"Systemic risk governance in Croatian financial system"

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Systemic risk governance in Croatian financial system

Abstract

Global financial crisis has revealed some major lacks in area of financial systems, especially in financial institutions risk management techniques. According to that point, main subject of this paper is identification, assessment, measurement and management of systemic risk. Systemic risk is a risk of financial (in)stability which is caused by systemic event that has negative consequences on economy. Systemic risk governance and systemically important financial institutions are sophisticate and complex issue which has influence on whole economy. In Croatia, issue of systemic risk and systemically important financial institution is insufficient researched. There is only few conducted research on this subject what suggests underestimation of importance of systemic risk and its consequences for real economy. Timely identification and prevetion of financial imbalances according to systemic risk can be achieved through proactive supervision. Regulatory framework and new capital requirements adopted through EU directives does not represent real problem for Croatian banks due to high share of capital in their balance sheets. But there is possibility of imbalances in long run due to future business trend. This paper analyzes factors which have influence on banking stability in terms of external shocks and appearance possibility of systemic risk in Republic of Croatia.

Keywords: systemic risk, systemic risk governance, financial systems, banks, financial institutions.
JEL Classification: G20, G21, G23, F65.

Introduction

Risk management literature in field of banking and finance was, until recently, focused on traditional operational and financial risks rather than on new derivated risk forms. Global trends, like globalization, internationalization and conglomerization, have affected on changing financial institution operations wherein is notable accelerated growth of financial holdings or groups what often have impact on creation large and complex financial institution. Complex financial institution participants are mutually, directly and indirectly, significantly interconnected intragrouped transactions what contributes riskiness of financial system. Their characteristic is systemic importance because they are source of new risk forms which require constant research and developing methods for their successfull managing. Also the systemic risk trigger could be other institutions, financial markets and payment or infrastructure systems, what will also be researched in the paper.

Lacks in functioning of existing regulatory framework is related to absence of key element in financial stability which is macroprudential aspect. Macroprudential supervision, which has been neglected till now, ensures system stability and sustainable development. Reform of existing regulatory architecture is necessary and requires changes on different areas. New approach to financial regulation is necessary to create much stronger and resilient financial system. Beside that, quality institutional framework is required because without good organized supervision neither good regulatory framework is efficient. This question represents huge challenge in all countries, especially in European Union country members which have especially felt affects of financial crises. Objectives of this paper are:

♦ To adduce triggers of systemic risk for Croatian financial system.
♦ To expose literature review in field of systemic risk.
♦ To give recommendations for systemic risk governance in Croatia.

This paper, also will use several types of methodologies. It will investigate domain of systemic risk throught inductive and deductive methods. Explanatory and contextual research in the field of qualitative research methodology will be used with the aim of systematization and clarification of terminology associated with systemic risk. Qualitative analysis of international, European and national regulation and supervision will be implemented using the available laws and regulatory standards. Primarily with deductive approach and using methods of abstraction and generalization, this paper will give recommendations for systemic risk governance in Republic of Croatia.

The following requirements are needed for quality systemic risk management: adequate reorganization of financial institutions in case of collapse, powerful and resistant market infrastructure, tax burdens, proactive macroprudential supervision and quality capital and satisfying liquidity standards.

1. Systemic risk theory and definition

Under the term banking traditional, financial, operational and business risks are considered (Greuning, 2006). Financial risk is connected with providing financial transaction while operational risk arises from non-financial transaction mainly. Most significant types of financial risk are credit risk, foreign exchange risk, market risk and liquidity risk. In

group of non-traditional risk appears risk of internal and external fraud, risk of asset destruction and risk of execution, delivery and process managing. Macroeconomic risk, law structure risk, legal liability risk, reputation and trust risk and country risk are considered to be business risks. Risk mentioned above appears in internal bank environment. Contemporary forms of risk come from external bank environment and are also called event risk. Among other contemporary risk, there are bank contagion risk and bank crisis risk. Bank contagion occurs because of bank symmetrical exposure to other financial institution. In that kind of condition of contagion channel risk is transferred among banks bringing consequences to whole banking sector. Bank crisis risk is a risk of crisis occurrence what causes disorders for to whole banking sector. From other new risk that can be identified exists inflation, fraud, strategic, reputation, residual, dilution and securitization risk.

