratios, especially in foreign currency ; limits on financial leverage ; the size of borrowing from non-residents ; exposure concentration, etc. Also stronger qualitative requirements may be included in terms of the quality of managements structures (providing specific requirements related to professional knowledge and experience involvement in the activities of the Bank, Governing Council and the Executive Managements; various incentives for limiting the exposure of the institution to high-risk activities , etc.)

Strengthening of control systems and internal audit independence, adjust the scope of external audit to include risk assessments, limit exposure to certain activities, ensure the effective establishment and operation of the risk managements structures, ensure regular and comprehensive reports for market participants, requirements for the adoption of specific reports on crisis situation, instances of necessary restrictions on “outsourcing” etc. From the perspective of supervisory practice, systemic banks would require a specialized supervision process (methodology, technical infrastructure, people) and perhaps more frequent presence of supervisors. In general, such an approach is justified by the

importance these banks have on the stability of the financial system and the economy, as well as may in fact represent a better used of limited supervisory resources and a concrete implementation of the concept of "risk-based" supervision. In additional effect, such an approach may prove useful from point of view of banking competition, with positive consequences for the costs of banking and financial services to the customer.

Furthermore, regulatory and supervisory perimeter should be extended to all institutions that provide financial services (horizontally), as well as to non-financial companies hat may influence or control systemically important financial institutions (vertically). Legal and regulatory framework should define clearly the authority responsible for the regulation and supervision in this case, as well as aim at a convergence of supervisory standards among authorities. Also, the supervisory framework in this case should identify and react to interactions that exist between banks and non-bank financial institutions, in order to control for specific risks in becoming systemic ones.

Such development would support the expansion of surveillance perimeter in the vertical direction, regarding the supervision of banks' institutional shareholders. For the case of institutional financial shareholders, monitoring and supervision would be easer after implementing a similar framework should supervisory authorities be different. Regarding non-financial institutional shareholders, who own a significant participation in the capital of banks, supervisory framework should include stronger requirements on the management's structure and their financial situation, not only during licensing process but also during the performance of shareholder of the bank.

These requests may start with the obligation to submit regularly audited financial reports at the supervisory authority of the bank, and can extend up with the obligation to undergo a specific supervision appropriated designed. Of course, such a thing would require legal support and sufficient capacity to act. An immediately and temporary solution could be for the bank supervisory authority to enter agreements of cooperation and exchange of information with authorities where these business are recorded, audited or report for tax purposes. These applications may be applied first to such shareholders who want to participate in systemically important banks. For non-bank financial institutional shareholders, it is also important to assess the suitability of the legal framework that defines their insolvency status and liquidation mode. Especially in cases when business companies have significant interests in banks, it is necessary to have similar and complementary liquidation procedures (to the extend possible). This would reduce conflicting legal requirements and possible delays in case of a "double" liquidation, of the bank and of the holding business entity.

The regulatory framework and supervisory practices should be directed to avoid excesses in banking activity, which are found in the case of pro-cyclical actions. For this purpose, the regulatory framework may contain requirements related to the increase in the bank reserves if the expansion of activity is going on with high rates (higher than a certain threshold). For that matter, the regulatory framework should be symmetrical, recognizing the right of the banking industry to use part of the reserves to fund activity in periods of financial crunch. Also, methods of risk assessment and the creation of appropriate reserves should require and include assessments of future developments.

For this purpose, especially for credit risk in banking activity, it is necessary that the current ways of assessing and establishing loan loss reserves (provisioning), be complemented with the methodology and regulatory requirements that enable the change of reserves on the basis of expected losses.

Legal framework and supervisory practices for the prevention and treatment of financial crisis could be improved if a comprehensive process to review the relevant legal definitions to improve the capacity and flexibility of the public authorities in dealing with these situations is undertaken. In general, it is acknowledged that a modern regime of financial crisis management should explicitly contain: the objectives of the regime; events that triggers it; the list of instruments that can be used in the process; the ability of the supervisor/liquidator to transfer part or the entire property of the bank that is failing; protecting settings for creditors, counterparties or shareholders of the bank that is failing; specific procedures in case of dealing with banking groups; and specify the application of the regime for local banks that conduct international activities. In this context, the legal framework would have to be specified and improved terms of providing: (i) clearer and more definition of the role of the Bank of Albania in terms of financial stability; (ii) greater clarity regarding supervisory powers and procedures for resolving disputes with the supervisory authority of the home country, in the case when the branch or the parent bank is taken into conservatorship or receivership; (iii) clarity that the failing bank should not necessarily go through conservatorship process if conditions demand it to be taken straight into receivership.

The legal framework should determine complete and specific requirements for the protection of financial services' consumers. This element has to do with the way financial

products are engineered and sold to them. Ensuring consistent monitoring of this process is important for consumer protection, for the integrity of the financial institution and well functioning of financial market. Often, these issues lead to disputes that have a significant value to the consumer, but do not (initially) have a material value for the financial institution. In other cases, the client's unresolved claim could end up in court and become subject of juridical decisions that do not appropriately consider the functioning of the financial institution, hence bringing adverse implications for its stability. Currently, at least for the banking sector, the Bank of Albania as the supervisory authority handles these issues. Not only in this case, but also in general, the position of the financial institution's supervisory authority to provide solutions to these disputes between the institution and the client is unsuitable. This is related with the primary focus of the supervisory authority, which is more concerned for the stability of the institution and of the market rather than the business conduct. Hence, in practice it results difficult to provide solutions that, while in favor of the consumer and fair, could cause material damage for the financial institution. Such hesitancy does not support the need for addressing the underlying problem and avoid similar cases in the future. Also it may actually push for the settlement of the disputes in courts, which could be costly for both the consumer and financial institution. Finally, these implications can bring damage to the credibility of the supervisory authority. Under these conditions, the optimal solution seems to be that of establishing an independent authority, which will follow the resolution of these disputes in a consistent manner, aiming at solving them in a fair, consensual and faster way. In Albania, such authority could be a new and independent institution or, should there be an unfavorable answer to the cost/benefit analysis, resolving disputes between consumers and financial institutions may be

recognized as an added function to the existing authority of Ombudsman. The second solution may be more appropriate in circumstances where the number and values of these disputes is considered low and the financial cost of creating new authority may be considered disproportionately high.

The second policy direction

Regarding *the second* direction, the main challenge is to establish a practice that allows for better coordination between monetary policy and macroprudential one. Without compromising with the main objective of ensuring price stability, the Bank of Albania, through its existing committees on Monetary Policy and on Financial Stability, should discuss and formulate a position on whether the monetary policy can have a wider mandate and be used to " lean against the wind" and try to avoid extreme behaviors of financial institutions and markets. If so, than the tools that are necessary to capture the economic cycles and such extreme behaviors must be developed. For example, there is a need to develop a comprehensive methodology that captures developments in the non-financial asset prices, particularly of real estate, given the importance it has in banking sector lending activity. In addition, such coordination should allow for the ability to define the most appropriate policy response, given predetermined economic situations. This is not an easy task but it is necessary to ensure transparency, accountability and credibility to the activity of the central bank.

International financial crisis and its impact in different countries, showed the necessity of a more effective cooperation between public authorities at national and international level, to identify risks, to manage them in real time according to the respective competences , as well as to limit the impact of financial sector problems in other segments

of the economy. Moreover, this cooperation in national and international level continues to be indispensable in the design and preparation of financial system reform in different countries, especially in terms of the management of financial crisis situations. At a national level, the cooperation among public authorities should serve not only for the exchange of the information, but to identify the necessary legal or regulatory changes; technical capacities, human and financial resources; and operational or strategic actions which are necessary to address a problem that threatens the financial stability. This new level of cooperation should be formed on the basis of regular and frequent inter-institutional contact, which should be achieved through regular and formal meetings, both at the highest and at the technical level. Such meetings should be well organized and operate on the basis of some predetermined rules, defining the role and contribution of each participant in the meeting. Meeting should have a defined agenda, which enables the preliminary preparation of the participants as well as allows the track of various issues as they evolve over time. Finally these meetings should serve to identify solutions to specific problems, which at the largest extent possible, rely on market mechanism, provide a long term or final solution, are transparent to the public and avoid illusive expectations, have a low public cost. To identify and apply these solutions to specific circumstances, each authority must design in advance proper actions plans for addressing varying financial emergencies and must harmonize these plans with other authorities.

Cooperation between public authorities in the country and corresponding foreign authorities is an evitable necessary and a requirement dictated by the unstoppable process of economic, financial and political integration of the country in the financial markets and the European Union. One should remember the “impossible trinity” in the activity of

supervisory authorities: it is impossible to simultaneously achieve an effective banking supervision and a similar process of crisis management, retain full sovereignty over supervision; and continue with the process of the integration into the financial markets and the European Union. Hence, the relevant legal framework in the country should support international cooperation on financial stability issues, of course taking into account the principles of confidentiality and reciprocity. Although the exchange of the information in the financial crisis between the authorities of different countries is necessary, it can simultaneously prove to be difficult at the required moment. Some of the problems that may arise relate to the uncertain legal support or conflicting legal definitions, lack of trust in each other, lack of the appropriate human capacities, etc. Some of these problems can be solved if the legal definitions are clear in terms of support for cooperation between the authorities in the country with international ones, in order to enable a sustainable and fair solution that preserves the financial stability of the country. For the banking sector, it may be necessary for Albania's legal framework to require the approval of cooperation agreements with foreign supervisory authorities at the time of bank licensing, particularly for systemically important financial institutions, implying that the authorities recognize each other's powers, especially for the supervision and liquidation of the financial institution and the way of operation of deposit insurance scheme. Cooperation should be easier and effective if there will be a convergence of methodologies and practices of regulation and supervision. For this reason, the law must require and the authorities of the country should ensure the broadest possible participation (especially in the form of membership) of their representatives in relevant organizations and forums, where standards for the operation, regulation and supervision financial industry are discussed. It is also

necessary that part of the cooperation with international authorities becomes the regular participation in the supervision of common financial institutions (in the form of joint examinations, exchange of opinions on key risks, etc.) and procedures and operational testing for actions to be taken in case of a common financial institution facing significant financial difficulties or insolvency (and forthcoming liquidation). It is necessary that the law require consistency of decisions and actions in such instances.

The third policy direction

Regarding the *third* policy direction, a number of areas in the economic policy and management, can be addressed. In connection with development in the real sector of the economy, it is necessary to establish a better balance between the contribution of various sectors, particularly by increasing the contribution of agriculture, agro-food industry and tourism. These sectors that relate well to each other, have the potential to steadily improve employment, better the structure of domestic production and increase the export capacity of the country. Supportive government programs as well as other incentives that facilitate the funding of these projects are necessary to achieve the required improvements in the medium term.

In the fiscal area, it is necessary to establish a legal and transparent mechanism that enables effective control over public debt indicators, budget deficit, level of external debt and the financing sustainability of the public pension scheme. In addition for providing better conditions for improvements, this control is necessary to ensure foreign investors about the sustainability of the fiscal position of the country, to reduce the cost of public and private borrowing and to avoid the stress that debt service can bring in currency exchange

rates. Through quantitative and qualitative constraints that are monitored in short to medium term, indicators can be placed in the connection between them and with other macroeconomic indicators such as revenue, expenditures, debt payments, exports, imports, official foreign exchange reserves etc., to achieve a framework of indicators that move in joint harmony and control each other.

From the perspective of risk management, concrete measures should be taken for the development of the financial market, especially of the capital market. In this way, businesses would benefit from direct access to financing in the form of issuing debt and new equity. This element would enable the development of a secondary market for trading such debt securities, would expand the funding base of businesses and would gradually reduce the weight of the banking sector in the Albanian financial system. To achieve this goal, it is necessary to improve the legal and regulatory framework and its applicability on financial reporting, handling of creditors' right, the establishment of specialized institutions for securities trading, etc.

The authorities have to identify a proper timeline for the implementation of macro-prudential framework (including policies and tools). Among other factors, such a timeline must consider the current position of the economy in the economic cycle and expectations or objectives of future economic and financial system developments.

3.2.2 Institutional arrangements for the conduct of MPP

While it is not specifically mentioned in the "On the Bank of Albania (BoA)" law of 1997, in the legislation, BoA has the legal and operational ability to adopt prudential rules/measures to deal with risks in the banking sector, which dominates the financial

system in Albania. In the BoA Law of December 1997, it is expressed through the Article 3, Point 4.c , which says : *The basic tasks of the BoA shall be : c) to license or revoke and supervise banks that engage in the banking business in order to secure the banking system stability* . The Article 12.a says*: The BoA issue such rules and regulations as necessary to ensure the soundness of the banking system in accordance with and to implement the law. And* the Article 21.4 says: *The BoA supervises the payments system in the Republic of Albania, directly or through any person or inter-banking agency created for this purpose. The BoA promotes inter-bank payments and efficient settlements between banks and other payment related services.*

In addition the article 66/1 of the Banking Law of 2006 also mandates BoA to adopt rules and procedures for addressing systemic risk. *Cit. "Systemic risk is the risk that threatens the stability, the value of assets and/or confidence in the system and financial market in general and may be caused by events or special factors in one or more system participants. The BoA shall lie down in a sublegal act the methods and rules to prevent and/or administer this risk".* Also the Article 8 of the same Law expresses the obligation of the BoA to report periodically to the Assembly and the Council of Ministers on the recent situation and the latest developments in the banking and financial system, and shall recommend the necessary improvements to legal and institutional framework of such system. This is sufficient to conclude that there is a legal mandate for BoA to use macroprudential policy with reference to the banking. The formal mandate for macroprudential policy except of Legislation, is made explicit in a Memorandum of Understanding signed between Bank of Albania (BoA), Ministry of Finance (MoF), Financial Supervisory Authority (FSA) and Deposit Insurance Authority (DIA), under the

framework of Financial Stability Advisory Group (FSAG), which defines inter-institutional cooperation at situations that threaten the stability of the financial system. The MoU broadly defines the role of each authority in dealing with systemic risk event in the financial system, and highlights some of the relevant instruments that can be used. The mandate of FSAG is ensured by the Law.no.9572 dated 03.07.2006 " On Financial Supervisory Authority", by the Article 30 point 1 and 2 which says: The consultative group of financial stability, hereinafter referred to as FSAG is established as a consultative entity to : (i) provides assistance in the development of mutual policies, and coordination of the action of the members of the council when it becomes necessary to carry out inspection over the supervised subject; (ii) ensures exchange of information amongst the members of the group; (iii) assists in safekeeping, stability and development of the financial markets in the Republic of Albania; (iv) assists in improving and increasing the efficiency of the control over the participants in the financial markets. Members of FSAG are the Minister of Finance, who chair the meeting of FSAG; the Chairperson of the Board of the FSA; the Governor of the Bank of Albania. The FSAG gives to each of the representatives' recommendations, and proposals that aim in the improvement of practices and expanding the legal infrastructure of the financial markets. In the FSAG meetings, members consult each other and exchange information on the assessment of risks to the financial system as a whole, and discuss appropriate measures for the prevention of risks to the financial stability. The authority also discussed financial sector analysis and the development of tools and methods in the area of macroprudential policy. When discussing the role and powers of FSAG in Albania, otherwise known as Financial System Stability Committee – it

provides only advices . The table below, represents for each institution in Albania, its actual or current responsibility, in the areas of :

- Identifying the buildup of systemic risk (i.e., probability and timing of its materialization, including the risk of low probability but high impact events, i.e., tail risk) ;
- assessing the potential aggregate impact on the financial system (impact of systemic risk materialization, transmission channels of risk within the financial system, and between the financial system and the real economy);
- acting as a lead coordinator among the institutions involved in the macroprudential policy making process;
- deciding on action to be taken (i.e., policymaking), that means : providing advice, making a formal recommendation or using a final decision on the use of instruments
- implementing and enforcing macroprudential policy decision;
- reporting to the executive or parliament about systemic risks and corrective actions to ensure overall stability of the financial system (accountability).

Table 4: *Macroprudential policy : Allocation of Responsibilities*

Institution	*Macro*	*Prunetial*	*Responsibilities*			
	Risk identification	*Systemic Impact Assessment*	*Lead Institution/ coordinator*	*Decision To take action*	*Implementation & enforcement*	*Reporting to executive /parliament*
Central Bank	✔	✔	✔	✔	✔	✔
Insurance/ regulator/ supervisors	✔					
Securities/ Regulator/ supervisor						
Ministry of finance	✔					
DIA						
FSSC	✔					

The BoA has the power to adopt any prudential measure or tools, including the capital (as used currently) and loan-to-value ratios (as used in the past). Although, BoA can change interest (as it is doing currently) or it can also use direct instruments (as in the past) because of the exclusive role in exercising Monetary Policy, the use of these tools for macroprudential reasons is not specified in the legislation. BoA can provide advice on tax issues; it can impose certain capital controls and also define and implement the exchange rate regime (policy). The legislation does not give the BoA the role on antitrust/competition policy, but it doesn't forbid us in providing advice either.

Table 5 *Perimeter of Macroprudential policy toolkit*

Instruments available to MP authority	*Level of Authority* *Advice*	*Formal Recommendation*	*Decision*
Prudential(capital;LTV)	✘	✘	✘
Monetary(interest rate or direct instruments)	✘	✘	✘
Fiscal(tax policies)	✘		
Capital controls	✘	✘	✘
Exchange rate policy	✘	✘	✘
Other(antitrust/competition policy	✘		

3.2.3 Monitoring Systemic Risk

In monitoring systemic risk, the BoA uses some model-base indicators, which are regularly monitoring for each of the risk categories. There are identified thresholds or range that are used or potentially used to respond the excessive build-up of systemic risk. Some of them are treated as leading indicators of financial stress in Albania, such as annual credit growth – an indicator of the booming or of the stress situation in the banking sector. Before 2007, credit growth rate has been used to introduce certain measures (higher risk weights and LTV ratios) that would curb credit growth to more sustainable levels. After 2008, and

more recently, marked decline in credit growth rates has been used as an indicator to provide for some measures that included, change in risk weights to provide higher capital requirements for banks foreign placements and lower capital requirements for credit to the domestic economy (aiming for a countercyclical impact), lower requirements for liquid assets of banks, change in provisioning rates to support credit restricting

***Table 6**. Financial Indicators to Monitor Systemic Risk*

Types of indicators/models	**"Alert" threshold or ranges**
I. Credit Risk	
1. Nonperforming loans to total assets 2. Nonperforming loans net of provisions to capital 3. Credit growth 4. Others loan structure 5. NPL structure: Maturity, business type, economic sector, currency, large exposures 6. Coverage ratio(provision/NPL)	NO. 1 , 3 and 6
II. Systemic Liquidity Risk	
1. Liquid assets to short-term liabilities 2. Liquid assets to total assets 3. Maturity gap 4. Loan to deposit ratio 5. Deposit growth	No.1, 2 and 4 Liquid assets to short-term liabilities (20%) , 15% for foreign currency and ALL
III. Capital Adequacy	
1. Capital to assets (leverage) 2. Regulatory capital to risk-weighted assets 3. Regulatory Tier I capital to risk-weight assets 4. Regulatory capital over minimum paid capital 5. Core capital over minimum paid capital	 2. 12% 3. 6% 4. > 1 5. > 1
IV. Foreign Currency Exposure Risk	
1. Net open position in foreign exchange to capital 2. Foreign-currency-denominated loans to total loans 3. Foreign-currency-denominated loans to regulatory capital	All of them 1. no more then 20% for each currency and no more than 30% for total . 3. no more than 400% fo total regulatory cap
V. Capital flows	
1. Gross international reserve to short-term external debt 2. Gross international reserve to months of imports 3. Gross external debt (% of GDP) 4. Other	> 100% > 4 months No. 1 and 2
VL. Other	
1. Reprising gap 2. Large exposure to customers	No. 2 and 6 2. 20% of regulatory capital

3. large exposure to related parties (among them) 4. large exposures to related parties with the bank 5. large exposures to the parent bank and affiliates 6. total exposure to large customers (over 10% of regulatory capital). 7. loan to bank administrators	3. 20% of regulatory capital 4. 10% of regulatory capital 5. 20% of regulatory capital according to internal regulation, 25% of regulatory capital according to the Banking Law (in October 2008, there was taken a decision to reduce such exposure to max of 10%. This measure was removed in Dec.2010). 6. 700% of regulatory capital 7. ≤ 8 mln ALL

However, there are still gaps in macroprudential framework in Albania. Lack of market data, insufficient data quality (data series, economic cycles) and shortage of time make it difficult to build effective models and have confidence in their results. This is expected due to the level of market development and is expected to improve with time. The BoA's work in developing the macroprudential analytical framework focus on assessing systemic risk and assessing the resilience of banks to such risks, also via stress test techniques.