Importance of systemic risk is primarily reflected on financial sector, so there are many opinions about its relevance for financial crisis spread and spillover on real sector. According to Greenspan, main cause of crisis is in risk underestimation on a global level. Systemic risk, to the fullest extent, has consequences on financial sector due to three main reasons (DeBandt and Hartmann, 2000): balance sheet structure, financial institution interconnecteness through money market and settlement system, financial contracts and credit disruption. Also, banking sector is more exposed to system risk because of market imperfections like asymmetrical information, moral hazard or externality. Because of term complexly and systemic risk definition (different shocks that are caused by systemic events), systemic risk appears in three, most common, forms: bank contagion risk, macro shock risk and financial imbalance risk. Bank contagion risk, occurs among banks, financial institutions and payment systems and depends on size and structure of interbank market, and in a case of symmetrical exposure to other banks, contagion arises hard but spreads rapidly. Bank contagion on financial market is hard to identify considering its depth and possibility of recovery during time. According to Acharya (2009) systemic risk is aggregate risk of collapse what is result of bank correlation. Most common sources of contagion on financial market is found in price changes which than overflows on real economy, wherein payment systems are one of the largest sources of bank contagion depending on payment system type. Different macro shocks, interest rate changing, foreign exchange changing or financial market change have negative influence on bank operations. Third form of systemic risk is embodied in existence of financial imbalance. Namely, in good and prosperous periods, as consumption grows, the need for lending also grows. In circumstances of intensive lending boom any kind of small disorder can cause negative effects on involved participants. Sources of financial imbalance can be lower interest rate or deposit insurance systems due to what bank undertake more risk on themselves. Sense and efforts of quality system risk defining has a goal of recognizing sources of its formation so that it could be prevented from regulatory aspect. In context of mentioned above, prudential regulation tries to recognize risk at system level observing bank as depended institution compared to other participants (Acharyja, 2009).

Borio (2011) defines sustainable framework of systemic risk analysis as time-related dimension and cross-sectional dimension. Group of ten (2001) defines systemic risk as risk of possible event occurrence that induces a loss of confidence in financial sector or it can cause significant economy losses. According to European Central Bank (2009) systemic risk is risk of financial instability which disables functioning of financial system to the point that it reflects on economic growth and welfare. European commitee for systemic risk[1] defines systemic risk as financial system disorder with possible consequences on market and real economy. Unlike European Central Bank, International Monetary Fund and Bank for International Settlement define systemic risk as a risk of financial service disorder that is caused by deterioration whole or part of financial system and has potential of making negative consequences on real economy (DeBandt and Hartmann, 2000). The concept of systemic risk is explained by systemic events. Systemic event is, in its narrow sense, explained as negative news about financial institution that has negative effects on one large or couple of smaller financial institution causing their failure (DeBandt and Hartmann, 2000). Source of systemic risk can be of exogenous or endogen ous character. Exogenous shocks come outside of economy and influence not only on financial institution but also on whole economy, while endogen shock occurs inside financial system and influence on only one financial institution. Example of mentioned shock can be internal fraud and liquidity problems wherein they influence on financial institution on way that they involve one institution, moving to other after that.

2. Literature review of systemic risk governance

In the context of systemic risk measurement, the significant attention is given to the credit institutions, respectively to banks, but with the development of disintermediation, possibility of financing

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[1] European Commitee for Systemic Risk is part of the European system of financial supervision (ESFS). Its purpose is to ensure supervision of the Union's financial system.

without bank intermediation, it is impossible to omit other financial institutions, that is shadow banking system. On the other hand, certainly due to interweaving, other smaller financial institutions also cannot be excluded, especially because of anonymity of their equity holdings and their business actions. Historically, it is not likely to recognize possible forms of systemic risk and there is no guaranty to predict the next channel of spillover through which would systemic risk came to the fore.

The task of macroprudential regulation is to determine which institutions are systemically important, because until today, the individual risk of every institution has not been investigated or defined (Acharya, 2011, p. 6). Therefore, it is necessary to use macroprudential approach so vulnerabilities in financial systems would be more successfully discovered (Gauthier, Lehar and Souissi, 2009, p. 53). This kind of systemic risk measurement, called macro stress test, was first used by Bank of Canada within the program of International monetary fund named Financial sector assessment program in 2007. Such macroprudential approach was also used by Borio (2003, 2009) and Gauthier and St. Amant (2005). Also, one form of the stress test (SCAP stress test) was used in the USA from February to May 2009 within the Supervisory capital assessment program, which is explained in Hirtle, Schurmann and Stiroh (2009). One of the ways to measure the systemic risk is to observe the market parameters that are the usage of market data enables the exposure calculation of individual institution. Acharya et al. (2010), Adrian and Brunnermeier (2009), Brownless and Engle (2010), De Jonghe (2010), Gray and Jobst (2009), Huang, Zhou and Zhu (2009), and many others have used this kind of estimations. Pedersen et al. (2010) measure systemic risk with systemic expected shortfall using data of stress test conducted by official regulator, data on capital value movement of large financial institutions in crisis and credit default swap, as variables. Black et al. (2012), also introduce hypothetical distress insurance premium as a measure of systemic risk. It contains all the main characteristics of the systemic risk (size, financial leverage and interconnectedness). Research is conducted on 58 relevant European banks by measuring variables like CDS of country, correlation of return on capital and total liabilities for every bank separately. Schwaab, Koopman and Lucas (2011) use mixed measurement dynamic factor model introduced by Koopman, Lucas and Schwaab in paper from 2010. The main idea of the before mentioned measure is to estimate composite factors of the nonobserved systemic risk by using econometric models of the panel time series. Table 1 shows structured view of the systemic risk of the system literature by categories: systemic risk contribution, conta-

gion/cross-sectional perspective, macro-financial stress, financial imbalance and identification of domestic systemically important banks. The category contribution to systemic risk includes papers which observe risk in market oriented financial systems, using appropriate ways of modeling such systems, some of which have been stated earlier. The cross-sectional dimension and the macro financial aspect include papers which observe risk and measures including macro economical parameters. The financial imbalance in models for systemic risk measurement includes data from financial markets, while domestic systemically important banks identification investigates recognition of banks relevant for financial system.

Table 1. Summmarized systemic risk measurement literature review

Measurement variables[1]	Authors
Systemic risk contribution	Adrian and Brunnermeier (2009), Acharya, Pedersen, Philippon and Richardson (2010), Brownless and Engle (2010), Huang, Zhou and Zhu (2010), Acharya, Engle and Richardsona (2012).
Contagion/Cross-sectional perspective	Hartmann, Straetmans and De Vries (2005), Segoviano and Goodhart (2009), Getmansky, Lo and Pelizzon (2010).
Macro-financial stress	Aikaman, Alessandri, Eklund, Gai, Kapadia, Martin, Mora, Sterne and Wilson (2009), Giesecke and Kim (2010), Koopman, Lucas and Schwaab (2010).
Financial imbalances[2]	Borio and Lowe (2002), Misina, St-Amant and Tkacz (2008), Barrell, Davis, Karim and Liadze (2010).
Identification of domestic systemically important banks	Slovik (2012), Bramer and Gischer (2013), Office of the Superintendant of Financial Institutions Canada (2013), Nessi (2013), Skorepa and Seidler (2013), Bengtsson, Holmberg and Jonsson (2013).

Source: Authors' research (2013).

Cross-sectional systemic risk dimension refers to the expansion of shock in the financial system which becomes systemically in one point, and time (procyclical) dimension refers to economic cycles (ups and downs) which enhance vulnerability of the financial system through a certain period. Both dimensions must be taken into consideration when creating a policy for systemic risk management. Policies for dealing with procyclicality in time dimension are based on building security reserves in good times which can be used in recession circumstances, while policies in the cross-sectional dimension look for limitations for damages which can occur from interconnection and common exposure of financial institutions. Inevitable question of the systemic risk management are also mechanisms of actions in the case of the collapse of the financial

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[1] According to Working Paper Series No. 1327, ECB (2011).
[2] Used variables are: loans and GDP ratio, total loan rise, basic financial ratios, mortgage prices, financial leverage ratio, capital adequacy.

institution. It is necessary to define adequate rehabilitation model for institutions to reduce loss for entire financial system, where the preventive action is needed while introducing restriction on size of a financial group or setting limits related to bank jobs. It is also necessary to consider possible consequences of introducing such models. So, for example imposing taxes to financial institutions, especially to banks, could create externalities, in that case, banks would be able to transfer the tax burden on their clients, therefore the higher liquidity and capital requirements and structure of financial industry are preferred in regards to entrance of new taxes.