3.2.4 Systemic Risk Assessments

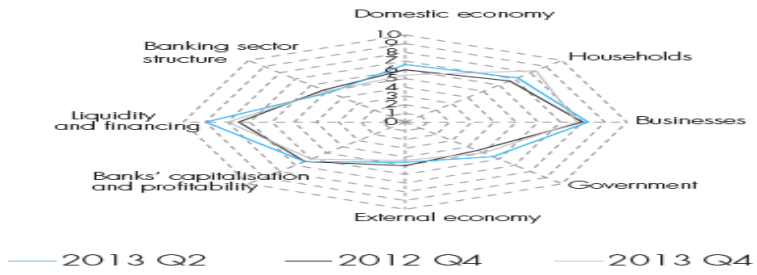
The process of risks assessment, should consider the performance of banking sector, its interaction with real economy developments, the financial situation of economic agents and other segments of financial system. Bank of Albania has conducted some indexes, as instruments to analyze financial stability. They are:

- ⇒ an index that indicates the stress in the financial system (SRI);
- ⇒ an index that indicates the financial strength of the banking sector (FSI) ;
- ⇒ a methodology for assessing banks with systemic importance ;
- ⇒ a systemic risk perception survey with banks;
- ⇒ a methodology for constructing a risk map ;
- ⇒ methodologies for top-down and bottom-up stress test;
- ⇒ a semiannual survey on financial state and debt burden of businesses and households;

⇒ a gap financial model, assessing the relationship between the financial sector and macroeconomic indicators;
⇒ under consideration – Constructing representative real estate price indices for Albania . First real estate survey was conducted on May 2013, in collaboration with Albanian Institute of Statistics (INSTAT).

Financial Stability Map (FSM) – an index that is used for a synthesized evaluation of risks to banking sector, real economy and economic agents. As of the end of June 2014, comparing with the end of 2013, the FSM shows that during that period, risks to financial stability have moved to economic agents. In the case of the domestic economy, the expansion of negative output gap and the increase of needs for foreign funds have contributed in the increase of the risk, which stands in moderate level. For households and businesses, the risk is evaluated as moderate, under combined factors linked with their expectations for further economic developments, their exposure to credit risk and financial sources. For the Government the shrinking of budget deficit and good performance of tax revenue have contributed to lower risk level, from the end of 2013. However, the size of debt cost is evaluated with maximum risk grade since the end of 2012. Risk arising from external economy is assessed as average in the context of weak economic developments and high unemployment rates of Albanian's main trade partners. For Banking sector, the performance of capitalization and profitability indicators, offers a moderate risk. The liquidity indicator presents a higher risk level, in the context of expanded negative gap between short-term assets and liabilities. Related to banking sector structure, the risk is evaluated average, although it is declined , because of the reduced concentration of banking activity , both in assets and liabilities sides.

Figure 18 : *Financial Stability Map (closer to center signifies less risk)*



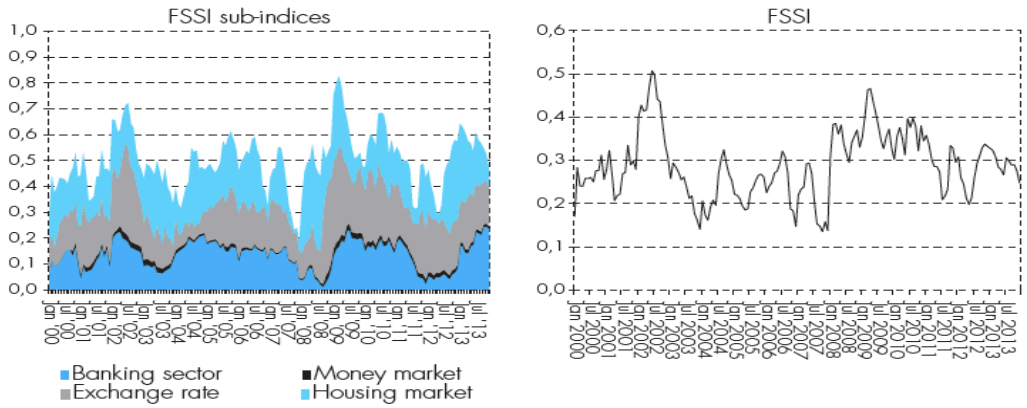
Source: Financial Stability and Statistics Department, Bank of Albania.

The Financial Systemic Stress Index (FSSI) – it is used to focus the assessment of risks to financial system. It measures the financial stress in the Albanian economy by aggregating in the single indicator the financial information on various segments of the system (i) banking sector; (ii) foreign exchange market; (iii) money market and (iv) housing market. For the first half of 2014, the index remains above the long-term average. Banking sector has contributed to increase systemic risk, due to sharpened negative gap of the credit and deposit toward long-term trend. This development is softened by the lower contribute of housing market, due to the decline of the housing price. The interaction between various segments of the market is reduced, softening aggregate level of systemic risk.

The model used two specific indexes to clearly differ the process of *risk accumulation* and the process of *risk materialization*. As of the end of June 2014, the risk accumulation is increased, mainly because of the deterioration of the foreign debt , public debt increase and current account deficit expansion. Meanwhile, the shrinking of the credit in foreign currency and housing price's fall has contributed to soften systemic risk accumulation. The deterioration of credit quality for businesses and household, as

well as the rise of unemployment rate are reflected in a higher materialization of systemic risk.

Figure 19. *Financial Systemic stress Index*



Source: Financial Stability and Statistics Department, Bank of Albania.

Economic agents perceptions survey: Financial risks are subjects of economic agents perceptions, therefore through a semi-annual survey , the Bank of Albania collects the banking industry risk perceptions. From March 2012 to end of June 2014, the banking industry has perceived two phenomena as developments with high risk potential: deterioration of the domestic economy and increase of public debt.

Top-down and bottom-up stress tests : With regard to assess the resilience of the been published, in summarized version, in Financial Stability Report. Since 2012, it has also run bottom-up stress testing with the participation of the 5 largest banks, covering some 70% of the banking sector activity. The results have been sharing with participating banks. More work is needed to integrate both stress-tests approaches. In addition, more work is needed to establish a consistent link between: the assessment results – their inclusion in decision/policymaking – the identification of specific prudential/macroprudential tools to address the problem.

Regarding qualitative methods used in Albania to make a forward-looking assessment of systemic risk, including tail risks are the process of reviewing financial institutions' strategies and business plans, active engagement with market participants, as well as stress-testing and surveys.

3.2.5 Macroprudential Measures taken from BoA after crisis

Prudential measures taken from BoA can be divided into three categories:

Supervisory measures – initiatives beyond the regulatory approach, which engage internal analysis of the Supervision Department, or communications with the banks.

Regulatory measures – including adoption of new regulations, regulatory amendments to existing regulations and special decisions of the Supervisory Board of the BoA.

Legal actions – are those initiatives that brought amendments to the legislation in force related to the banking system and maintaining its stability.

In December 2006, in order to control credit growth in the country, a several regulatory measures were settled which have been materialized with an additional demand for capital, in the event of a quarterly loan growth above 7 percent, or an annual growth of portfolio credit greater than 30 percent.

In 2008, an open debate with banks was organized to address potential risks related to lending to the economy. The debate concluded with some regulatory changes orienting the controlling credit risk, as follows:

- Introduction of the concept of "un-hedged loan" which are loans in currency different from the currency of the primary source of repayment of the loan, thus avoiding the risk of the borrower exposure to exchange rate fluctuation;
- Increasing the weighting of un-hedged loans, for the calculation of capital adequacy, by 50 percent compared with other loans;
- Setting a maximum limit exposure of 400 percent of the regulatory capital for un-hedged loans portfolio.

In the mean time, in order to maintain consistency for all banks in Albania and to avoid arbitrary behavior of banks due to regulatory gaps, the regulation for the supervision of branches of foreign banks was amendment. This amendment consisted in the implementation of the bank's supervisory regulation also to the branches of the foreign banks in the event of an occurrence of one of the following events:

- The average value of its assets, would exceeded 6.25% of total assets of the banking system for two consecutive quarters;
- The average value of its deposits would exceed 6.25% of the total deposits of the banking system for two consecutive quarters.

Another important initiative was the regulation of the transparency issue of banks toward their clients. This issue appeared to be very sensitive and the regulatory framework in force didn't foresee all the range of the bank-customer relationship. So, after an extensive discussion with the banking industry, in August 2008, was approved the new regulation regarding transparency. Its innovations were numerous and the content was aligned with the best international standards and respective laws within the European Union.

Besides providing a wide range of issues and products throughout the lifetime of the relationship between the bank and the customer, it also introduced an important concept, that on the calculation of the effective interest rate (EIR), which basically embodies all client costs of the banking products in a single interest rate. In March 2011, this regulation had a further improvement, which aimed the adjustments for the proper definition of variable and fixed interest rates concepts, on the indicative indices for the notification of the banks clients for the amendments.

The transparency issue was addressed also through another regulation, adopted in February 2009, regulation for the consumer and mortgage loans. In this context, this regulation was an extension of the transparency requirements under the above-mentioned Regulation, but enhancing the borrower's bank relationship with the small amounts borrowers, a group of clients who are judged to have poor information on banking relationship. Even this regulation had a corrective amendment in March 2011, an amendment, which was oriented towards regulating relations in the event of early repayment of obligations by the client.

Under the appearance of the international financial crisis, in October 2008, was materialized in Albania an increase demand for the withdrawal of deposits. The Bank of Albania decided to reduce the limit exposure to parent banks to a maximum of 10% of the regulatory capital. This measure was undertaken in order to maintain adequate liquidity to cope with increasing demand on deposits by the bank customers. The maximum limit allowed up to that point was defined in the Law on Banks, up to 25% of regulatory capital. However, in December 2010, this restriction had facilitation, allowing maintaining the maximum level of up to 20% of the regulatory capital.

In March 2009, the Supervisory Council of the Bank of Albania decided "on the prohibition of distributing banks profits generated in 2008 and those that would be realized in 2009". This decision was based in rationality of maintaining a good support base for the capital due to economic uncertainty of the international crisis emerged in 2008. This decision was revoked in February 2010.

Also in March 2009, were proposed by the Bank of Albania and approved by the Assembly amendments to the law " On deposit Insurance", whose main amendment was the increase of minimum sum insured to 2.5 million from 700 thousand that was in force.

In the beginning of 2010, reflecting the banking industry request to review the supervisory rules for the facilitation of loan provisioning in order to increase the capital adequacy to support credit growth, an overall analyze was conducted aiming two major direction:

- Was analyzed the financial situation of banks on several scenarios that anticipate maintaining the bank's Capital Adequacy Ratio in case of increase of Non Performing Loan ratio and loan portfolio growth.

Regulators in the region were contacted and it was obtained information on regulatory measures undertaken from each of them in order to address the emerged situation, which was quite similar in the region. Results of this analysis showed that banks possessed enough capital to cover losses in the event of deterioration on NPL and also to support the economy with further lending. Given these findings no regulatory changes were made, but it was preserved the same prudential approach toward the establishment of provision, decision, which was justified with the upcoming events till to date the availability of capital, remains at good levels. However, the Supervision Department took the initiative for

a thorough review of the regulation on credit risk management, which was approved on 14.09.2011. In summary this regulation brought these novelties:

- request to conduct stress test on credit risk by banks;
- the implementation of the method of credit risk mitigation in case of loan guaranteed by financial collateral.

Meanwhile, the regulation basically preserved the same prudential approach for the classification and provisioning of loans and the same requirements for the additional capital in the case of un-hedged loans. In June 2011, as result of the emergence of the debt Greek crisis, Bank of Albania decided to implement more restrictive measures against banks that originate the capital in Greece. Specifically, these banks were required to maintain a minimum ratio of capital adequacy of 15% at any time, against the minimum of 12% required for other banks through the respective regulatory acts. For the Alpha Bank branch was required to respect the minimum ratio at the end of September 2011. The bank implemented this request. For the two other banks, Tirana Bank Branch and National Bank of Greece Branch, it was required to be respected within December 2011.

The BoA undertook a campaign aiming to raise awareness for the parties involved in the process, for the issue of the difficulties faced by banks regarding the enforcement of collateral pledged by borrowers. Thus, in June 2011, a forum was organized with participants from a wide range of institutions, in which emerged all problems encountered during the collateral enforcement processes. Following this forum, the work is organized at technical level, where representatives drafted a work plan to set in motion the chain of institutional and legal required improving the process. Beyond all the undertaken measures or internal analyses, the BoA has established an effective communication with the external

public. It has been active in giving different messages to all interested parties, such as banks and individuals and businesses. In order to guide the conduct of banking operators, to make present its position and to rise and awareness to these institutions for their role and importance in the national economy, the Bank has organized forums and roundtables on various discussion topics.

Concerning the management of the effects of the international financial crisis, in order to give full competencies to BoA aiming addressing the situations that pose systemic risk, the BoA proposed several legislative amendments in the Law on banks, which were approved in the Parliament in November 2011. These amendments can be summarized in the following elements:

- Introduction of the concept of systemic risk;
- giving competences to the BoA to order the sale of the part or all of assets of a trouble bank toward another bank selected by BoA for the purpose of addressing systemic risk.
- introduction of the concept of a bridge bank, in order to enable the management of assets of a troubled banks;
- creating legal gaps in order to allow an efficient transformation of foreign banks branches in subsidiaries, were should be specially mentioned the performance of the transformation required by decision of the BoA when it deems necessary for purpose of addressing risk systemic.

To address the concern of weak loan increase, nonresident investment increase and the low level restructuring issue, BoA made some regulatory changes by March 2013. In regard to weak performance of loan restructuring in terms of either low stock of restructuring or of

low recoverability, BoA has worked closely with WB on an NPL enhancement framework, which was launched on October 2013.

This project has been designed in cooperation with FinSAC project of the World Bank and for the purpose of execution; it has been decided to receive conceive consulting services from a company with international experience in this context (ADASTRA).

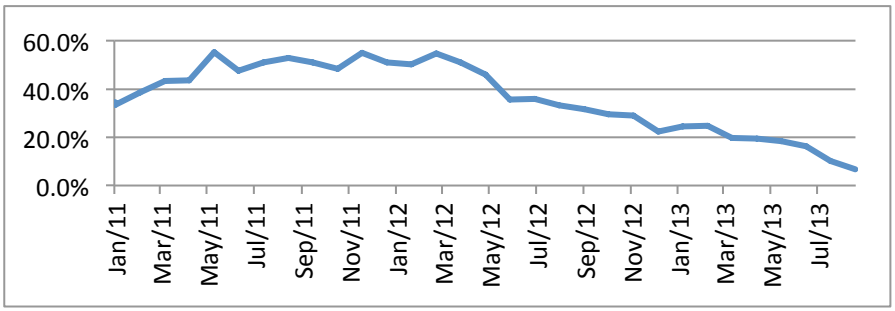
The selection will involve first banks that have systemic relevance in the market, as well as to ensure that the project's execution has an extensive effect on the system's loans portfolio.

The new platform will be developed in two phases. The first phase consists in compiling an excel template with identification and financial data on bank's clients, which has to be completed by each bank. This step has already been undertaken. The second phase consists in selecting a sample of banks classified loans portfolio, for loans classified in the "special mentioned" , "substandard" and "doubtful" categories, by a team from ADASTRA as well as BoA. This sample must cover at least 75-80% of the value of exposures for each bank. Selective criteria shall be applied for specific clients, including those representing large exposures, as well as those who are borrowers at several banks simultaneously, or other criteria such as the largest clients in specific sectors, etc. for which the banks must prepare potential scenarios for the resolution of specific problems with less costs for stakeholders. Results of this comprehensive process will serve as a basis for future decision–making by BoA.

Other initiatives undertaken by BoA, which go beyond its jurisdiction, regard the issue of collateral execution and the issue of considering written offs as a deductible item in

term of calculating the net income for tax purposes. Above mentioned initiatives are expected to positively impact the non-performing loans both on nominal and ratio levels.

Figure 20 *Annual growth of NPL portfolio*



Source BoA

With a view to manage the effects of the global financial crisis, and give the Bank of Albania more complete power to manage the situations posing systemic risk, it was needed to undertake some **legal changes.** Hence, the Albanian Parliament with proposal of BoA , approved the amendments to the Law : "On Banks in the Republic of Albania " . Such changes were pushed by the need of approximating the Albanian legislation with the EU directives. The amendments consisted in removing the exclusive right of exercising the business of electronic money issuance solely by banks, including the latter (the business) in the range of diversified financial activities provided in this law. In the context of enhancing the completion, actually not only banks but also electronic money institutions may issue electronic money according to market demand.

The amendments of the banking law included also:

- the introduction of bridge bank concept , aiming the management of the assets of banks in difficulty. This is going to be an institution that, if necessary, will be financed with public funds, and manage good assets of banks in severe distress,

until a potential buyer is found. In addition, a decision of the Supervisory Council of the BoA approved a regulation with purpose to set out main criteria and rules of the supervisory authority in case of establishment the bridge bank.

- the provision of the right to BoA to order the sales of part or of all assets of a bank in difficulty to another bank chosen by the BoA , aiming the management of systemic risk;
- the introduction of the possibility to effectively change a branch of a foreign bank in a subsidiary, in case BoA deemed it appropriate, by aiming the management of systemic risk. Legally isolate branches of foreign banks operating in Albania from adverse financial and reputational impact coming from the Eurozone situation, according to the revised legal framework allowing for a more efficient transformation process, the BoA required them to convert into subsidiaries. The transformation process was complete by the first quarter of 2012.
- The provision of the right to the BoA monitor systemic risk developments.

On the regulation aspect, have been undertaken important changes with macroprudential purpose before and after crisis.

Lending has experienced a rapid growth starting from 2004. However, this growth was explained by the low lending level in the country. At the end of 2003 credit accounted for about 3% of GDP, while currently it accounts for about 50%. Thus the low lending level has brought the relative large growth. Such developments were accompanied by regulatory changes, which required additional capital in case the loan portfolio growth was above 30% in general terms. The intervention towards crediting have not been prohibitive,

instead they have been discouraging growth, by introducing demotivating capitalization elements rather than intervening in the crediting itself.

In 2009, the new liquidity risk management regulation set the minimum liquidity limit at 20% for all banks.

After the international financial crisis in 2008, the banking environment in the country has changed, reflecting both the international developments as well as restrictions imposed by parent banks and the regulators of the originating countries.

The banking activity reflected the changes occurring in the economy, which felt the effects of this international financial crisis, when local businesses experienced restrictions to their liquidity conditions, a kind of reluctance for new investments and debt repayment difficulties towards banks emerged. These last ones led to the nonperforming loan increase in the banks.

Lending continued to be the main activity conducted by banks, but appears to be at lower rates for two reasons:

⇒ Due to the economic problems explained above, and the human resources engaged to manage the nonperforming portfolio;

⇒ Because it was coming from a high growth period. By now the crediting base was higher, therefore the relative growth level was expected to be lower. This expectation existed despite the occurrence of the global financial crisis. However, the crisis made it go beyond this expectation.