Proactive supervision is the key factor of the enforcement of the systemic risk management policy. Neither well placed and quality regulation will not act efficiently without efficient organized supervision. Macroprudential supervision ensures systemic stability which is important factor of the sustainable economic development. The last financial crisis has shown that there are countries like Canada and Australia in which banking system was relatively resistant on financial shocks because of the conservative supervision.

Assumption about quality structure capital and higher liquidity is built in Basel III, which requires higher liquidity from financial institutions, and also higher capital demands, especially improvement of the basic capital quality. The countercyclical capital buffer is also required, and it can be introduced by domestic regulator in case of fast credit growth what leads to excessive accumulation of the risk in the upstream part of the business cycle. The countercyclical buffer is introduced on the national base, which means that it is

not applied only on banks in one country, but also on the all exposures of banks from other countries to clients from that country. Also, additional capital requirements are introduced for globally systemic important banks. Although improvements of the new regulatory framework are referred, its critics also exist. One of them highlights that higher capitalization in the times of crises can even more distract liquidity from markets towards secure globally significant banks and that way can "drain" the market. There are some opinions which said that the proposal did not take into account the fact of international diversification of these banks makes them more resistant on risks comparing to banks whose activities are locally and regionally concentrated, and that efforts for better ways of solving problems in banks will significantly remove reasons for additional capital requirements.

Considering facts and figures, it can be identified which countries in the world are the most exposed to systemic risk by using the list. The list of globally systemic relevant banks and insurers is presented in Table 2. The data quality used in calculation and analysis of globally systemic relevant banks has significantly improved and it complements every year by the Basel committee on banking supervision. Some data, necessary for calculation of additional absorption capacity to cover losses is enhanced for better estimation. The size characteristic is not the most important criteria during identification of systemic relevant financial institutions considering that on the list are institutions which are not large by asset category, but are again relevant in fields of international activities, interconnections, substitutability and complexity.

Table 2. Globally systemic important financial institutions (GSIB and GSII) 2013 (billion USD)

Banks	Country	Assets	Capital
1. Mitsubishi UFJ FG	Japan	2 709 402	129 576
2. HSBC	UK	2 692 538	151 048
3. Deutsche Bank	Germany	2 654 788	66 600
4. Group Credit Agricole	France	2 649 277	81 355
5. BNP Paribas	France	2 516 214	99 223
6. JP Morgan Chase	USA	2 359 141	160 002
7. Barclays	UK	2 350 664	80 110
8. Bank of America	USA	2 212 004	155 461
9. Royal Bank of Scotland	UK	2 069 866	88 157
10. Mizuho FG	Japan	2 049 810	74 956
11. Bank of China	China	2 015 996	121 504
12. Citigroup	USA	1 864 660	136 532
13. Sumitomo Mitsui FG	Japan	1 718 045	78 902
14. Santander	Spain	1 674 971	81 260
15. Societe Generale	France	1 649 995	50 260
16. Banque Populaire CdE	France	1 513 880	61 355
17. Wells Fargo	USA	1 422 968	126 607
18. UBS	Switzerland	1 373 208	44 691
19. Unicredit Bank	Italy	1 222 727	64 470
20. ING Bank	Netherlands	1 102 992	52 084
Insurance companies			

Table 2 (cont.). Globally systemic important financial institutions (GSIB and GSII) 2013 (billion USD)

Banks	Country	Assets	Capital
21. Axa S. A.	France	1 006 770	74 028
22. Allianz SE	Germany	917 928	74 291
23. MetLife, Inc.	USA	836 781	64 837
24. Prudential Financial, Inc.	USA	709 298	39 291
25. Assicurazioni Generali S.p. A.	Italy	583 757	29 822

Source: According to financial stability board reports and institutions annual reports (2014).

During the times of financial crisis it is obviously that there is no possibility to identify forms of systemic risk and there are no guarantees in order to predict the next overflow channel of systemic risk contribution (Adrian and Brunnermeier, 2011). Therefore, the task of macroprudential policy is to determine which financial institutions are systemically important, because individual risk of each financial institution still has not been examined or defined (Acharya, 2011, p. 6). Macroprudential policy includes measures, instruments and activities which are necessary to preserve stability of the financial system, strengthening of resilience of the financial system and avoiding and reducing systemic risk.