During the years 2009-2012 the average loan growth has been about 10% per year, a growth rate that is relatively satisfactory considering the activity environment. In the region countries the growth have been lower, in some cases a loan portfolio declining. The slowdown occurred during 2012 is related to the demand situation in the country. During 2012 demand for loans was 11% lower than 2011 . Bank of Albania has been actively providing proper economic incentives by lowering four times the base interest rate. Under the external factor influences, such as developments in several Eurozone countries that are connected to the economy, Italy and Greece, especially Greece, it was decided to increase the banks minimum liquidity indicator from 20% to 25% , as well as the minimum rate for each currency, 20% for ALL and 20% for foreign currency, in 2011.

3.2.6 Future regulatory and supervisory orientation

The regulatory and supervisory framework to better respond to the challenges facing the stability of banking system, including the quality of the loans portfolio, has continuously improved. In this context, the BoA has aimed at strengthening the fundamental drivers of sound banking activity, focusing especially on good bank governance, sound regulatory incentives that lead to effective risk management practices, better processes to assess risk-taking and capital planning within banks themselves, and better supervisory instruments that provide a comprehensive and proactive detection of risks. During its communication with the banking industry, the BoA has required banks to take all the necessary measures to ensure:

- An adequate risk administration culture within their institutions;
- Comprehensive internal control and risk administration systems;
- A strong commitment to the management and supervision of banking activity;

- Sound policies on recruiting, promotion, and training of staff.

An amended version of the regulation "On core management principles of banks and branches of foreign banks and criteria on the approval of their administrators", on November 2012, enhances the requirements of the Law on Banks, charging the Supervisory Council with the task of determining the bank's **risk tolerance**, and monitoring the bank's compliance with the latter, ensuring that capital levels sufficiently cover the undertaken risk. The regulation introduces further requirements on the risk administration function of banks, the establishment of risk committees, as well as the role of CRO according to the proportionality principle. Specific clauses of the regulation require banks to align their remuneration policies with a sound risk-taking approach. In this respect, banks are required to align the remuneration of risk-taking staff with the risk results of their work, in order to provide correct incentives for a sound banking activity. The regulation also enhances requirements on the transparency of policies, structures, and remuneration policies of banks to improve market discipline.

On July, 31 2013, the BoA approved a new regulation on capital adequacy, adopting Basel II standards on capital requirements for credit and market risk, as well as and operational risk. The regulation enters into force on December 31, 2014. The second pillar of Basel II, as transposed in the regulation, requires banks to develop internal processes to evaluate their capital adequacy and overall risk mitigating capability based on a full assessment of risks through the development and reporting of ICAAP. The regulation is expected to provide significant incentives to increase the effectiveness of risk administration system in banks, through aligning capital requirements with the level of effectiveness and sophistication of risk management processes.

The combination of full scope and targeted examinations allow for a flexible supervisory approach to assess risks and closely monitor the performance of individual banks. The set of supervisory tools available to examiners is expected to be further improved with the introduction of the new supervisory manuals, and risk-rating system. The set of regulatory measures to promote credit growth are built such as to provide broad breathing to the economic environment, borrowers and financial institutions (banks). Under such circumstances the strain of borrowers in paying their debts and their repayment capability might are expected to see a relief that can be spread into the entire chain of economic relations.

In addition, the initiative undertaken with the World Bank for NPL resolution is expected to improve banks' abilities in revisiting and the relations with their borrower for the methodology of approach toward restructuring. The selection of banks and portfolios will be such that the impact of solutions options with spread not only to banks, but to economy in a broader sense, to different economic sectors, business size and region. It will also aim to provide solutions to cross-exposures among banks, which will try to provide equal solutions for each bank and, at the same time, establish the basis for a cooperation framework between banks for similar future collaboration.

The changes of the Code of Civil Procedures allow less room for borrowers to impede the process of collateral execution. They also shorten the period of execution as well as offer the possibility of reducing the collateral selling prices in the second auction, though a more ample space is provided for liquidation. The overall process itself, although the impact is expected to be in the near future, is expected to positively impact in the sense of lowering the actual NPL ratio.

The selling of portfolio has recently been approach by two of the banks and it is welcomed as a positive development. Bank of Albania will create all the necessary, legal and regulatory, facilities and will discuss with all the interested parties to promote a more active and healthy process.

3.3 Package of macroprudential measures of March 2013

3.3.1 The core of package

Based in projections made by the Bank of Albania due to last country's economic developments, to have a GDP increase of at least 2 percent, the lending in the country would have to be increase with at least 4 percent. On the core of the package of measures, which have been considered as a whole, was the promotion of credit growth in the country as this activity is considered very important for maintaining macroeconomic balances and avoiding pro-cyclical effects that its deterrence would have in the economy and the banking system itself. These measures were obtaining considering the financial stability in the country, considering elements of the monetary policy as well as of the banking supervision. They were also a product of extensive and continue discussions held between BoA and representatives of the banking system on such purpose. The main issues that encouraged the necessity of deciding for the package of measures were:

- ⇒ The economic forecast point to a reduced pressure of monetary indicators;
- ⇒ Credit growth has been insufficient to stimulate economic growth and the projections suggest similar developments;
- ⇒ During 2012 , it was recorded an increase of investment banking to non-residents;

⇒ Pressures from international developments have been reduced, particularly from Greece, where recent measure on the performance of the economy of this country were taken at the time;

⇒ The requirements of banks and domestic business to facilitate the criteria's for the restructuring of the existing loans.

These measures asked to guide the bank investments, aiming to make more expensive further growth of assets to non-residents and easing costs for lending to the domestic economy. Measures do not prevent investments to non-residents, but increase capital requirements, making them more costly; On the other hand, measures do not imply a mandatory lending growth, but provide incentives for its growth given that banks will have a lower cost of capital requirements for these loans.

Under these circumstances, the Bank of Albania has managed to design a full package of measures, with aim to boost credit and improve micro and macroeconomic balances of financing the economy. The full package of measures, with aim to boost credit and improve micro and macro balances of financing the economy, consists in three pillars:

- ✓ legal pillar;
- ✓ monetary policy pillar and
- ✓ prudential pillar

1 – *Legal pillar*

The rapidly increased of non-performing loans in the recent years, reflects, inter alia, a number of known and unknown problems about collateral execution. Legal amendments to the Civil Procedures Code and to the Civil Code have been done aiming to

accelerate the obligatory collateral execution, by avoiding procedural delays that bank debtors cause. More specifically, the proposed amendments address the following:

- Courts do not take measures to secure charges, in the event the bailiff actions are rejected;
- Courts do not take measures to secure charges and do not suspend collateral execution, in the event the debtor requests the invalidity of the executive title arising from a bank credit;
- Reduction by 50% of the initial price of the immovable property, placing an acceptable average for the debtor and the bank, and making clearer the value (price) of the item with which the second auction begins.

Improvements in the legal framework and collateral execution practice would provide public authorities with new spaces to boost lending in Albania.

2 – Monetary policy pillar

The Bank of Albania has eased the monetary policy, by undertaking consecutive key interest rate cuts. The one-week repurchase agreement rate has fallen to record low as of January ’13 (3, 75%), even when compared to other economies in the region, including most new EU member states as well. The Bank of Albania deems that the monetary conditions are appropriate to ensure the meeting of inflation target in the medium run, providing at the same time the necessary monetary stimulus to support domestic demand. The Bank of Albania has continue to pursue a stimulating monetary policy, as long as inflationary pressures remain weak. Furthermore, also the operational framework has maintained the same stimulating nature. It aims at preventing banks from any tensions,

even sporadic ones, with regard to liquidity adequacy (quantity, price and maturity) in the market.

3 – Prudential pillar

While both first pillars impact indirectly and over an extended period of time, the prudential pillar impacts directly and swiftly on credit revival. It includes a number of measures that would release financial resources to banks and encourage them to channel those resources toward lending. Regulatory changes are at the core of these measures:

- Change risk coefficients in the investment structure to boost lending;
- Reduce bank requirements for liquid assets.

Reduction of regulatory bank requirements for liquid assets may be conducted without undermining the stability of the system, since their level is generally higher than that of international standards and of banks in the region. Moreover, given that banks operating in the country have their origin mostly in Europe, this reduction may take place in the context of declining risk *premia* in European financial markets. However, it should be monitored and implemented according to each bank's risk profile. This means that though the reduction may be overall, the level of liquid assets requested by currency and in total may be different in different banks. The risk coefficients of the investment structure will change, so that banks' capital would support shifting of their resources to lending. More specifically, the risk coefficients used to calculate the banks' capital increase, considering the new flows of bank investments with non-residents. This increase in risk coefficients may take place also for a part of the stock of bank investments with non-residents, taking into consideration:

- regulatory requirements for liquid assets;
- adequate coverage of bank liabilities to non-residents; and
- the time needed so that this shift does not cause any operational overburden to banks.

On the other hand, risk coefficients may decrease in banks for the amount of new credit added to the existing stock, for a certain period of time. In this way, the intended shifting of funds toward lending in the country may take place even in those banks that have a lower capital adequacy ratio. These measures are not administrative. The decision to conduct funds shifting to private sector credit in the country will be made by the bank itself. As in any other case, the bank should balance all the factors affecting the risk, costs and benefits from such a shift. The implementation of the above measures requires amending the existing regulatory framework. It will be effective temporarily and after that, banks should gradually return to implementing the existing regulatory framework on the methodology for calculating capital requirement. In this way, banks retain the necessary stimulus to lend prudentially. The need to address non-performing loans is a concerning issue for both the banking industry and the Bank of Albania, not so much for the stability of the system, as for the costs that this phenomenon brings to banking activity, consumers and related services. Public authorities may also take measures in this regard.

The Bank of Albania amended the regulatory framework to urge banks to support borrowers' requests *for credit restructuring right from the moment the credit is regarded as good*. If the banks realize this effectively, they will have a lower cost from loan-loss provisioning requirement. This element would make banks address prudently and proactively their best clients, who may be showing their first signs of credit repayment

problems because of factors beyond their control.

To monitor this action, the regulatory framework will require that the restructured loan stays temporarily in this category (or in the substandard category), and that it falls immediately under a lower category, if after the restructuring the loan quality deteriorates. A part of the non-performing loans, mainly loss loans, are still in the banks' balance sheets because of a different interpretation by the banking industry and the tax authorities about the commencement and completion of the legal proceedings against a debtor. Lack of coordinated interpretation about writing off these loans from the banks' balance sheets, leads to consequences in the banks' tax burden and prevents writing off loss loans from the balance sheets, hence swelling the level of non-performing loans and engaging banks' capacities inefficiently. The banking industry and fiscal authorities need to identify the factors leading to different interpretations of the same problem, and to formulate the necessary legal and sublegal amendments for a definite solution.

In quantitative terms, these macro-prudential measures consist:

- ✓ Reduction of capital requirements for credit growth between 4 - 10%. Hence, if the loan for the Albanian economy is grown 4 and 10% annually, compered to Dec-12 for 2013 and compere to Dec-13 for 2014, the amount of growth will be deducted from the total amount of risk weighted assets and off-balance sheet items. In case the growth is higher than 10% , than only the amount corresponding to 10% of credit growth will count for the
- ✓ Increase of capital requirements for the growth of investments to non-resident counterparts (loan excluded). So, if such assets are grown compered to the total

exposure as of March 2013, the amount of growth will be added to the total amount of risk weighted assets and off-balance sheet items.

- ✓ Reduction of the minimum liquidity ratio, in total, from 25% to 20%. Reduction for minimum liquidity ratio, for domestic currency and for foreign currency separately, from 20% to 15% for each.
- ✓ Loan categorized, as standard "or" special mentioned, restructured for first time, will provision by 10% and remain in same category after restructuring takes place. Prior regulatory requirements were that the restructured loans would be classified as "substandard" and be provisioned by 20%. The provision of 10% for the restructured loan, would return to the requirements of prior to the restructuring, 1% for the "standard" and 5% for the "special mentioned" , if the loan have been performing well for 6 months in a row and the payment of at least 3 installments have occurred. The prior requirements were for 9 months.

Other financial stability contributor

The mission of the Bank of Albania is closely linked to financial stability in the country. In this context, financial stability is closely linked to sustainable economic growth. Measures undertaken during previous, reducing the base interest rate, and the package of measures proposed in March 2013, are exactly in fulfilling the mission of the Bank of Albania. These measures are indicative and not restrictive. They do not restrain activities or indicate that other activities will take place by any means. Measures undertaken, except defining some quantitative indicators that tend to orient banking activity, as well as transmit the appropriate messages to the concern of the Bank of Albania. The impact of

these measures has been followed up consistently and carefully and if necessary BoA will interfere with other regulatory measures to address any deficiencies.

The *BoA* should not be the only concern about local economic developments. Other Institutions will have to take their responsibilities in this very important process by taking appropriate steps to simulate it. The payment of *government* arrears toward local business remain a focal concern since besides releasing capital in the economy gives the appropriate messages to the private business to promote further growth of the investments.

Even *private business* plays a key role in this regard. Its awareness for the regular payment of bank loan and undertaking appropriate and well-augmented investments would create preconditions for the expected development of the local economy, the fruits of which they will benefit in the mid-term period.

Banking operators should increase the intermediation role in the economy by investing all the necessary funds needed to ensure economic sustainability and to avoid pro-cyclical effects. Their role is considerably very important process. Now they must play the role of financial adviser to local businesses in order to create a satisfactory standard of doing business in the country, from quantitative as well as qualitatively point of view. In any case, banks should have in the center of their attention risk management process, which should select qualitative borrowers with the ability to survive and to give new impulses to the economy.

3.3.2 Concluding remarks on Macroprudential approach in BoA

The process of drafting and reviewing the regulatory and supervisory framework of the Bank of Albania during the course of last years is widely supported in the standard of the

Basel Committee , European Directives and considers the best practices in the field of regulation and current developments in the Albanian banking system, banking supervision, by implementating 29 Basel Committee principles for effective supervision. (Basel Core Principles for Effective Banking Supervision) .

This chapter presented Albanian macroprudential approach, as a key component of the financial stability policy toolkit. The macroprudential policy objective is to prevent systemic risk from forming and spreading in the financial system and thereby reduce the probability of occurrence of financial crisis with large real output losses for the entire economy. Besides the tools embodied in bank regulations, Bank of Albania should designed and conduct the document of MPP in BoA, after experience accumulated from international and national in that matter. When conducting macroprudential policy it is also vital to respect the fact that systemic risk has two different dimensions. The time dimension is linked with procyclicality in the behavior of financial institutions and their clients, manifesting it as financial cycles. The cross-sectional dimension arises as a result of mutual exposures and network linkages between financial institutions. In an economy dominated by banking sector, with a relatively small and simple financial sector like the Albanian one, the time dimension of systemic risk is identified as being more important and the BoA is advised to prefer a relatively narrow macroprudential policy concept focused primarily on risks associated with financial cycle. Given that financial or informational contagion resulting from links between the economy and its institutions and the external environment can be a major source of systemic risk, the MPP framework must also include the cross-sectional dimension and external macroeconomic and financial developments.

Constructing a sophisticated operational framework linking the individual dimensions and

development phases of systemic risk with relevant indicators and instruments will be an important condition for efficient and effective implementation of macroprudential policy. When performing the two main tasks mentioned above, macroprudential authorities must focus their attention on forward-looking indicators and simultaneously take into account the potentially high degree of discontinuity in the evolution of systemic risk. To this end, they need to use specific sets of indicators and tools reflecting the different dimensions and phases of systemic risk.

Over the financial cycle it will be necessary, using forward-looking indicators, to catch the moment at which systemic risk starts to accumulate, identify the point at which the tolerable limit for systemic risk has been exceeded, and send out a signal that macroprudential tools need to be activated. If prevention fails, it will be necessary, using a different set of indicators, to determine the point at which a financial instability event has to be declared, assess the potential scale and seriousness of the manifestations of the crisis, and recommend appropriate anti-crisis tools. Forward-looking analytical tools should then ultimately help us to detect when systemic risk has fallen below the critical level and tell us when we can discontinue the anti-crisis measures and support policies.

Within the macroprudential policy operational framework there must still be a trigger mechanism for the use of tools in the risk inception and manifestation phase. This mechanism should be relatively complex yet flexible. When implementing such a policy, it will be vital to combine a rigorous analytical approach with a large dose of judgment. Although the priority should be to use rules and more or less automatically applied tools, it will be necessary to leave the macroprudential authority considerable room to exercise discretion. No macroprudential policy tool can work as a magic wand for “making sure it

won't happen again". Some tools can help in building up buffers in good times for weathering bad times. Yet it would not be realistic to expect them to be very effective in curbing credit booms. These are complex phenomena that need to be addressed by a concerted set of policies and tools. In other words, if, in the future, the international economy starts undergoing a dynamic drive again, accompanied by credit and asset price booms, the authorities will have to apply a set of microprudential and macroprudential measures to tame the immoderate optimism. Factors mitigating procyclicality embodied in regulations will hopefully ensure accumulation of buffers, and better supervision may prevent bank managers from taking excessive risks. Monetary policymakers might need to step in directly using the interest-rate channel or indirectly using prudential tools to change its transmission.

All theory depends on assumption, which are not quite true. That is what makes it theory. The art of successful theorizing is to make the inevitable simplifying assumptions in such a way that the final results are not very sensitive. (Solow 1956)

CHAPTER IV

Analysis of the Effects of macropudential policy measures taken from BoA on Albanian GDP trends– simulation using a Macro Financial Model for Albania

This chapter provides an analysis of the impact of macroprudential policy measures taken from the Bank of Albania on the main financial indicators and real economy dynamics, as well as their impact in raising the resilience and stability of the financial system. It starts by describing the latest developments of in applied methodolygies and instruments used to assess financial system stability and the impact of macroprudential policies in real economy dynamics. This chapeter focuses empirical analysis of the elasticity of Corporate Lending Volume to Credit Interest Rate. Then it uses the Macro Financial Model for Albania to analyse the effects of three macroprudential measures taken from the Bank of Albania on March 2013- (i) decreasing capital requirements for total credit growth in a range 4-10% from banks; (ii) general decrease by 5% of the minimum regulatory liquidity indicator; (iii) establishing the provisions to the extend of 10% in case of credit restructuring during regular phases, as well as (iv) the effects of the combination of these three above measures together on the main financial indicators and on real GDP in Albania.

Next section outlines an overview of the Macro Financial Model (MFM) used in our analysis and explains how we change it. Then it explains the methodology and specification of business credit dataset. Further it describes the simulations used and analyzes the results of the effects of each macroprudential measure on Albanian economic indicators and the effects of the combination of those measures. Last section judges the impact that these measures have on the resilience of the financial system against risks. Followed by chapter V Conclusions and Recommendations. Appendices I and II contain, respectively a detailed list of model variables and an explanation of estimated behavioral equations.

4.1 Applied metodologies to assess financial stability and impact of MPP

One of the most usable instruments by central banks to assess the stability of the financial system to shocks is macro stress test. The experience of the recent financial crisis triggered by the loan related problems in U.S, reaffirmed the significance of macro stress testing, as a tool to share information with market participants on financial system's current situation, the regulatory action to be taken, the need for policies to be implemented, so as to prevent financial panic. The Bank of Albania has also conducted macro stress testing according to various scenarios and made public the results in its semiannual *Financial Stability Report* of the Bank of Albania. In the Report of 2014H1, a forward-looking stress-test is run to assess the financial system's stability and banking sector's capital adequacy,

for a period extending to the end of 2015. It exercise assesses the impact of macroeconomic situations on the banking sector's financial standing, excluding the possibility of an increase in the paid-in capital during the period under review.