3. Financial stability triggers in Croatian financial system

A few different issues are introduced with the aim of efficient and preventive systemic risk governance in Croatian financial system.

♦ Systemic risk in Croatian financial system is usually viewed in the context of financial stability which is reflected in clear functioning of all segments of financial system (institutions, markets and infrastructure), and it is actually a condition that is reflected in the smooth and efficient functioning of the whole financial system in the process of allocation of financial resources, assessment and risk management and payments, as well as the resilience of the financial system to sudden shocks (Law of Council for Financial Stability, 2014). Financial stability are closely related to monetary stability, which Croatian National Bank achieves with operational implementation of monetary policy and through the function "the lander of last resort" for commercial banks in ensuring smooth functioning of payment settlement and reducing risks. In context of analysis main triggers for the financial (non)stability, there is important need to study microeconomic and macroeconomic environment for financial system participants because financial distress or failure of one entity would harm financial stability.

♦ In Croatia, according to the Law for Council for financial stability, main goal is to contribute to preserving the stability of Croatian financial system as a whole, by strengthening its resilience with prevention and reduction of systemic risk, and thus support sustainable contribution of the financial system to economic growth. It can be accomplished through six subordinate objectives: (1) reducing and preventing exceeding of credit growth and financial leverage; (2) reducing and preventing exceeding conscripts mismatches and illiquidity of market; (3) limiting the direct and indirect exposure concentration; (4) limiting systemic effects of actions which are motivated by inappropriate motives and incentives to prevent violations of good business practices and code of practice; (5) strengthening the resilience of the financial infrastructure.

♦ Volatility in intensity of systemic risk is reason for partially observing each part of financial system. It is necessary to protect financial system of those risks, and most common form of that protection are levels of additional loss absorbency with specific indicators for each country in European Union. That way of protection also depends on specific country risks and subset of similar risk exposures for financial institutions which is determined on condition of financial and banking system. There is also a need for mechanisms that are designed to ensure development of effective supervision and prevention of potential "bubbles" to create optimal deployment of capital in context of macroeconomic challenges and objectives, particularly in relation to long-term investments in real economy (Journal of the European Union, No. 575/2013, p. 9). For example CDS for Croatia in February 2013 was 279 and in January 2014 was 358 basis points.

♦ Selection of methodology for measuring systemic risk depends on i.e. whether the system is bank-based or market-based. Market-based financial systems such as the U.S. have a focus on capital market with less significant role of banks in financial intermediation (Allen, 1999). In bank-based financial system such as the Croatian financial system, banks have central role (Figure 1).
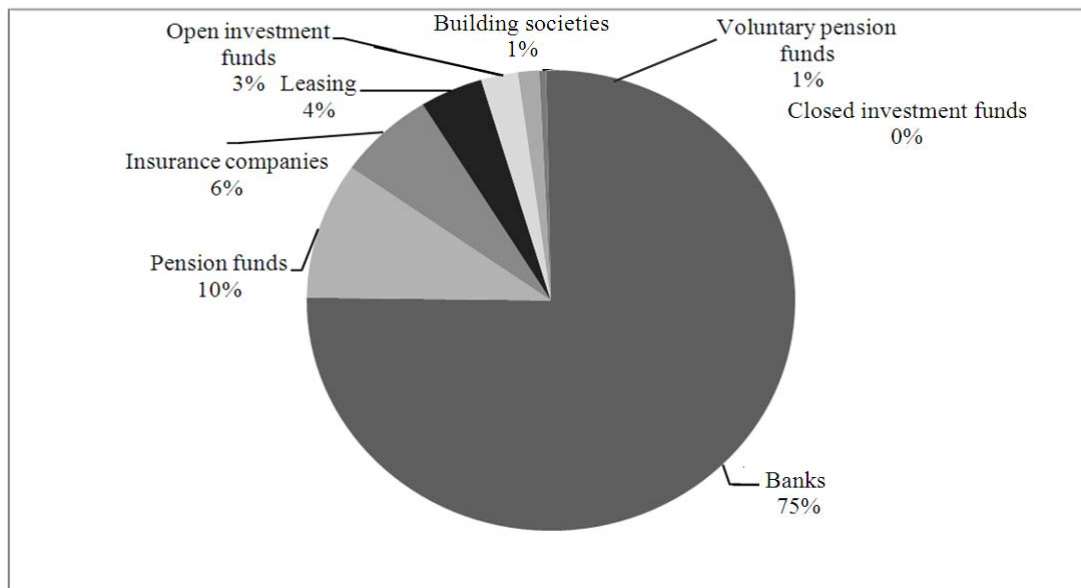
Source: Annual review (2012), Croatian office for insurance (2013).