However, conventional macro stress testing fails to capture explicitly the interaction between the financial system and the real economy, assessing only the impact of a slowdown in the real economy on the financial system without taking into consideration the negative feedback effects, whereby the destabilization of the financial system leads to the stagnation of the real economy and, in turn, the stagnation of the real economy leads to further destabilization of the financial system. (Mishkin 2008) stresses the significance of mutual effects. In order to quantify the economic losses caused by a financial crisis or to evaluate the impact of financial regulations, such as macroprudential measures, we need a macro financial model that incorporates the interrelation between the financial sector and the macroeconomic sector. This study uses a macro financial model, where macroeconomic sector has a simple Keynesian framework, while the financial sector is characterized by actual risk management behavior of banks. That is, a financial sector model in which banks lending is influenced by credit costs, capital adequacy ratio, and other considerations. To the best of our knowledge, only a few financial supervisory authorities and central banks are equipped with similarly developed models. The Bank of Japan has released a number of macroeconometric models namely, the dynamic stochastic general equilibrium (DSGE) model by (Sugo and Ueda 2008) as well as the hybrid models , such as the Quarterly Japanese Economic Model (Q-JEM), developed by (Ichiue, *at al.,* 2009) and (Fukunaga *et al.,* 2011), all of which combine a theoretical model with a time-series model. In addition,

The Board of Governors of the Federal Reserve System developed a well-known hybrid model called the FRB/US by (Brayton and Tinsley, 1996); (Brayton *et al.,*1997).

Financial Macroeconometric Model by (Ishikawa *et al.,*2013) is a medium-size structural model comprising two sectors : a financial sector and macroeconomic sector. It permits quantitative analysis of various phenomena created by feedback loop between financial economy and the real economy. As pointed out by the Basel Committee (2011), the financial sector has not been addressed sufficiently by the macro model, except for the financial accelerator models by (Kiyotali and Moore 1997) and (Bernanke *et al.,* 1999).

However, in efforts to analyze the impact from macro-prudential measures, since the last global financial crisis, has been made rapid progress, on both the theoretical and empirical sides. Chapter II describes some of the latest findings in this context, thus here it is provided just a summary of them . As *theoretical* studies, (Bianchi 2010) and (Farhi and Tirole 2012) provide a reason for introducing macroprudential policy measures to constrain excessive leverage of financial institutions and borrowing entities. Other theoretical studies using dynamic stochastic general equilibrium (DSGE) models to examine the impact of macroprudential policy measures include (Cristensen et al., 2011), who look at countercyclical capital ratio requirements, (Crowe *et al*., 2011), who look at a loan-to value (LTV) regulation, and (Funke and Paetz 2012), who look at a time-varying LTV regulation. On the *empirical* side, (Aiyar *et al*., 2012) examine the impact that the time varying minimum capital requirement introduced in the United Kingdom had on lending, and also look at the degree of regulatory arbitrage that resulted from introducing the regulations. (Alberola 2011) look at dynamic provisioning in Spain, while (Wong *et al.,* 2011) look at the impact from the LTV regulation in Hong Kong and elsewhere. The papers noted focus

above all on analyzing a single macroprudential policy measure, but not on a comparative analysis of multiple measures. Research that makes a comparative analysis of multiple macroprudential policy measures under a unified framework includes (Angelini *et al.,* 2011), who compare a countercyclical capital requirement with an LTV regulation, and (Goodheart *et al.,* 2012), who analyze an LTV regulation, a repo haircut, a capital ratio requirement, a liquidity coverage ratio requirement, and dynamic provisioning. These papers have their own set of issues, however, including modeling that is dependent on extreme. Simplification of the banking sector, and a reliance on models that are too abstract to analyze actual economic fluctuations.

In this study, we use a Macro Financial Model (MFM) to mimic Albania's macroeconomic dynamics through GDP performance and financial sector activities, we **intervene in the model to re-evaluate Corporate Lending Volume equation** based in micro data taken from Credit Registry (CR) in the Bank Of Albania – the electronic database on demographic data and information, as well as on real financial engagements of persons/businesses applying for a loan at banks, branch of a foreign bank licensed by the Bank of Albania or at other lending institutions , that has started to operate since 3 January 2008. Currently, lending entities which report to (CR) are 16 banks and 12 non-bank financial institutions that operate in the area of lending and financial lease, 1 savings and loan association that is independent of the union, and 2 unions of savings and loan associations. At the beginning, only banks and branches of foreign banks reported to the Registry. Since 19 November 2010, the database has been enriched with information reported by non-bank financial institutions and savings and loan associations.

Specifically, considering the developments in Albanian economy after 2008, this study want **to assess the effects of 3 macroprudential policy measures below:**

i. the decrease of capital requirements for annual credit growth , if it is between 4%-10% ;
ii. the general decrease by 5% of the minimum liquidity regulatory indicator, in total (both in Lek and foreign currency); and
iii. the application of provisioning rate of 10% , in case of loan restructuring at the stage where it is categorized as a regular loan , when the borrower begins to show problems before the loan payment .
iv. as well as the effects from the combination of **three** above measures (i);(ii) and (iii)

in main financial and real indicators [4].

At the same time, through the analysis of the four scenarios, it is judged the impact that these measures have in raising the financial system's resilience against risks.

4.1.2 Macroprudetial package – toolkit to address credit revival

In the activity of the financial system in Albania, direct and indirect credit represents major risks, especially for the banking sector. The decline in credit quality over the past years was associated with a marked slowdown in the pace of lending. These are two trends that reinforce each other. Hence, to address the problematics of credit in Albania, significant decrease of bank lending and the worsening of loan quality, as well as the increase of banking sector investments in non-resident financial institutions. Seeking to

[4] The measure taken to address the increasing of banks investments to non-residents would not able to be modeled under actual version of the model.

boost credit and improve micro and macroeconomic balances while financing the economy, the Bank of Albania presented on 27 March 2013[5] a package of measures of countercyclical nature and approved some amendments to the regulatory framework. The package consists of three pillars: legal, monetary policy and prudential.

The prudential pillar impacts directly and swiftly credit revival. It includes a number of measures that will provide financial resources to banks and encourage them to channel those resources toward lending. Regulatory changes are at the core of these measures:

A. *Change risk coefficients in the investment structure to boost lending*

i. *Decrease* of the risk coefficients for the amount of new credit added to the existing stock in the range 4%-10% , for a certain period of time.
ii. *Increase* of the risk coefficients used to calculate the banks' capital increase, considering the new flows of bank investments with non-residents.

B. Reduce bank requirements for liquid assets, reducing by 5% the regulatory liquidity indicators ratios, in total and by currency, according to each bank's risk profile.

C. *Credit restructuring right from the moment the credit is regarded as good*

when clients start showing first signs of credit repayment problems because of factors beyond their control. The aim is that under new conditions after re-construction, the client maintains solvency and credit quality. This loan will continued to be classified as a regular loan (in two first classes before categorization), but will require a higher provision rate (of about 10%).

[5] This package entered in force May 2013

In order to verify the validity of loan modifications, regulatory framework requested the stay of reconstructed loans in the same category for at least 9 months or until the borrower had paid regularly three loan installments. In order to get banks more interested toward the reconstruction process, the new regulatory changes reduce the maintenance of a loan in the same category to 6 months.

Changes in capital requirements based on credit stock growth rates and flows of investments by the banking sector to non-resident subject are temporary countercyclical measures that will affect and spread through the 2013-2014 period. Unless otherwise decided by the Bank of Albania, these amendments will be annulled upon the termination of the effective period, and banks will ensure compliance with the current regulatory framework requirements by June 2015. This mechanism is considered important to preserve banks' cautious lending and well-capitalized activity.

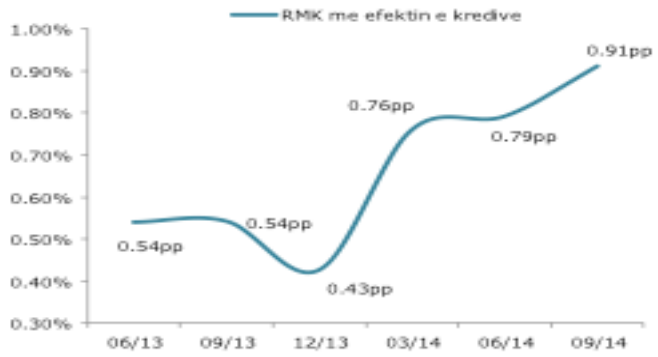
These measures come following legal proposals for amendments to the Civil Code and the Code of Civil Procedure, which aim at improving the collateral execution process. The Bank of Albania considers that the timely approval of these amendments by the Albanian Parliament will aid at tackling and easing the banking sector's non-performing loan situation, contributing in turn to its recovery.

The primary objective of the Bank of Albania is to maintain a stable banking sector. Under the impact of these amendments, banks' behavior should be monitored closely and continuously, in order to assess the impact of these measures on banking activity indicators and identify the need for further action.

The presence of high stock of non performing loans in banks' balance sheets, increases to the banks' operating costs the need for extra capacity and inefficient use of existing capacity. As a result, banking services tent to become more expansive for consummators. Basically, the macroprudential measures aim to slow down further deterioration of non-performing loans to total loan portfolio. It is very important during this process to evaluate further action regarding the treatment of the stock of non-performing loans.

After measures have been implemented, at the end of each quarter, the Department of Financial Stability and Statistics in the BoA evaluates the impact of measures on Capital Adequacy Ratio (CAR) , in total for the system and by banks. According to the latest's estimates (September 2014), the combined effect of change in the risk coefficients on the investment structure , on capital adequacy ratio is estimated at – 0.51 percentage points. This means that the level of CAR as of September 2014 from 17.54% , is 0.51pp lower that the value without measures' effect. Combined measures' effect on CAR has been negative from the beginning, except in the second quarter of 2013 when this effect was positive +0.52pp. Analyzing in regards to measures (i) and (ii) , it is estimated that simplifying capital requirements for annual growth of the economy's credit stock, within an interval of 4%-10% , impacted the banking sector's CAR by 0.91pp, compared to the level of CAR without the measures' effect. Negative impact on CAR resulting from the increase of capital requirements for investment flows to non-resident institutions resulted -1.29pp, dictating net negative effect on CAR. The Figure below depicts positive impact of measures (i) and on CAR on a quarterly basis in the sector level. The highest impact at 0.91pp is noted in the third quarter of 2014.

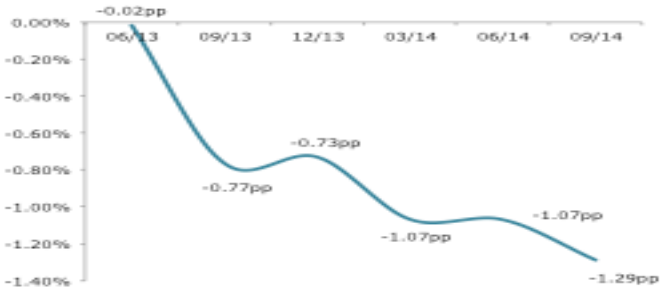
Figure 21: Impact on CAR from measure A/(i)



Source : DM and DFSS [6]

The phenomenon of investments to non-resident institutions continue to increase, but during 2014 growth pace has slowed . The impact on CAR is estimated to be negative. Assessed by period and for banking sector level, negative effect on CAR due to expansion of investment flows to non-resident financial institutions is presented by the figure below.

Figure 22: Impact on CAR from measure A/(ii)

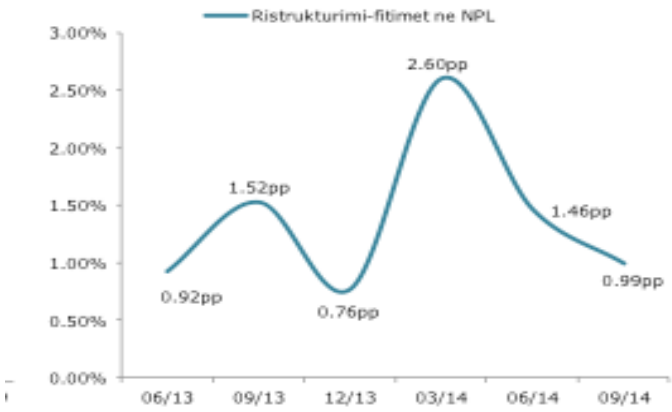


Source : Supersisory Department and Financial Stability Deparrtment BoA

[6] The levels rapresent the difference in percentive points among CAR calculated with effect of credit growing and CAR withour measure effect for total banking system.

Measure "C" – regulatory changes for easing terms for credit restructuring, undertaken to address the phenomenon of credit quality, had influenced banking activity. At the sector's level, in September 2014, non-performing loan indicator should be 0.99pp higher at a 26% level, without the impact of measure "C". For the estimated period, the effect of this measure on non-performing loan rate for the banking sector results were as follows:

Figure 23 : Impact on NPL ratio from measure "C"



Source : DM and DFSS

Corollary it is estimated that countercyclical measures have limited influence on the banking sector's activity . In case when expectations have been more optimistic, might clear that, lending remains a complex problem determined by many factors from demand and supply, including even psychological reason of potential borrowers. Package of Measures of the Bank of Albania covered a narrow specter of the banking universe and addressed mainly the supply side of credit.

- It is not easy to accurately assess credit performance without the measures' impact, but it is tested that without measures, decreasing of lending, increasing of

investment at non-residents and deteriorating of credit quality might have resulted in higher levels.

Based on analysis of measures and their impact on the banking system, aiming to

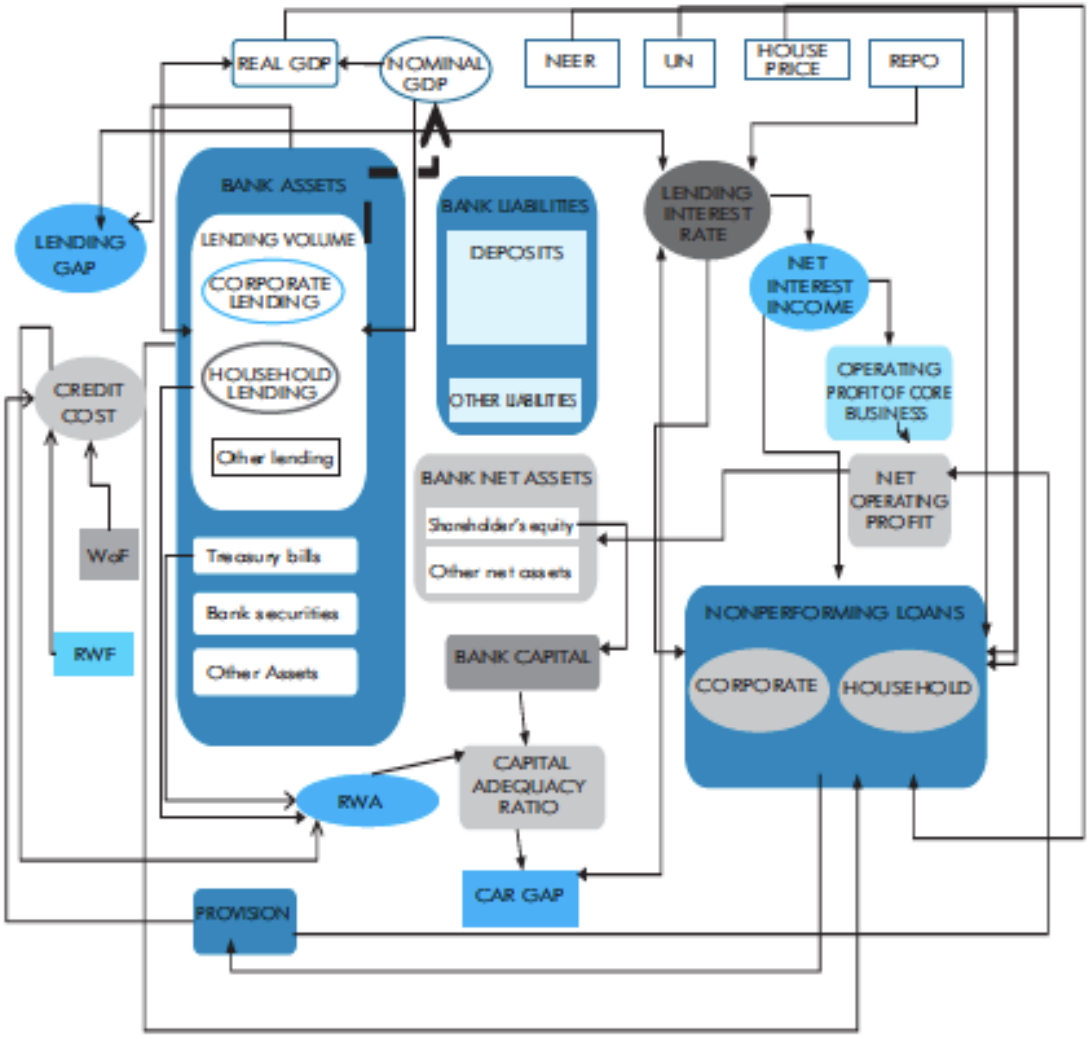
- give a contribution on lending , by turning it in sustainable growth pace ; and
- to offer compensation to those banks , which are panelized from measure A/(ii)

it is recommended to continue implementing the measures in 2015.

4.1.3 Overview to Macro Financial Model for Albania

To analyze the impact on the macro economy landscape, of using macro prudential policy measures to directly affect the financial system, it is necessary to use a model that incorporates the feedback loop between the financial sector and real economy. The Macro Financial Model (MFM) from (Dushku and Kota 2013) that it is used in this study is a small and medium-sized structural model, comprising two sectors, a financial sector introducing mainly by banking sector in Albania, and some macroeconomic variables. The Model focuses the banks' soundness in the Albanian financial system. To these banks, the Model provides a quantitative framework for assessing the transition mechanism of different shocks to banks' balance sheets, taking in consideration the macro-credit risk, the interaction between banks and feedback loop displayed in two sides of balance sheet (assets & liabilities). *The MFM is a model that explicitly incorporates the feedback loop between the financial sector and the real economy* in Albania. Figure 24 below shows model structure, explaining in detail the main inter linkages between the most important variables and the main channels incorporated in the model. Through this mechanism, it allows to know how the banks act to macroprudential measures and how this shock is transmitted in real economy through GDP's trends.

Figure 24: Albania Macro-Financial Model mechanism

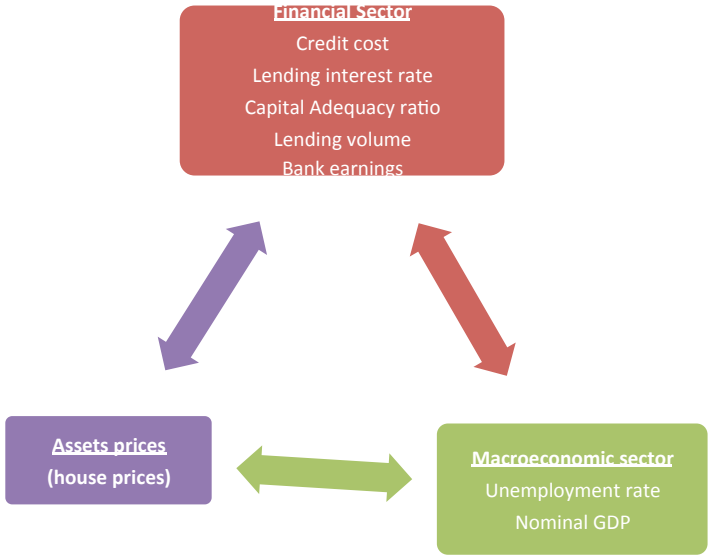


Source: MFM for Albania, Dushku and Kota 2013

Oval forms present endogenous behavior variables, endogenous variables that are defined as identity are presented by rectangles with rounded corners and exogenous variables by rectangles. Arrows and their direction show the dependence of variables in the model, whereas the arrow at interrupted lines shows the feedback channel between lending and GDP in the model.

The MFM ‘s most distinctive feature is in financial sector, which has modeled the actual risk management’s behavior of banks. That is, the financial sector is so designed that banks’ credit supply is affected by credit costs, capital adequacy ratio and other considerations. *Macroeconomic conditions influence the amount of bank lending and credit ratings, which, in turn impact, credit costs and bank capital. Further, these financial sector changes are passed on to the macroeconomic sector, affecting household expenditures and business fixed investments. These macroeconomic fluctuations are then feedback into the financial sector.*

Figure 25: *Structure of MFM*



The Model focuses on two traditional transmission channels which are relevant for Albania :

- banks credit channel; and
- banks capital channel
- feedback channel

The exchange rate channel is included through MEAM model, while assets price channel is exogenous. Through the transmission channels of banks' balance sheet, negative shocks on financial institutions may drive to a contraction in lending and then of economy. These shocks amplify higher if two conditions are met: *first*, borrowers are considerably depended on bank lending and *secondly,* banks are not able to isolate the negative impact of lending fall.

By banking lending channel, one shock that affects banks' balance sheet, affects accordingly the cost and availability of loan, which goes beyond the traditional monetary channel, through the interest rates channel. Based on the bank capital channel, a reduction in bank capital increases the banks' cost of funds, which also affects the borrowers' cost of funds. Another reason why bank capital can affect lending is the regulatory capital requirement that banks should meet. This criterion is put as an upper bound on bank assets and thus affects the banks' lending. Requirements for additional capital to risk-weighted assets have the potential to further exacerbate the effect of bank capital on lending. The worse economic conditions deteriorate the actual bank capital ratio not only due to increase in loan losses, but also to increase in risk-weighted assets. Bank capital affects lending even when the regulatory constraint is not momentarily required, which implies that shocks to bank profits, such as loan defaults, can have a persistent impact on lending.

Other element of the model is the feedback channel, which considers the second-round impacts from financial sector to real one, through the effect this indicator has on lending. This impact is simply modified by directly affecting nominal GDP rate, without specifying or dividing the impact that lending has on different components of Aggregate Demand , specially has on consumption and investments.

4.1.4 Business Credit determinants

Credit to the business is an important component of banks' activity. As at the end of 2014, this indicator accounted for 73% of total lending activity, and approximately 30.5% of GDP. Hence, the performance of this indicator is important in analyzing the current and future developments of the economy and the banking sector. The determinants of the credit to the private sector are mainly divided into the demand and supply side, even though, it is difficult to fully separate these channels as many variables may explain developments from both sides. Generally, most studies include an economic activity variable (for example GDP) and financing costs (for example bank lending interest rates) as main drives of crediting (Calza 2001). Authors such as (Kashyap *et al.,* 1993) argue that higher economic growth allows the agents to borrow more in order to finance their consumption investments; therefore should be a positive relationship between GDP and the lending activity. On the other hand, the relationship between the demand for loans and their cost in the form of the bank lending interest rates, is mainly found to be negative (Calza *et al.,* 2001) and with a strong impact on the demand for loans. However, a third component of borrowing cost is comparing the bank lending interest rates with the cost of alternative internal or external sources of financing for the corporate. In the case of Albania, the private sector relies largely on the banking sector to finance its needs, as other forms of external financing (such as bonds) are missing, while borrowing from informal markets, though present, is difficult to be quantified in the form of historical data.

(Focarelli and Rossi 1998) include private investment as an important determinant of lending to the private sector, while taking into consideration other explanatory variables such as profitability. In our case we suffer from lack of data, given that private investment

data are published in annual terms with at least two years lag, while measures of profitability of businesses are not available.

Regarding the supply-side determinants of lending to the private sector, we rely on the capital adequacy ratio of banks. The idea is that banks are able to lend money to a given demand from the businesses, if their regulatory capital requirements are fulfilled (Teglio *et al.,* 2011). Following the ultimate financial crisis, the long –term impact of the capital requirement on the macroeconomic development (including lending to private sector) has been largely studied, as (Teglio *et al.,* 2011) summarized in his work. The main findings are that not only higher capital requirements reduces the probability of the banking crisis, but it also causes lower output growth as it dampens the output volatility. In the case of private lending, it plays an important role in the banks' credit availability and willingness to meet the demand for loans.

The estimation results in the model indicate that the impact of the cost of borrowing on lending to the private sector is rather low, mainly because bank lending is the main source of financing and as such, the demand for loans may be considered as rather inelastic to the interest rates fluctuations. Expectations on future development of GDP growth rather than past developments are found to be relevant, probably because from demand side, businesses expecting better economic development in the future are more likely to ask for loans, while from the supply side, banks expecting higher economic growth are more willing to provide loans. The same implies for the impact of capital requirement: banks expecting to have better capitalization in the next year are keener to provide lending. Discussing the magnitude of the coefficient, it appears that lending to the private sector is persistent with a coefficient of 0.64, while banks and the private agents incorporate their

expectations for the economic growth and banking capitalization for the current development of lending.

4.1.5 Methodology

The Macro Financial Model (MFM) has in total 49 financial and macroeconomic variables. The MFM emphasizes the importance of financial activities, where 40 variables being included in the financial sector, and 9 variables are included in macroeconomic sector.

Among total 35 equations of the model, eight are behavioral equations and the rest are identities equations. Estimation of the equations is based on regressions with fix effects, to account for the dynamic relationship at individual bank level, using the quarterly annualized growth rates as the main variables and we have paid attention to enter all variables as stationary variables in all behavioral equations. All the dates are quarterly from 2002T1 – 2014T3 . The estimated equations are :

- household and corporate lending volume equations,
- lending interest rate equation,
- net interest income equation,
- credit cost equation,
- credit risk equation,
- portfolio risk (or non-performing loans) equations for households and business

Using statistical software Eviews 7.2, with panel data, observing banks several time it is analyzed the linear relationship between endogenous variables and explanatory variables, or exogenous variables. A general approximation of a multiple linear regression

for banks i = 1, 2, 3 …, N , who is observed at several time periods t= 1, 2, 3…, N is given as below :

$$\mathbf{Y\ it = \alpha + x'it\ \beta + ci + u\ it}$$

Where:

Y it is the dependent variable,

x'it is a K-dimensional row vector of explanatory variables excluding the constant ;

α is the intercept;

β is a K-dimensional column vector of parameters ;

ci is an individual-specific effect and

uit is an idiosyncratic error term.

The linear regression is estimated based on the so-called balanced bank **i**, in all times period **t** .

The **T** observations for individual **i** can be summarized as follows :

$$y_i = \begin{bmatrix} y_{i1} \\ y_{it} \\ y_{iT} \end{bmatrix}_{Tx1} \qquad X_i = \begin{bmatrix} x'_{i1} \\ x'_{it} \\ x'_{iT} \end{bmatrix}_{TxK} \qquad u_i = \begin{bmatrix} u_{i1} \\ u_{it} \\ u_{iT} \end{bmatrix}_{Tx1}$$

NT observations for all banks and time periods are presented as :

$$Y = \begin{bmatrix} y_i \\ y_i \\ y_N \end{bmatrix}_{NTx1} \qquad X = \begin{bmatrix} X_1 \\ X_i \\ X_N \end{bmatrix}_{TxK} \qquad u_i = \begin{bmatrix} u_1 \\ u_i \\ u_N \end{bmatrix}_{NTx1}$$

Data generation process (DGP) is described by linearity and independence, while idiosyncratic error term **uit** is assumed uncorrelated with the explanatory variables of the same individual. There are chosen to estimate fixed versus random effect equations, to see how the main relationships variables vary across individuals at the same point in time, and possibly over time for all banks all together. Due to the lower (cross-section) banks number

than the number of the period we use in the model, we have been oriented towards fixed-effects regressions, by not considering GMM models.

According to common diagnostics, macro financial model performs well. Equations display a good performance in the sample, having an adjusting coefficient R^2 that ranges from 40 to 85% on average, excluding the credit cost equation that has a lower fit. Another diagnostic feature is the forecasts performance that is reasonable, for the major part of the equations in the sample. Regardless above presented features, the most important is the performance of the whole model, measured by the impulse responses of the main shock running into the model.

4.1.6 Specification on Business Credit Dataset

The estimation of the Corporate Lending Volume equation is based on the records of the Credit Registry, using statistical software Eviews 7,2. The dataset represents an unbalanced panel of all entities, which records appear in the Bank of Albania Credit Registry. The study is focused only in the business records covering the period 2008 - 2014. All together this period contains 152,785 individual records.

The Credit Registry data represent stock values of the outstanding debt per each credit at the end of each year as reported by the banks and other non-bank financial institutions as of December 31 of each corresponding year, for all kind of credits including overdraft.[7] All outstanding figures are reported in Albanian lek, regardless of the original currency in which credit is extended. Each individual business is identified by a unique number, as is identified and each credit. These numbers, which are randomly selected to

[7] Data for 2014 represent observations as of Sep. 30, 2014

address the confidentiality issues, remain unchanged during all periods. Therefore in all those cases when one business have more than one credit, the credit register contains multiple entries with same business identification corresponding to different credits numbers within the same report period. The credit register contains additional information on each credit, the date of first disbursement, interest rate in percentage, the status of credit, kind and number collaterals, the purpose of credit, the sector of industry and the amount approved in original currency.

Upon careful observation of the database it became evident that in many cases, due to particular regulation requirements, one credit could be represented by more than one record in the credit register within the same period (year). In all those cases double entries were identified using the credit identification number, the date of first disbursement, the interest rate and the total amount in original currency fields of the credit register. All double entries were removed.

In the next step the database is transformed and reported in per business terms. After this transformation each row in the dataset represents one business. The corresponding entries in the outstanding loans and interest rate fields of each business, report the sum of all outstanding loans (of this business) as of December 31, and the average interest rate of all loans respectively. After the following transformations the database contains 27,241 individual observations for the entire period 2008-2014. The data is organized as an unbalanced panel.

In addition to credit register data, GDP growth data is also used as an explanatory variable in the estimation of the credit equation. GDP data in this study represents annual growth

rates for the period of investigation as reported by INSTAT (Albanian Institute of Statistics).[8] Also, the gap of Capital Adequacy Ratio, or the difference between actual CAR rate and the minimum regulatory rate by 12% , is used as explanatory variable .

The focus of the empirical investigation is to estimate the elasticity of outstanding credit to price of credit (interest rate) based on micro data.

The results of the regression estimation are presented below:

Corporate lending volume

Log(lendv_c_g)= 0.12 + 0.64 * log(lendv_c_g(-1)- 0.020* lend_ir_real(-1)
p-value (0.05) (0.00) **(0.00)**
+ 0.41 * d(car_gap(3)) + 1.78 * gdp_g(1)
(0.0) (0.00)
R^{2-}adj=0.8

Where

lendv_c_g= year on year growth rate of lending volume to corporate,

lend_ir_real= lending interest rates in real terms

car_gap= gap of the capital adequacy ratio to the 12% minimum required level

GDP_g= GDP annual growth rate in real terms.

Correlation between corporate lending volume and lending interest rate is negative and significant statistically. So, an increase of the interest rate by 1 percentage point impacts by 0.020% the lending volume.

[8] GDP growth enters the equation as a lagged variable therefore 2013 represents the last observation for the purposes of this exercise.

Comparing with old version of the behavior equation,

Log(lendv_c_g)= 0.12 + 0.64 * log(lendv_c_g(-1)- 0.011 * lend_ir_real(-1)
p-value (0.05) (0.00) **(0.046)**
+ 0.41 * d(car_gap(3)) + 1.78 * gdp_g(1)
(1.0) (0.00)

Correlation between corporate lending volume and interest rate results stronger statistically, it is showing that using micro data in business level, the information is more complete and accurate. Also, the p-value indicator is higher then in older version, it results 0.00, from 0.46 .

Initially we tested if series were stationary or not. Results showed that they were continuing the assessment procedure using the method OLS- least squares. The results are the following:

Table 7: Test unit root for corporate lending volume

Panel unit root test: Summary				
Series: Shuma e aprovuar e kredisë				
Date: 01/08/15 Time: 16:32				
Sample: 1 27241				
Exogenous variables: Individual effects				
User-specified lags: 4				
Newey-West automatic bandwidth selection and Bartlett kernel				
Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				

Levin, Lin & Chu t*	-77.4820	0.0000	7	27206
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-75.3349	0.0000	7	27206
ADF - Fisher Chi-square	1517.65	0.0000	7	27206
PP - Fisher Chi-square	128.945	0.0000	7	27234
** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.				

Table 8: Test unit root for credit interest rate

Panel unit root test: Summary

Series: Norma e interesit të kredisë.

Date: 01/08/15 Time: 16:34

Sample: 1 27241

Exogenous variables: Individual effects

User-specified lags: 4

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-59.0212	0.0000	7	27206
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-56.5450	0.0000	7	27206
ADF - Fisher Chi-square	1413.17	0.0000	7	27206
PP - Fisher Chi-square	128.945	0.0000	7	27234
** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.				

Table 9: Estimation of elasticity among Corporate lending volume & interest rate

Dependent Variable: LOG(CTOL)

Method: Panel Least Squares

Date: 01/08/15 Time: 16:36

Sample: 1 27241

Periods included: 15323

Cross-sections included: 7

Total panel (unbalanced) observations: 27241

Cross-section weights (PCSE) standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CI	-0.029779	0.001759	-16.93340	0.0000
C	14.79966	0.020090	736.6708	0.0000

R-squared	0.010438	Mean dependent var	14.58423
Adjusted R-squared	0.010402	S.D. dependent var	2.425336
S.E. of regression	2.412689	Akaike info criterion	4.599434
Sum squared resid	158560.1	Schwarz criterion	4.600037
Log likelihood	-62644.60	Hannan-Quinn criter.	4.599629
F-statistic	287.3171	Durbin-Watson stat	1.515519
Prob(F-statistic)	0.000000		

Table 10: Estimation of elasticity among Corporate lending volume, intrest rate & gdp rate

Dependent Variable: LOG_CTOL

Method: Panel Least Squares

Date: 01/12/15 Time: 09:50

Sample: 1 27241

Periods included: 8950

Cross-sections included: 7

Total panel (unbalanced) observations: 11646

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG_CTOL(-1)	0.061527	0.010336	5.952462	0.0000
CI(-1)	-0.019792	0.003796	-5.214395	0.0000
REAL_G(-1)	0.207572	0.007960	26.07535	0.0000
C	13.36695	0.179205	74.59044	0.0000

R-squared	0.079228	Mean dependent var	14.99489
Adjusted R-squared	0.078990	S.D. dependent var	2.156238
S.E. of regression	2.069325	Akaike info criterion	4.292666
Sum squared resid	49852.29	Schwarz criterion	4.295195
Log likelihood	-24992.19	Hannan-Quinn criter.	4.293515
F-statistic	333.9109	Durbin-Watson stat	1.776073
Prob(F-statistic)	0.000000		

The estimation results indicate a negative significant correlation among credit amount and interest rate.

The F statistic - indicates statistical significance of all variables used, indicates that equation is estimated correct.

The statistic DW - basically is used to see if the model suffers or not by autocorrelation (a correlation between main variable and waste of the model). The result is 1.8 indicating that the model does not suffer so much, by positive autocorrelation.

The statistic R-square - indicates model quality, the result 8% of lending behavior is explained by previous values of lending interest rate and real growth rate of GDP.

4.1.7 . SIMULATIONS and INTERPRETATIONS of RESULTS

Regarding the macroprudential measures taken from the Bank of Albania, through the Macro Financial Model for Albania, this study analyses the impact that three instruments from the package of macroprudential measures have on the main financial and real indicators[9] , and the impact of the three measures used jointly . *The simulations analysis is the way to evaluate the performance of these measures, by observing the reactions of all endogenous variables and feedback loop between financial and macroeconomic sectors.* Generation of the baseline[10] - current level of endogenous variables, determined according to the assessed equations and the connections provided in the model, with assumption that exogenous variables have a determined value and behaviour and all other exogenous shocks are equal to zero. The simulations results for the entire banking system are given as the differences between the simulation results and the baseline, expressed as a percentage or in base points. As shocks results are taken within the sample, the deviations of scenarios from the model baseline bears also their current behaviour during the period of assessing the equations in the model.

SCENARIO 1

Assumptions:

- Increase of total credit stock of 4% and 10% for a period of two years, while
- Risky weighted assets (RWA) remain unchanged, equal to current period level

The *first* SCENARIO, analyzes the impact that the increase of total credit within a range of 4%-10% of all banks , which would be accompanied by not increasing risk weighed assets

[9] The measure : increasing capital requirements for the new flows of bank investments with non-residents, can not be modeled in actual version of the model

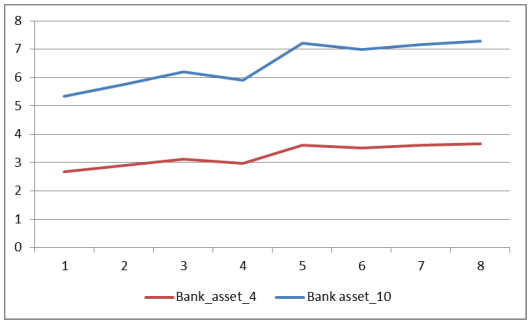
[10] The baseline is the behaviour of variables when no policy measures are used

, meaning they will remain at least at an equal level to the current period. The figures given below assume a credit growth of 4% and 10 % for eight quarters. It should be noted that the following variables are expressed as a percentage or percentage points deviations from the baseline model. [11]

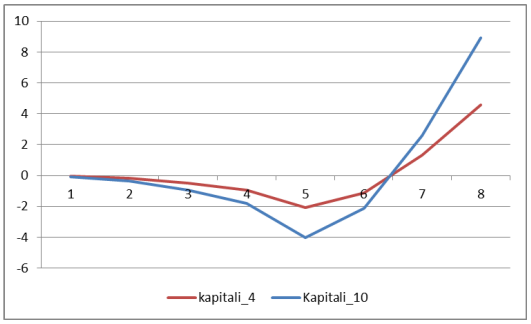
Figure 26 : *Results of the first scenario*

(Increase of Credit growth rate of 4 % and 10% , when Risk Weighted Assets remain unchanged)

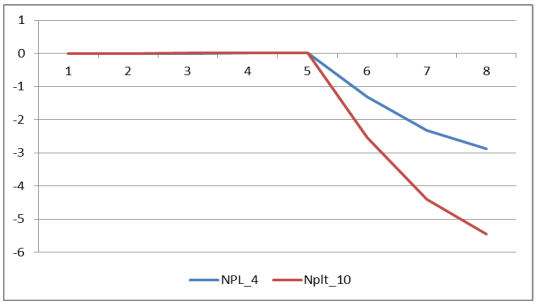
Total Assets



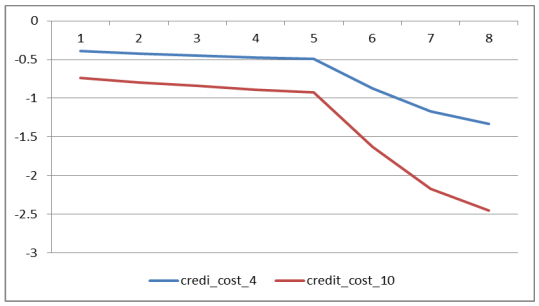
Capital



Non-performing loan rate

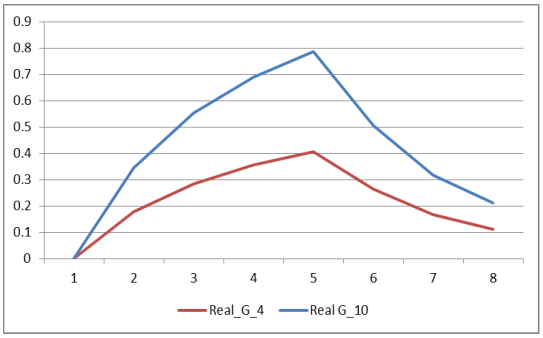


Credit cost ratio

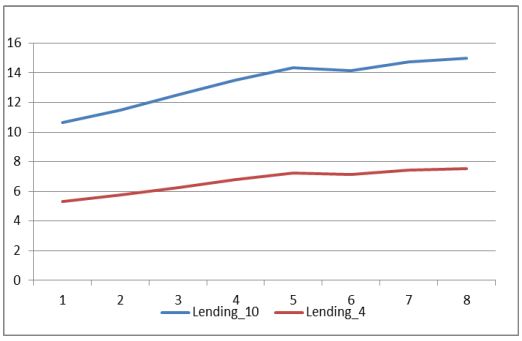


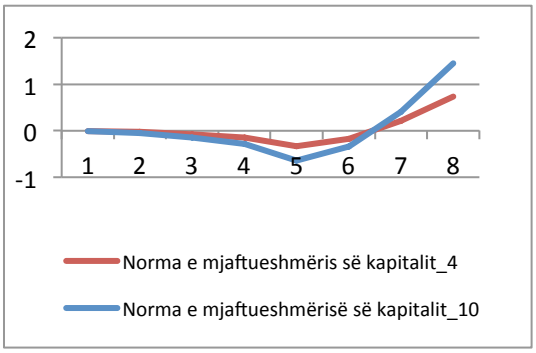
[11] each of the graph introduces the deviations of variable from the baseline of the model (deviations are in-sample).