Fig. 1. Shares of financial intermediaries in total asset of financial intermediaries in Croatia at the end of 2012

♦ Systemic risk is also determined with liquidity requirements. Financial institutions should have a diversified protective buffer of liquid assets for situation to cover liquidity needs in the short-term liquidity stress. It is impossible to know with certainty which category of assets would be exposed to stressful circumstances, it is appropriate to support a diversified and high-quality buffer of liquidity, which is consisting of various categories of assets. Concentration of assets and overreliance on market liquidity creates systemic risk for financial system (Journal of the European Union, No. 575/2013, p. 9). It is necessary to take into account a broad set of high-quality assets that will be used to define the requirements for liquidity coverage.

♦ Also, the Croatian banking system is characterized by several specificities of small open developed economies. One of the biggest is the high exposure to foreign currency risk because Croatia is high euroised country. About depending on euro movement, it is significant euro currency risk. Foreign exchange risk is a *financial risk* posed by an exposure to unanticipated changes in the *exchange rate* between two *currencies* (Moffet et al., 2009). It is risk which credit institution have in situation of open position in foreign currency and gold, which can result in losses due to cross currency changes, changes in the value of the HRK against other foreign currencies and changes in the value of gold (CNB, 2013). Therefore, it is important to calculate currency exposure in evaluation of systemic risk, whose importance mentions Croatian national bank in Decision on limiting

the exposure of credit institutions to foreign currency risk in June 2011. It is certainly necessary to calculate the total open foreign exchange positions of credit institutions and the maximum permissible exposure of credit institutions to foreign currency risk and it is also determine the terms and ways of reporting to the Croatian national bank of exposure to foreign currency risk of credit institutions.

♦ Significant feature of the Croatian banking system is its ownership structure. Foreign-owned banks have 89.7% of total assets of banks in Croatia. Given the above, proper evaluation of relation between subsidiary (a type of foreign bank that is incorporated in the host country but is considered to be owned by a foreign parent bank) and home bank and business activities of foreign owned banks will significantly affect quantification of systemic risk. It is known as coordination of regulators in home state banks and host state banks (home host coordination). There are few problems according to conflicting interests and low and lack communication among these countries. The largest one is different interest of regulatory bodies. The home regulator has no interest to monitor bank subsidiary of parent bank in the country in which subsidiary operates until it becomes systemically important as regulator in the host country has an interest to regulate the operations of the bank, but there are not enough quality information on the operations and business decisions of domestic banks. In the situation of a bank failure, the problem arises regulatory jurisdiction or settlement costs (in most cases these are state

funds, which represents an additional problem). Finally, the scope of international interconnectedness is extremely important function of systemic risk in the Republic of Croatia.

♦ The use of derivatives or such innovative structured products in Croatia has no large significance. In asset structure of Croatian banking system at the end of 2012 mere 0.2% of total assets, while derivative liabilities amounted 0.4% in 2012. In according to developed market instruments and techniques, the use of securitization of receivables and its derivatives in Croatia does not apply in true sense. The most common use of off-balance sheet activities are guarantees, and other items of credit lines and financing obligations and other risky off-balance sheet items especially in large foreign owned banks. Based on the presented data, in Croatia there is no significant risk of usage of contemporary financial instruments, which would affect systemic risk.

♦ Existing regulatory and supervisory framework should be adapted to contemporary financial trends with accent on management of the financial holding company. Size and interconnectedness of financial holding companies represent important contribution of systemic risk. As such, they can adversely affect on stability of financial system, so regulation of their operations are really important question. In Croatia seven group of credit institutions are operating. These are Erste & Steiermarkische Bank with eleven institutions, Zagrebačka banka with eight, Privredna banka Zagreb and Raiffeisenbank Austria with six, Hypo Alpe-Adria Bank with four, Societe Generale Bank-Split with two and Croatian Postal Bank with one member of financial holding company. For frame of systemic risk in Croatia it is important to define their ownership and other relations (rights and obligations) for group of credit institutions. In determining of a group of related persons, and risk exposures, it is important to consider the risks arising from significant sources of co-funding from institution inside, it's financial group or associated institutions (Journal of the European Union, No. 575/2013, p. 9).