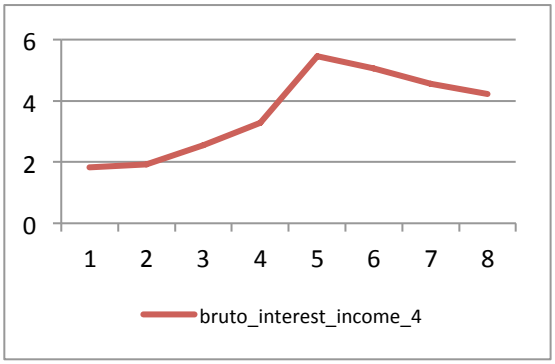
Gross Domestic Product



Total Lending Volume







Thus, an increase of total lending by 4 % and 10 % will bring about a reduction of non-performing loan rate mainly in the second year, respectively by an average of 1.6 percentage points and 3.1 percentage points during second year, coupled with the increase of gross interest income during eight quarters, reflecting the performance of NPL ratio and Lending volume growth. Total assets increased by average levels of 4.7 % and 6.5 % over two years. The increase of total lending, which is not associated with increased of risky assets, but stays at least in previous levels, brings an increase of capital adequacy rate by an average of 0.022 percentage points in case of a credit growth of 4% and of 0.048 percentage points with a growth of 10%. The stimulus that credit growth brings to the economy is estimated to average between 0.22 and 0.42 percentage points during two years.

SCENARIO 2

Assumption :

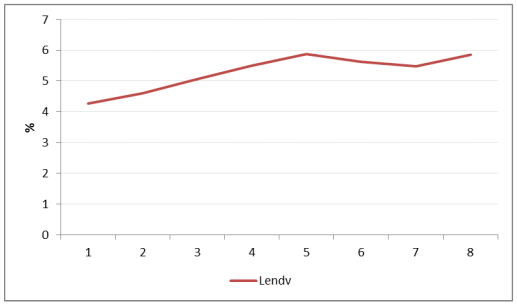
- general reduce by 5% of regulatory liquidity indicator in total, for Lek and foreign currency, compared with its current level as per banks' risk profile.

The *second* SCENARIO, analyzes the impact that a general reduction by 5 per cent of the regulatory indicator for the minimum liquidity ratio in total, for lek and foreign currency, compared with actual level according to each bank risks' profile. The Macro Financial Model for Albania, has mainly modeled the assets side of the bank and rather then the liabilities side, which is treated mainly through identities. So, it is assumed the impact that the reduction in regulatory liquidity ratio will have in the increase of total lending. The Figure below shows in detail the results of this scenario in some of the financial indicators, as well as the impact through the feedback channel in the real economy.

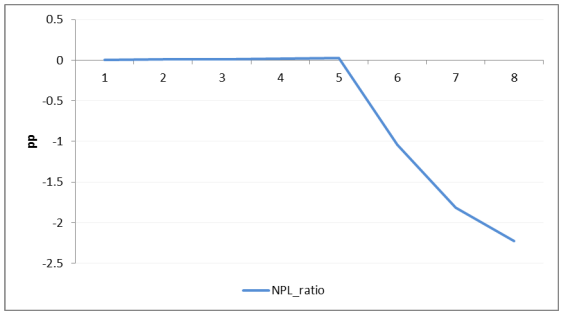
Figure 27 : *Results of second scenario*

(Impact of the decrease of 5 % of the regulatory liquidity indicator)

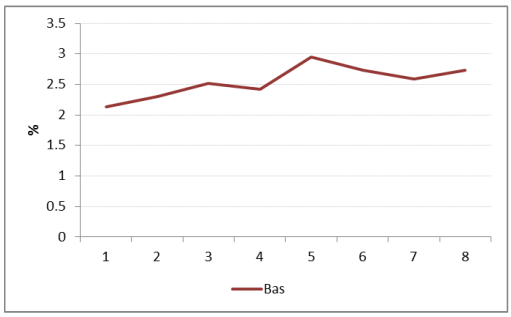
Total lending volume



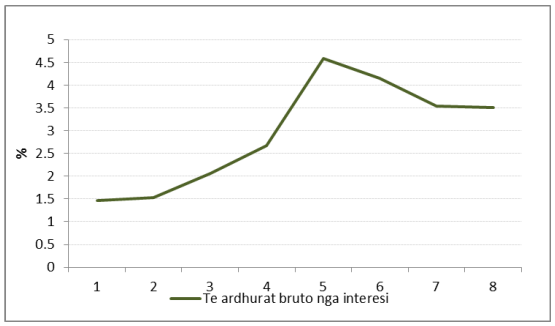
Total NPL ratio



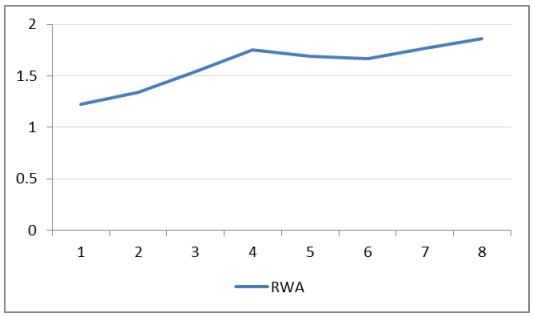
Total assets



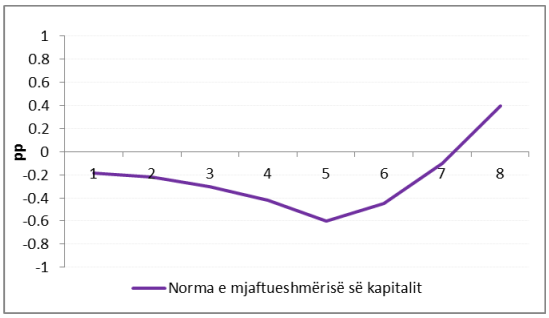
Gross income from interests



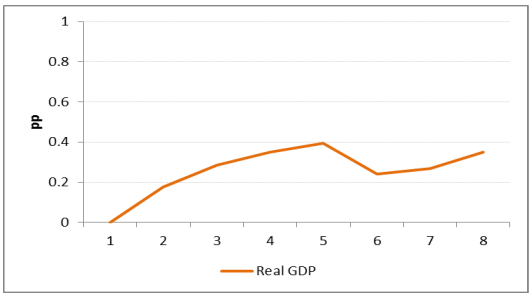
Risk-weighted assets



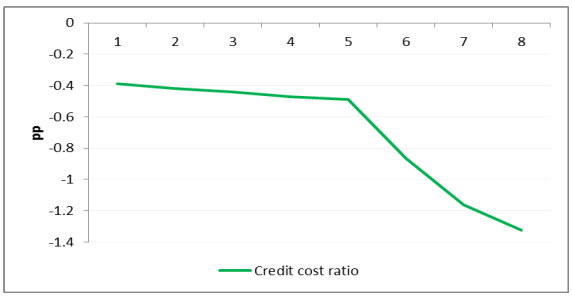
Capital adequacy Ratio



Real GDP



Credit cost ratio



The decrease of the regulatory liquidity indicator by 5% will be associated with the release funds, which will influence further increase of credit by households and business sectors. This development will cause the decrease of Non performing loan rate by an average of 0.8pp; the increase of gross income from interests by an average of 3.7% and total banks assets by an average of 3.25% during two years. The capital adequacy ratio will be decreased, as a result of increased risk-weighted assets and the initially decrease of banks capital, and during the fifth quarter will start an upward trend. The final impact in the real economy is positive, increasing the real GDP with 0.4 percentage points over the first year.

SCENARIO 3

Assumption :

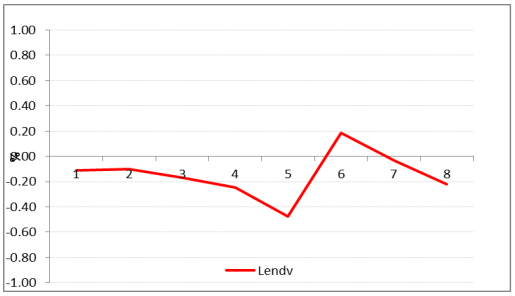
- the increase of provision by 10%, from credit restructuring in good categories.

In the *third* SCENARIO, results that comes from credit restructuring stimulus are introduced , that is presented through an increase of expenses for provisions by 10% , for the new category " regular loan restructuring " .

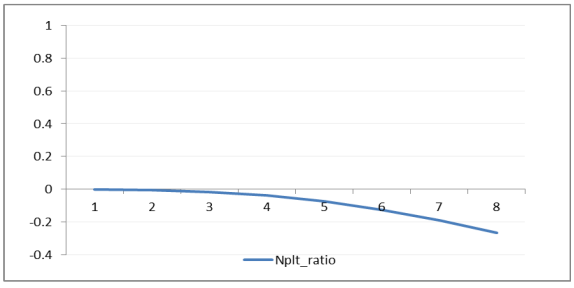
Figura 28: *Results of the 3rd Scenario*

(Increase of provisions with 10% for regular loans)

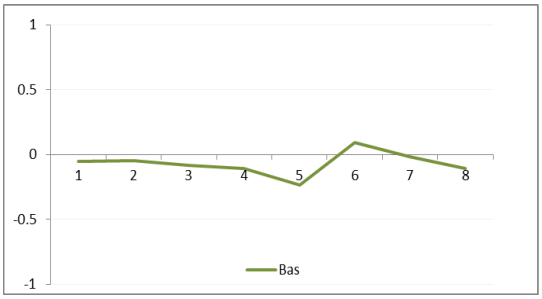
Total Lending Volume



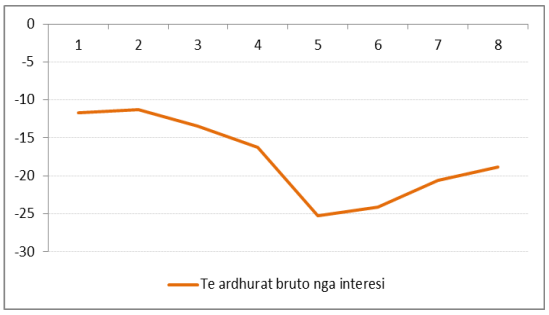
NPL ratio



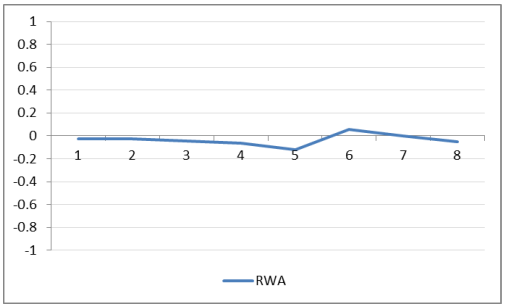
Total Asset



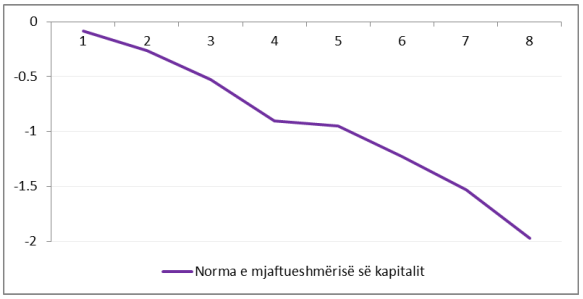
Gross incoming from interests



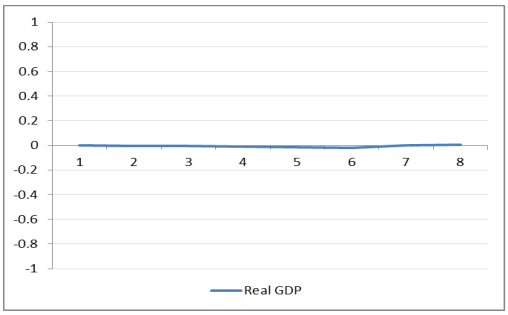
Credit Risk Asset



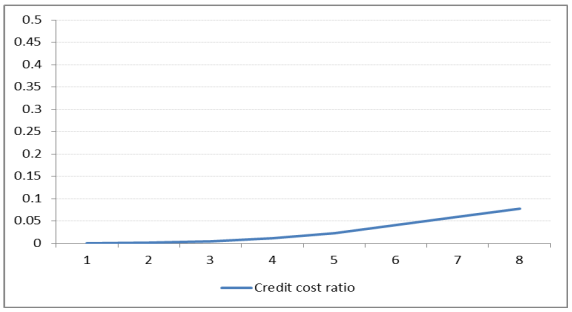
Capital adequacy ratio



Real GDP



Credit Cost Ratio



The result of this scenario is that an increase of 10 % of the costs of provisioning that came as a result of the restructuring of regular loans seem to have no impact on the real economy, because the impact is almost zero, rather it appears as a statistical effect.

SCENARIO 4

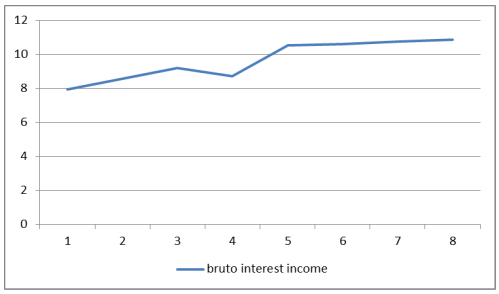
Assumptions : Combination of three measures:

- increase of total credit stock by 10% for a period of two years ;
- general reduce of regulatory liquidity indicator by 5%;
- increase of provision by 10%, from credit restructuring in regular categories.

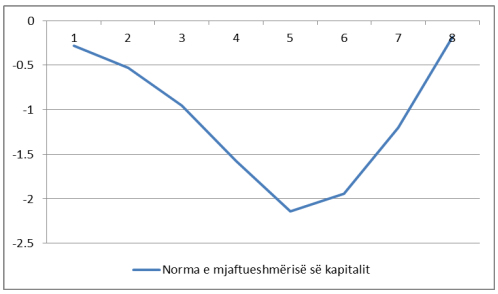
Figura 29: *Results of the 4th Scenario*

(combination of three measures)

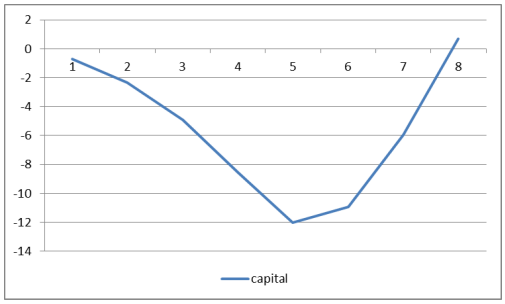
Bruto interest income



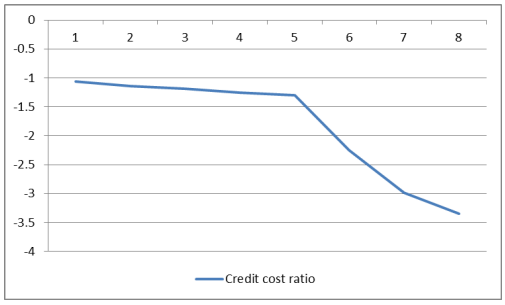
Capital Adequacy Ratio



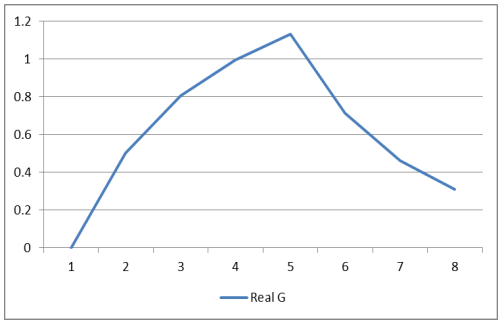
Capital



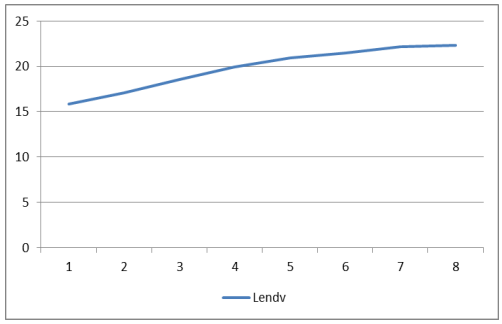
Credit Cost Ratio



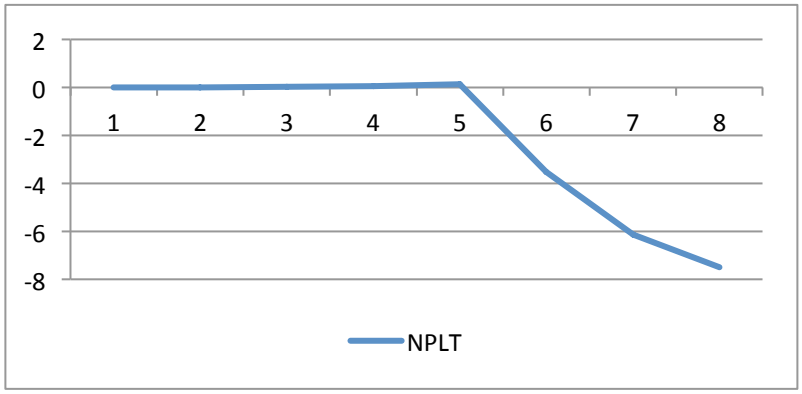
Real GDP ratio



Total lending volume



Non Performing Loan ratio



The impact of a combination of all three measures causes a significant rise of lending volume by an average of 17.84% during first year and 21.73% during the second year. Credit cost ratio is reduced by an average of 1.8 percentage points during eight quarters and capital adequacy ratio is shrunk by an average of 0.84 pp and 1.57pp during first and second year respectively. The impact on the GDP is on average 0.7 pp during second year.

z

Table 11: *Summary of the four scenarios*

	1-st Scenario – increase of credit 10%		2-nd Scenario – decrease of min liquidity indicator		3-rd Scenario – increase of provision' costs		4-th Scenario- combination of Scenario 1;2&3	
	1st Year	2nd Year	1st Year	2nd Year	1st Year	2nd Year	1stYear	2nd Year
Assets (avg, %)	5.80	7.16	2.9	3.6	-0.07	-0.067	8.60	10.68
Capital (avg, %)	-0.80	1.34	-0.43	+0,52	-2,9	-8,9	-4.12	-7.06
Lending volume (avg, %)	12.04	14.57	6.02	7.3 %	-0.16	-0.14	17.84	21.73
NPL ratio (avg, pp)	0.00	-3.09	0,03	-3,7	+0.04	+0.4	0.03	-4.25
Credit cost ratio (avg, pp)	-0.82	-1.79	-0,43	-0,96	+0.0 04	+0.05	-1.16	-2.47
Bruto interests income (avg, %)	4.78	7.16	2,4	4,9	-13,17	22,4	-6.03	-7.89
Car (avg, pp)	-0.12	0.22	-0,28	0,52	-0.44	-1,42	-0.84	-1.37
Real GDP (avg, pp)	0.396	0.454	0.20394	0.2380325	-0	- 0.0066475	0.5752	0.654

4.1.8 Impact of measures on the Resilience of the Financial System

As most of the theories conclude, a primary objective of macroprudential policy measures is to increase the resistance of the financial system to shocks and ensure financial stability. The package of macroprudential measures undertaken by the Bank of Albania, beyond addressing the considerable slowdown in crediting and the worsening quality of credits given, considered increasing the resilience of the financial system to shocks from different grounds, that is eliminating risk from financial crisis.

We judge on this impact, by analyzing the trend of Capital Adequacy Ratio (CAR), Non-performing Loan Ratio (NPL) and GDP growth rate through four scenarios.

- CAR's performance in all scenarios shows that this indicator does not fall in any cases under its minimum of regulatory threshold by 12%. The deviation from base-line in the worst case in the 4th scenario results -1.10 pp, meaning that if the actual value of this indicator is 17,54%, it will fall to 16.44% in the worst of cases. This

result demonstrates that undertaken measures have considered maintaining system's capitalization at a desirable level.

- The table above, summary of four scenarios, shows nonperforming loan ratio reactions from the impact of each scenario. The deviation of this variable from the baseline is moderate; meaning that macroprudential measures have managed to slow down further deterioration of non-performing loans.
- Lastly, analyzing the GDP growth rate performance, in all scenarios , we conclude that it is positive in all cases, meaning that the financial system is functional and ensures financial services to economic agents, which impact positively and improve real economic dynamics in the country.

4.1.9 Summary of results of four scenarios

- the increase of total lending by 4% and 10% causes the improvement of NPL rate by an average of 0.81 and 1.54 percentage points ; the increase of the Real GDP rate respectively by an average of 0.22 and 0.42 percentage points during eight quarters ; and slight increase of capital adequacy ratio by an average of 0.049 percentage points in case of credit growth by 10% for two years.

- the general decrease by 5% of the regulatory liquidity indicator, as per banks' risk profile will be associated with improvement of the NPL ratio by an average of -0.79 pp during two years ; slight decrease of Capital Adequacy ratio by an average of -0.24pp; and improvement of real GDP rate of 0.3 pp during eight quarters.

- the increase of 10% of provisions for credit restructuring when it is considered as a good credit – does not have any impact on real GDP ratio . This measure serves mainly to prevent further deterioration of credit quality.

- the combination of all three measures impact positively Real GDP growth by an average of 0.62pp during eight quarters; Lending volume and Total assets by an average of 19.7% and 9.64% respectively. CAR decreases on average by 1.10 pp during eight quarters.

As a general conclusion, a single macroprudential policy measure has a slight positive affect on financial and economic variables, but their role is not ideal. While using multiple macroprudential policy measures is a better alternative, because of their significant positive impact on main financial and economic variables and the ability to maintain the efficiency of policy measures by responding to the multiple source of risks.

The performance of NPL and CAR indicators in four scenarios shows that the package of measures addressed also the resistance of financial system to shocks, the parameters of NPL and CAR stand in good levels compared to their current respectively regulatory thresholds.

CHAPTER V

CONCLUSIONS and RECOMMENDATIONS

CONCLUSIONS

This dissertation has sought to clarify the meaning of macroprudential policy and provide strong support for the need of such a policy. It further seeks to identify issues for its implementation that ought to be addressed as policy recommendations. It is hoped that it will help drive agreement over the ongoing process of designing a suitable macroprudential framework for Albania, required to meet this challenge.

The role of macroprudential policy in safeguarding financial stability is attracting growing attention and support from recent theoretical advances and policy thinking. They also highlight the high costs of a financial crisis. More generally, the potential economic costs arising from the way the financial system operates – whether from excessive financial cycles or spillovers through interconnectedness – are increasingly recognized. These policies aim to contain the build-up of systemic risks and achieve greater financial stability, so as to reduce any adverse consequences, including through crises, for the real economy. They are designed to complement microprudential regulations and traditional macroeconomic management tools, notably monetary and fiscostructural policies. Reviewing that aspect, *we conclude that :*

- *a better knowledge and understanding of the macroprudential policy combined with the existence of a certain degree of standardization of the macroprudential tools and indicators can significantly improve the ability of financial stability authorities to forecast the systemic risk and to avoid or reduce the consequences of the financial crisis in public budget.*
- *It is still a work in process that asks exhausted analytical analyses for consolidation.*

- *The Macroprudential policy is not expected to completely safeguard the financial system from cyclicality and shocks. That would be an unrealistic and undesirable goal. But the balance between enhanced financial stability and resistance to shocks while retaining flexibility is essential.*

- *At the same time, a tight stance of macroprudential policy may promote financial stability but hamper the transmission mechanism of monetary policy.*

The international standard-setting bodies will continue to play a very important role in driving standards and early warning functions of future systemic risks.

The institutions, onto which these new responsibilities will be delegated, be it a central bank or other institutions should be ensured a certain level of independence and authority, while being required to provide appropriate transparency and accountability.

- *It is crucial that macroprudential, prudential, and macroeconomic supervisors work together, while giving due regard to the scope of each supervisory authority, to ensure an oversight of the financial system that is as complete as possible.*
- *Macroprudential policy could be both complementary and substitutionary of other traditional policies, monetary policy, microprudential policy and fiscostructural policy.*

Up until a few years ago it was thought wrongly that it was sufficient to combine monetary policy with bank prudential supervision in order to ensure financial stability, however, it was proved that a link is missing, namely macroprudential supervision. Although the surveillance work at the macro level involves monitoring the overall banking system,

macroprudential policy interacts with both monetary policy and microprudential supervision. Thus, the insurance of the financial stability requires price stability, soundness of individual banking institutions and the soundness of the banking system as a whole. Another conclusion would be that for each policy a separate tool is needed, not in an independent way, but in a complementary one. In regards to macroprudential policy it is essential to establish ways of coordinating macroprudential policy decisions with authorities responsible for monetary policy and macroprudential supervision.

In regards to interaction between macroprudential policy and other policies it is necessary to establish channels of coordination, decision-making and consultation between concerned authorities, as well as a consensus on the usage of macroprudential tools. In this study we have identified a number of issues related to the institutional framework of banking macroprudential supervision activity. These issues relate to: the mandate, competence and instruments, responsibility and transparency of the mechanisms, the composition of the decision-making organism and the mechanisms of the intern policy coordination. In addition to the need for an institutional framework for macroprudential supervision a set of means to achieve this activity is required. The means identified to achieve this task are: statistical data, the macroprudential indicators and macroprudential tools.

Given that the particular shock that destabilizes a financial system is different each time, and given that each country inherently has different problems within its financial system, the challenge

- *remains to select the proper macroprudential tools*, *best fitted to the characteristics of individual national financial system.*

On the basis of our new analysis as well as the existing literature and other experiences, besides the macroprudential policy measures embodied in regulation in the past,

- *there is a need to establish a Document of Macroprudential policy of the Bank of Albania, as a strategic document of the Central Bank.*

This document will help to make this policy more transparent, and will influence to increase the accountability of the BoA. By detailing and making public its principles, objectives and tools, will help increasing efficient and effective implementation of macroprudential policy. Constructing a sophisticated operational framework linking relevant indicators and instruments of systemic risk will be an important condition for good implementation of such a policy.

In a small and open economy like Albania, with a simple financial system, dominated by banks,

- *the time dimension of systemic risk is identified as being more important and the concept of macroprudential policy should be narrow and focused primarily on risks associated with the financial cycle.*

Financial or informational contagion resulting from links between the economy and its institutions and external environment can be a major source of systemic risk, so the

- *macroprudential framework must also include the cross-sectional dimension and external macroeconomic and financial developments.*

- *The Bank of Albania should continue to play its pivotal role in supervising financial system in Albania , and due to its high independence , access in information and*

expertize , it is well positioned compered with other authorities to play a leader role in conducting macroprudential policy in Albania .

Over the financial cycle it will be necessary, using forward-looking indicators, to catch the moment at which systemic risk starts to accumulate, identify the point at which the tolerance for systemic risk has been exceeded, and send out a message that macropudential tools need to be activated. And if prevention fails, it will be necessary, using a different set of indicators, to determine a point at which a financial instability event has to be declared, assess the potential scale and seriousness of the manifestations of the crisis, and recommend appropriate anti-crisis tools. Forward analytical tools should then ultimately help to detect when systemic risk has fallen below critical level when to discontinue the anti-crisis measures.

Another important element of operational framework is the need to have a trigger mechanism for the use of tools in the risk inception and manifestation phase. This mechanism should be complex yet flexible. When implementing such policy, it will be vital to combine a rigorous analytical approach with a large dose of judgment. It will be necessary to leave the authority considerable room to exercise discretion.

The macro financial model used in this study showed the existence of a significant influence of macroprudential measures on certain financial and macroeconomic variables included in the analysis. Our regression looked at correlations between business lending volume and interest credit rate, we have found a stronger negative correlation between them, in the case when data for credit was generated in micro base from Credit Registry. The results of the analysis of the effects of macroprudential measures on main financial

variables and on real GDP, provided by simulations in four scenarios showed that during a period of 8 quarters, implementation of measures had a positive effect on GDP growth and credit volume in both quality and quantity.

- *The regression empirical study confirms the high level of interdependence of the financial sector and real economy.*
- *The re-estimation of Corporate Lending Volume equation based on the records of Credit Registry (micro based data) is showing that correlation between Corporate Lending Volume and Credit Interest Rate become stronger statistically, due to that fact.*
- *The performance of equation is improved in comparison with old estimation, which is based in data generating by banks annual reports. It is explained in terms of R-squared and Durbin-Watson statistics.*
- *Simulation results show that each of macroprudential measure, individually impacts slightly positively the main financial indicators and real GDP growth , but the use of a single indicator it is not the best solution.*
- *The using of multiple macro prudential policy measures is a better alternative, because of their significant positive impact of main financial and economic variables and the ability to maintain the efficacy of policy measures by responding to the multiple sources of risks.*

The social and economic costs of financial crises highlighted in this thesis are high. All of this indicates the need for an effective macroprudential policy. Accordingly, we believe that the effectiveness of macroprudential policy translates into the reduction of the adverse

effects and the economic and social costs driven by imbalances through the macroprudential policy in conjunction with macroeconomic developments and also using the proper time and proper calibration of the instruments.

Finally, as a general conclusion, we believe that a better knowledge and understanding of the macroprudential policy combined with the existence of a certain degree of standardization of the macroprudential tools and indicators can significantly improve the ability of financial stability authorities to forecast systemic risk and avoid or reduce the consequences of a financial crisis in the public budget. This dissertation along with the importance and complexity of the macroprudential framework opens up new perspectives for rigorous analytical approaches related to the composition of the Document of Macroprudential policy for the Bank of Albania, where an important element is its operationalization.

RECOMMENDATIONS

This dissertation will address recommendations in two directions: *first*, as part of discussing the second objective of this study - to find solutions for a reasonable Macroprudential Policy framework that best fits the Albanian economy, and *second* as part of discussing the third objective of this study - to find an instrument that incorporates the strong correlation between the financial and macroeconomic sectors and enables quantitative analysis of the impact of financial regulation on economic costs.

This study has evidenced that, even the Bank of Albania has recognized and used macroprudential issues in the past, there exists a wide consensus that a more powerful macroprudential supervisory oversight regime is necessary.

- *The challenge here is to design and implement the strategic Document of Macroprudential Policy for the Bank of Albania, to select the proper macroprudential tools, to calibrate and operate them in the context of the existing monetary policy and micro prudential framework.*

Concrete proposals to adopt a macroprudential approach in Albania, have been identified as part of the discussion of the *second objective* of this dissertation. The proposals have been covering three directions: a) enhancement of systemic risk measuring methodologies and improvements in the supervisory framework; b) improvements in internal organizations of the Bank of Albania, as the macroprudential authority, and its cooperation tools with other authorities; c) improvements in the macroeconomic environment and policy.

With regard to the first direction,

- *the dissertation highlights the importance of exploring other methodologies that provide ways of measuring the systemic risk in a more consolidated way, and also quantify the relationship between the financial sector and the macroeconomic indicators*.

In addition, the dissertation proposes

- *to adopt a tighter regulatory and supervisory framework for systemic banks, given their importance for financial stability.*

Other proposed measures include those that

- *reduce pro-cyclicality in the banking activity, through, for example, dynamic provisioning.*

Furthermore, the discussion supports

- *improvements in the crisis management framework, and the development of a specific consumer protection framework based on a cost-benefit analysis.*

With regard to the second direction,

- *the dissertation highlights the importance of having better harmonization of monetary and macroprudential policy at the Bank of Albania.*

This requires the development by the Bank of Albania of a policy standing regarding the scope of the monetary policy and its role in preventing imbalances in banking activity and the financial market. It also requires the preparation of a macroprudential framework and the identification of a macroprudential toolkit that can be used in specific and

predetermined financial situations.

- *The Bank of Albania, as the central bank of the country with supervisory powers, does have an important role to play in building the macroprudential framework. However this role is not exclusive. Hence the regular and effective cooperation with other national and international relevant authorities, appropriately supported by legal definitions, is paramount in safeguarding financial stability.*

With regard to the third direction, the dissertation points out

- *the importance of financial market developments and fiscal responsibility, for financial stability. The whole framework is better supported by policies that would sustain Albania's economic growth in the long term.*

For our empirical research we have used the first version of Macro Financial Model for Albania published in 2013. This Model itself has several aspects which need to be improved . So, we recommend

- *the feedback channel should to be extended, modeling the impact on GDP, from each component of aggregate demand , especially from consumption and investments.*
- *modeling of assets price channel, which in model is exogenous and approximate it with the price of housing.*

Regression results indicate for a stronger negative correlation between Business Lending Volume and Credit Interest rate, when we used micro data for business loan. We suggest for further studies :

- *to use the same source of information (Credit Registry) for Household Lending Volume , and analyze the elasticity of Household Lending Volume to Credit interest Rate .*
- *the model should be tested in terms of out of sample forecasting in order to evaluate its performance.*

5.3 Limitations of the research

Studying an issue with a wide focus, the limitations are inevitable.

Qualitative research limitations:

- the theoretical foundation for macroprudential policy is at an incipient stage and still far from being able to provide the bases required to design integrated policy framework. This is referring specifically to the need for a better understanding of the relationship of the financial system with the macro-economy, and to the importance of devising models that capture this relationship adequately.
- it is necessary to have adequate measures of systemic risk. Despite efforts, currently there are no reliable and generally accepted measures of systemic risk. The absence of precise and complete indicators to evaluate risk is not exclusive to the macroprudential arena.
- empirical evidence on the effectiveness of macroprudential tools is scarce. This is understandable, given the fact that recognition of the important role that macroprudential policy can play in financial stability surfaced only recently, and given the great variety of measures that have been called macroprudential, which makes it hard to compile, homogenize and evaluate the information.
- we still do not have sufficiently sound and comprehensive frameworks for analyzing the effectiveness of macroprudential policy and understudying its transmission channels despite some recent advances. The main difficulty lies in integrating the above-mentioned market failures into models giving a key role to financial institutions, while taking account of arbitrage opportunities. We must therefore act on the basis of our understanding and our current knowledge of the

functioning of the financial system while progressively integrating advances in research.

- it is indispensable to establish adequate institutional arrangements for the design and implementation of macroprudential policies. In general, such institutional arrangements should be effective, in the sense that they enable the corresponding authorities to take preventive action, in a timely and coordinated fashion. Nonetheless, I would like to emphasize that there is no one recipe that works in all cases. In reality, the selection of an adequate arrangement depends on the specific characteristics of each country, including its legal and political context.

Quantitative research limitations :

Macro Financial Model for Albania , that we have used in our study to evaluate and quantify the impact of macroprudential countercyclical measures represents a first and courage efferts to mimic financial and macroeconomic albanian contex.

- *This model needs to be extended with new variables and improvements in terms of calibrating it.*
- *The model suffers from the lack of data, that is the reason the model does not include private investment as an important determinant of lending to the private sector, while taking into consideration other explanatory variables such as profitability.*
- *Public investment data is published in annual terms with at least two years lag, while measures of profitability of businesses are not available.*

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APPENDIXES

Appendix I : List of Equations

I. Behavior Equations

1. Corporate lending volume (old equation)

Log(lendv_c_g)= 0.12 + 0.64 * log(lendv_c_g(-1)- 0.011 * lend_ir_real(-1)

p-value (0.05) (0.00) (0.046)

+ 0.41 * d(car_gap(3)) + 1.78 * gdp_g(1)

(1.0) (0.00)

R^{2}-adj=0.8

Where lendv_c_g= year on year growth rate of lending volume to corporate,

lend_ir_real= lending interest rates in real terms

car_gap= gap of the capital adequacy ratio to the 12% minimum required level

GDP_g= GDP annual growth rate in real terms.

1. Corporate lending volume (new equation)

Log(lendv_c_g)= 0.12 + 0.64 * log(lendv_c_g(-1)- 0.020* lend_ir_real(-1)
p-value (0.05) (0.00) (0.00)
+ 0.41 * d(car_gap(3)) + 1.78 * gdp_g(1)
(2.0) (0.00)

R^{2}-adj=0.8

Where lendv_c_g= year on year growth rate of lending volume to corporate,
lend_ir_real= lending interest rates in real terms
car_gap= gap of the capital adequacy ratio to the 12% minimum required level
GDP_g= GDP annual growth rate in real terms.

2. Household lending volume

Log(lendv_h_g)= 0.04 + 0.75 * log(lendv_h_g(-1)- 0.011 * lend_ir_real(-1)
p-value (0.47) (0.00) (0.03)
+ 2.76 * gdp_g(1) + 0.12*hpi_g(-2)
(0.00) (0.08)

R^{2-}adj=0.85

Where lendv_c_g= year on year growth rate of lending volume to households,
lend_ir_real= lending interest rates in real terms
gdp_g= GDP annual growth rate in real terms
hpi_g= House price index growth rate in annual terms.

3. Net interest income

net_in_inc_g= 0.23+0.005* net_in_inc_g(-1)+0.17* lendv_g-0.36* dummy_08
p-value (0.00) (0.00) (0.04)

+ 0.029*lend_repo(-4)+3.8*d(nplt_ratio(-3))
(0.01) (0.09)

R^{2-}adj=0.42
Where net_in_inc_g=net interest income annual growth rate
lendv_g= growth of lending activity
dummy_08= Dummy variable for q3 2008
lend_repo= difference between lending rate and repo rate
nplt_ratio= ratio of nonperforming loans for the total portfolio of lending

4. Lending interest rate equation

lend_ir = 0.32* lend_ir (-1) + 0.02* g_repo(-4) + 0.0008* g_lendv_gap(-1)
p-value (0.00) (0.00) (0.00)

- 0.03*car_gap + 0.07
(0.03)

R^2 –adjusted =0.6

Where: lend_ir = average weighting of lending interest rate in nominal term
g_repo= year on year change of monetary policy rate
g_lendv_gap=year on year change of lending volume gap
car_gap=capital adequacy ratio gap

5. Credit cost equation

D(ccost_g) = - 0.65*growth_n(-1) + 0.18*D(lendv_g(-1)) + 4.13
p-value (0.05) (0.00)

R^2 –adjusted =0.1

Where ccost_g= is the growth rate of credit cost volume
Credit cost is measured as a sum of loan loss provision and write off minus recovered write off growth_n=quarterly annualized nominal GDP growth
lendv_g=year on year change of lending volume

6. Risk Weighted Assets equation

risk_g = 0.19 + 0.24* lendv_g + 0.01* ccost_g+ 0.03* bills_bond_g

p-value (0.00) (0.00) (0.043)
R^2 –adjusted =0.6 (equation 6)

Where: risk_g is the growth rate of credit risk, in annual term,
lendv_g= year on year change of lending volume
ccost_g=year on year growth rate of credit cost volume
bills_bond_g=quarterly changes of total obligations and treasury bills held by banks, express in annualized term

7. Nonperforming loans equation

7.1 Households NPL equation

Log(nplh)=0.69*log_nplh(-1)-4.55*gdp_g(-4)-4.59*lendvh_ratio + 0.03* lend_ir_cpi(-4) +
p-value (0.00) (0.00) (0.00) (0.00)
0.30* d(un(3)) + 4.08* d(log_neer(-1)) - 0.78
(0.04) (0.05)
R^2 –adjusted=0.81

Where nplh is log transformation[12] of NPLHs ratio
lendvh_ratio = quarterly change of household lending
lend_ir_cpi = real lending interest rate
un = unemployment rate
neer = nominal effective exchange rate

7.2 Corporate NPL equation

Log(nplc) = 0.78*log_nplc(-1) - 3.30*gdp_g(-4)-0.11*lendvc_ratio(-1) + 0.02* lend_ir_cpi(-1) +
p-value (0.00) (0.03) (0.00) (0.06)

4.06* d(log_neer) - 0.64
(0.07)

R^2 –adjusted 0.73

Where nplc is log transformation of NPLC ratio
gdp_g = real GDP growth
lendvc_ratio =quarterly change of corporate lending
lend_ir_cpi = real lending interest rate
neer = nominal effective exchange rate

[12] I.e. log(NPLHs/(1-NPLHs) where NPLHs is NPLHs ratio), as this transformation ensures the dependent variables spans over the interval]-∞, +∞[(as opposed to between 0 and 1) and is distributed symmetrically.