♦ Non-banking financial system in Croatia includes approximately just 1/3 of total assets of whole financial system, but its significance for systemic risk is not irrelevant. According to the Croatian Law of capital market, regulatory bodies claimed specific requirements for systemic risk and liquidity risk that threatens the integrity of the financial market in Croatia.

♦ Shadow banking system in it's true sense in Croatia does not exist. It is possibly to observe

relationships within the non-banking financial system whose institutions can become triggers for stress events in the financial system, in particular to liquidity, solvency, limiting large exposures and other factors that could affect systemic risk. Other factors which could affect systemic risk are primarily administrative and accounting procedures and internal control mechanisms. The regulatory body of non-banking financial institution verifies and assesses the financial stability and position of non-bank financial institutions in financial system. It also control risks which are investment company is exposed or could be exposed in regular operations and risks which are investment company poses to the financial system (Law of capital market, 2013).

♦ Because of great diversity between banks on global level (measured by assets), there is no universal methodology for identification systemically important financial institutions in different financial systems. Comparability of parameters and variables that are used for identification systemically important financial institutions in Croatia in comparison with globally important financial institutions is impossible. Croatian National Bank, systemically important financial institution, is defined as a financial institution whose characteristics size, position and importance is important for financial stability in Croatia, and determined by competent authority. Given the above, it is necessary to develop a methodology for measuring systemic risk in Croatian financial system, based on informations of individual institutions and adjusted with global methodology.

The most important indicators would indicators of banking system because of their importance and influence on possible systemic disorders.

Conclusion

Existing and new arrival trends in financial system will inevitably affect on financial service industry arhitecture. It will influence on developing and continued grow of large and pronouncedly connected systematically important financial institutions wherein is systemic risk one of most important form of contemporary risk which has undoable affect on financial system stability and functioning. Because of its complexity and form variation, managing the same requests conduction of deep research as also developing efficient methods and models.

Given overview of systemic risk in Republic of Croatia indicates state and trends in manner of identifying, assesment, measurement and managing systemic risk in Croatian financial system, which is bank-based.

Current financial system stability is a result of bank system stability so in calculating systemic risk, considering all mentioned above is important to analyze bank influence on financial system from the point of bank relationship with other financial institution because of activity prevention. Bank relations with other financial institution require performing research of credit institution intergroup activity which operates in Croatia. Correct valuation of their activity will contribute to better macroprudential supervision and due to increasing of financial services availability important issue is also financial product complementary and regulation of their activity. Regulatory infrastructure, in context of unique supervisory body that should have function of long-term financial stability maintenance, is also a question that has to be investigating considering presented facts.

Croatian banking system international (un)dependence is important factor because correct valuation of bank relationship and activity in foreign property with domestic banks significantly affects systemic risk, that is coordination of domestic and foreign regulatory and supervision bodies.

Systemic risk needs to be valuated by time dimension and cross-sectional dimension with correctly chosen variables for its modeling. Systemic risk estimating model should contain variable that will represent its exposure to foreign currency risk, give picture of off-balance sheet items, visualize international connectivity, risk bank operations and share of poor placement and other variables that coul display financial holding activity with objective of identifying systemically important financial institution. It is also necessary to involve in model representative variables all financial market including key interest rates and data about macro economic country state, for example value of economic growth. Though not so important, non banking system has to be surely included in model, because with more intensive financial system development, it becomes potential trigger of financial system stress event. It is inevitably that Croatian financial sector will start to develop increasingly, modeled after developed countries, especially in terms of shadow banking system development which closes hole intermediation between surplus and deficit saving units so its valuation is necessary. With respect to stated above, banking of future will be result of synergy, traditional banking and banking credit instruments effects but also alternative shadow banking system. Equally, credit and other financial streams will interflow and regardless what kind of financing or risk transfer will overcome it is important that economic growth moves to ascending path. In future, it can be expected emergence of new, so called, contemporary risk forms that come from external bank environment. Key challenges will be promptly risk identification, model development, but also their coordination of supervision with the aim to retain stability. Only on that way financial system stability will be enabled and possibility of financial crisis emergence will be reduced or neutralized.

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