II. Identities Equations

1. *Equation "Total lending volume"*
   Lendv = Lendv_C + Lendv_H + Lendv_Jo

2. *Equation "Capital adequacy Ratio"*
   Car = Cap / Riska

3. *Equation "Bank Liabilities"*
   Bl = Bdep + Boliab

4. *Equation "Bank Assets"*
   Bas = Bl + Bnas + Bnas_Oth

5. *Equation "Bank other Assets"*
   Boas = Bas - Lendv - Bsec

6. Equation "Capital adequacy Ratio Gap"
   Car_gapv = Car - 0.12

7. *Equation "Lending Gap"*
   Lendv_gap = (lendv / lendv_hp - 1)

8. *Equation "Other net interest income"*
   Netinc_oth = inc_oth - exp_oth

9. *Equation "Total interest income activity"*
   Bruto_inc_act = netintinc + netinc_oth - exp_prov

10. *Equation "Total interest income activity"*
    Net_Inc_Act = Bruto_Inc_Act - Exp_Act

11. *Equation "Total net interest income "*
    Net_Inc = Net_Inc_Act + Net_Exd_Inc - Inc_Tax - Oth_Tax

12. Equation "Loan loss provisions"
    Llp=NPLT*0.5

13. Equation"Bank capital"
Cap=cap (-1) + Net_inc

14. Feedback equation
Dlog(YN) =0.53dlog(yn(-1))+0.042Dlog(lendv(-1))

Appendix II : Lists of Variables

Nr.	Code	Variable	Variable description	Unit	Source
1	**BAS**	money supply rate	Any item of economic value owned or controlled by a bank, which could be converted easily to cash.	mill AL	BoA
2	**BILLS_BOND_G**	Obligations and treasury bills held by banks		%	BoA
3	**BL**	Bank liabilities	Bank liabilities recorded on the balance sheet of the bank (right side) and are vital to the bank. Main items of liabilities are deposits, equity, treasury and interbank liabilities from investments in securities and other obligations.	mill AL	BoA
4	**BNA**	Bank net assets	This item represents bank's standing sources which are entered in the liabilities of the bank.	mill ALL	BoA
5	**BOAS**	Bank other asset	Other assets of the bank consist in any other asset excluding lending activity and securities investments.	mill ALL	BoA
6	**BOND**	Obligation held by bank	The issuer owns to It the bond holders a debt and depending on obligation terms will pay to them an interest and or pay back the principal by a specific date, called maturity.	mill ALL	BoA
7	**BONO**	Treasury bills held by bank	Securities held by banks (as investments), issued by the central government at zero risk, having a maturity of one year or less	mill ALL	BoA
8	**BRUTO_INC_ACT**	Gross income from core business	Pre-tax gross income realized from the bank's core business	mill ALL	BoA
9	**BSEC**	Bank's securities	Bank's security investments as asset item and include fix income securities, changeable, purchased/sold	mill ALL	BoA

			accordingly to the repurchasing agreements		
10	**CAR**	Capital adequacy ratio	It is the ratio between regulatory capital and risk-weighted assets in percentage. This ratio should not be below the levlel of 12%.	mill ALL	BoA
11	**CAP**	Capital	It is the indicator encompassing the core capital and additional capital as well as a set of other calculations of the balance-sheet items. It is used to measure the capital adequacy.	mill ALL	BoA
12	**CAR_GAP**	Capital adequacy ratio gap	It shows the gap between capital adequacy ratio at a certain period with the supervisory regulatory rate of12%	%	BoA
13	**CCOST**	Credit Cost	Credit cost is measured as a sum of loan loss provision and write off minus recovered write off	mill ALL	BoA
14	**CCOST_G**	Credit Cost growth	year on year change of credit cost	%	BoA, our calculations
15	**CCOSTRATIO**	Credit Cost Ratio	Credit cost as ration of total credit	%	BoA
16	**CPI**	Consumer price index	A **consumer price index** (**CPI**) measures changes in the price level of a market basket of consumer goods and services purchased by households.	index, 2007=100	Albanian Institute of Statistic (Instat)
17	**G_REPO**	Growth rate of policy rate	Growth rate of policy rate (repo)	%	
18	**GDP_G**	Real GDP growth	Përfaqëson normën e ndryshimit të prodhimit të brendshëm bruto (PBB) të një vendi nga një vit në tjetrin.	%	Instat, our expectation for GDP growth
19	**HPI**	House Prices	House price index is a proxy for real estate market	index	Instat

20	**HPI_G**	Real house price	House price index deflated with inflation	%	
21	**INC_TAX**	Income tax	It represents income arisen from tax.	mill ALL	BoA
22	**LEND_IR**	Lending intereat rate	average contract interest rates on loans	%	BoA
23	**LEND_IR_CPI**	Real lending interest rate	Nominal lending interest rate minus inflation	%	BoA, our calculation
24	**LENDV**	Lending volume	Total loan volume from banking sector	mill ALL	BoA
25	**LENDV_C**	Corporate lending volume	Lending volume to corporate sector	mill ALL	BoA
26	**LENDV_G**	Lending volume growth	year on year change of lending volume	%	Boa, our calculations
27	**LENDV_GAP**	corporate lending volume to corporate sector	corporate lending volume/potential corporate lending volume *100-100	mill ALL	BoA
28	**LENDV_H**	Household lending volume	Total loan volume to household sector	mill ALL	BoA
29	**LLP**	Loans loss provision	An expense set aside as a reserve to be used for bad loans (in the event the customer fails to meet the respective financial obligations or when the terms of a loan have to be renegotiated).	mill ALL	BoA
30	**NEER**	Nominal effective exchange rate	A nominal effective exchange rate is the exchange rate of the domestic currency vis-a-vis other currencies.		BoA
31	**NET_EXD_INC**	Net extradionary income	It represents the spread between gains deriving from extraordinary activities to extraordinary expenses.	mill ALL	BoA
32	**NET_INC**	Net income after taxes	net_inc_act + net_exd_inc - inc_tax - oth_tax	mill ALL	BoA

33	**NET_INC_ACT**	Net interest income	interest income-interest expenese	mill ALL	BoA
34	**NETINC_OTH**	net income from other activities	Other activities income-Other activities expense	mill ALL	BoA
35	**NETINTINC**	Net interest income	It represent the difference between total interest income to interest expense	mill ALL	BoA
36	**NPLC**	Non-performing loans of corporate sector		mill ALL	BoA
37	**NPLC_RATIO**	Nonperforming loans of corporate sector	ratio of non-performing loans of corporate sector to lending volume of corporate sector	%	BoA
38	**NPLH_RATIO**	Nonperforming loans of household sector	ratio of non-performing loans of household sector to lending volume of household sector	%	BoA
39	**NPLH**	Nonperforming loans of household sector		mill ALL	BoA
40	**NPLT**	Nonperforming loans	Total credit, principal and interest, classified into the three last categories of loan classification (sub-standard loans, doubtful loans and loss loans) .	mill ALL	BoA
41	**OTH_TAX**	Other taxes	Item included in the income (profit and loss) statement of the bank	mill ALL	BoA
42	**REPO**	Repo rate (repo)	It is the rate the bank applies to repurchase government instruments from commercial banks and which is set out by the level of money supply that should be maintained in economy in the framework of monetary policy implementation.	%	BoA

43	**RISKA**	Credit risk asset	In compliance with capital requirements, banks should generate a capital report based on their assets, weighted by a risk factor attached to them. A different risk factor is applied on different assets categories.,	mill ALL	BoA
44	**RWOF**	Recoveries of write off	This item represents an extraordinary gains y	mill ALL	BoA
45	**SHEQ**	Shareholders' equity	Capital calculated for banking supervision purposes. There are included various capital and reserves categories, and other elements set out by the Bank of Albania by by-laws.	mill ALL	BoA
46	**UN**	Unemployment rate	The percentage of total force able to work that is unemployed, but that actively requests to be employed and is ready to work..	%	Instat
47	**WOF**	Write off	It implies credit write off balance-sheet. Any income arising from these written-off loans is considered as extraordinary income.	mill ALL	BoA
48	**Y_REAL**	Real GDP	An inflation-adjusted measure that reflects the value of all goods and services produced in a given year, expressed in base-year prices.	mill ALL	Instat, our calculations
49	**YN**	Nominal GDP	A gross domestic product (GDP) figure that has not been adjusted for inflation	mill ALL	Instat

APPENDIX III - Finacial Stability Indicators

Phase	Dimension	Indicators
Risk accumulation	Time (cyclically induced risks)	• credit-to-GDP (deviation from long-term trend or normal) • rate of growth of loans and asset prices • gaps in asset prices and yields (deviations from long-term trend or normal) • leverage ratio (F) • default rate, NPL rate (F) • level and adequacy of provisions (loan-loss provision rate, coverage ratio, F) • credit conditions and characteristics of new loans from BLS (F) • credit spreads and risk premia (F) • haircuts on collateralized lending (F) • debt-to-assets ratio (H,C) • debt-to-income ratio (H,C) • interest-to-income ratio (H,C) • price-to-income ratio (P) • loan-to-value ratio (P) • price-to-rent ratio (P) • market liquidity in the form of market turnover (P) • macro stress tests of markets and credit risks (F) • early warning systems (F) • composite indicators of financial stability or leverage level (F) macroeconomic imbalance indicators (government deficit and government debt, current-account deficit and external debt, national investment position, foreign exchange reserves, external financing requirements, currency under- or overvaluation
	Cross-sectional time (structurally induced risks)	• quality of liquidity structure (loans-to-deposits ratio, ratio of funds acquired on interbank market, ratio of non-core liabilities to total funding, F) • maturity transformation ratio (maturity mismatch indicators, customer funding gap, F) • capital quality structure (F) • liquidity stress tests (F) • composite liquidity index (F) • indicators of scale of activity within financial system, including network analyses (e.g. flows between institutions, F) • degree of asset and liability concentration (F) • share of large exposures in balance sheet (F) • scale and structure of off-balance-sheet items (F) • bank foreign debt to bank foreign asset ratio (net external assets of banks, F) • currency mismatch indicators (open foreign exchange position, share of foreign currency loans, F) • composite volatility index (M) • macroeconomic imbalance indicators (capacity for external contagion shock)

Risk Materialization	Time	• dynamics of default rate and NPL ratio (F) • dynamics of provisioning (coverage ratio, LLPR, F) • decline in profitability (F) • change in CAR (F) • macro stress tests of markets and credit risks (F) • credit spreads (H,C,G,M)
	Cross-sectional	• stress tests of liquidity (F) • changes in market liquidity measures (M) • activity and spreads on interbank money market and government bond market (F) • CDS spreads (F) • interbank contagion tests (F) • CoVaR (F) • joint probability of distress (F) • contingent claim analysis (F)

Note: The table contains a list of selected indicators. Many of these tools can be directed at both the time and cross-sectional component of systemic risk. Sector abbreviations: H – households, C – corporations, F – financial institutions, P – property market, M– financial markets, G – government. No abbreviations are shown next to indicators that are valid for the economy as a whole.

Financial Stability Tools

Phase	Dimension	Tools
Risk accumulation	Time (cyclically induced risks)	• countercyclical capital buffers • provisioning through cycle • introduction of "through-the-cycle" elements into risk management models and asset valuation models • countercyclical setting of margins and haircuts for contracts used to raise funding* • ceiling on leverage ratio* • increased risk weights for certain types of loans (e.g. loans for residential or commercial property and foreign currency loans) • increased loan loss provisions depending on period in default • ceilings on LTV ratios for loans for house purchase (or increased capital requirements for loans with high LTV ratios) • ceilings on debt-to-income or payment-to-income ratios for household borrowing (or increased capital requirements for loans with high ratios) • increased collateral requirements for loans to corporations • additional reserve requirements in the event of a change in credit dynamics • rules for reference rates for loans for house purchase • monetary policy tools: interest rates, minimum reserve rates and marginal reserve rates for selected liability sources, foreign exchange market interventions • fiscal and tax policy tools: tighter property taxation rules (for second and additional homes), reduction or elimination of tax deductibility of interest on loans for house purchase, introduction of transaction taxes for certain items of capital inflows from abroad, government spending cuts
	Cross-sectional time (structurally induced risks)	• capital or liquidity surcharges for size, complexity and interconnectedness • systemic risk buffer (CRD IV tool targeted at structural sources of risk) • liquidity buffers and requirements for stable balance sheet liquidity sources* • maturity transformation limits (maturity ladders, liquidity coverage ratio)* • loan-to-deposit ratio ceilings • reserve or levy on non-core bank liabilities • margins and haircuts for fundraising contracts • reserve requirements (e.g. for sources in domestic or foreign currency) • leverage limits for financial investors • limits on intra-group exposures (e.g. between parent and subsidiaries) and interbank exposures • limits on currency mismatches (net open positions, share of net external liabilities) • changes to capital requirements for large exposures* • other restrictions on large exposures* • limits on sectorial concentration for lending or investment • increased disclosure of risky positions • active communication by authorities regarding changes in risk

Risk Materialization	Time	• release of capital and liquidity buffers • release of provisioning buffers • funding for lending schemes • capital injections for selected banks* • active communication by authorities to explain extent of problem* • disclosure of stress test results*
	Cross-sectional	• easier access to central bank refinancing facilities* • relaxed collateral policies of central bank* • transparency regarding exposures and risks of individual market segments (e.g. CNB has disclosed extent of exposures to highly indebted governments) • activation of contingency funding plans (CM) • protection of bank creditors (e.g. government guarantees for bank liabilities, CM)* • higher or wider deposit insurance (CM) • programmes to transfer bad assets to bad banks and clean up balance sheets (CM) • communication regarding methods for dealing with illiquid and insolvent institutions (CM) • recovery and resolution plans, living wills (CM)

Note: The table contains a list of selected instruments. Many of these tools can be directed at both the time and cross-sectional component of systemic risk.
Asterisks (*) denote tools that are also highly relevant to the second dimension.
Sector abbreviations: H – households, C – corporations, F – financial institutions, P – property market, M – financial markets, G – government. No abbreviations are shown next to indicators that are valid for the economy as a whole. CM – tools of crisis management going beyond financial stability mandate.

Key sources of Systemic Risks and appropriate tools

Source of systemic risk (of vulnerability)	*Appropriate tool*
• Undue leverage • Excessive credit growth accompanied by lenient lending practices	• Countercyclical capital buffer • Through-the-cycle provisioning • LTV and LTI (PTI) limits • Leverage ratio • Increased risk weights for specific sectors
• Shortage of quick liquidity • Maturity mismatches regarding asset and liabilities • Unstable structure of bank funding	• LCR • NSFR • LTD ratio or core funding ratio
• Excessive interconnectedness of financial institutions • Complexity and opacity of financial sector • Reliance on bail-out of large and important institutions	• SIFI capital surcharges • Systemic risk capital surcharges
• Excessive concentration in assets or liabilities of financial institutions	• Large exposure limits

Properties of Macroprudential Policy Framework

Horizon	• relatively long and variable
Ultimate target	• preventing the accumulation of systemic risk (reducing the probability of occurrence of financial crises with large output losses and/or costs for public budgets) • mitigating the impacts of the materialization of systemic risk if prevention fails
Indicators for identifying risks and their intensity	• macroeconomic indicators • banking sector indicators • data from non-bank financial sectors • data from financial markets • qualitative information
Intermediate targets	• securing resilience and shock-absorbing capacity of the financial system • preventing excessive credit growth and leverage and thereby lowering the potential amplitude of the financial cycle • averting large asset price misalignments (especially overheating of the real estate market) • setting limits on maturity transformation, concentration, interconnectedness and complexity of financial institutions • limiting the level of uncertainty regarding the soundness of the system at times of financial instability
Instruments	• built-in stabilizers oriented towards creating and releasing buffers • macro prudentially calibrated supervisory and regulatory instruments • communication
Transmission mechanisms (instruments functioning via)	• bank capital and liquidity requirements affecting the price of loans and the supply of and demand for credit • banks' income and costs related to the risk of new and existing exposures • penalization of increasing scale of risk assumed by financial institutions • financial institutions' risk management stances • perception of risk of investors and creditors of financial institutions • expectations of financial institutions and their clients

The matrix of Research Questions, Objectives, Conclusions and Recommendations

Research questions	Objectives	Conclusions	Recommendations
Q_0 : To what extend macroprudential policy measures impact real economy dynamics ?	**O_0 :** To analyze and deepen theoretical and methodological aspects of macroprudential policy framework in order to ensure financial stability and stable economic growth.	**C_0 :** a better knowledge and understanding of the macroprudential policy combined with the existence of a certain degree of standardization of the macroprudential tools and indicators can significantly improve the ability of financial stability authorities to forecast the systemic risk and to avoid or reduce the consequences of the financial crisis in public budget.	**R_0 :** Macroprudential policy is a work in progress. The goals and scope of MPP need to be defined clearly. It should aim to contain systemic vulnerabilities, and not be overburdened with objectives that it is unsuited to achieve.
Q_1 : What is meant by "macroprudential policy" and why macroprudential policy is a necessary toolkit in any financial supervisory regime seeking to minimize systemic risk?	**O_1 :** we wanted to highlight the need for implementation at a national level of a sophisticated macroprudential regime that creates premises for efficient and effective of its implementation of macroprudential regime	**C_1 :** Macroprudential policy is a necessary ingredient for each financial system regulatory toolkit that may ensure the oversight of financial system as a whole. It is still a work in process that asks exhausted analytical analyses for consolidation.	**R_1 :** The key to avoiding financial system vulnerability is to ensure that the system is robust. Robustness can be achieved via high loss absorbency, strong liquidity and barriers to excessive credit growth
Q_2 : How the concept of MPP and the Framework for its conduct should be developed in Albania?	**O_2 :** to find solution for a reasonable MPP framework that best fit Albanian economy, with a relatively small and simple bank-based financial sector that is controlled by foreign banks, usually from EU countries.	**C_2 :** the need to design a Document of Macroprudential policy of the BoA, as a strategic document of the Central Bank has come. This document should be focused primarily the risk associated with the financial cycle (time dimension), without neglected financial and informational contagion resulting from links between the economy, its institutions and the external environment.	**R_2 :** The challenge of the strategic Document of Macroprudential Policy for the Bank of Albania , is to select the proper macroprudential tools, to calibrate and operate them in the context of the existing monetary policy and prudential framework.
Q_3 :	**O_3 :**	**C_3 :**	**R_3 :**

Which is the best instrument to measure the impact of macroprudential policy measures in main financial and economic variables?	To find an instrument that incorporates the strong correlation between financial sector and macroeconomic one and made possible quantitative analysis of the impact of financial regulation on economic costs	This is a Macrofinancial econometric model that explicitly incorporates the feedback loop between financial sector and real economy.	The Macro Financial Model used in this study , need to be extended with other elements and to be improved in terms of calibrating the model .