UNIVERSITY OF LJUBLJANA
FACULTY OF ECONOMICS

MASTER'S THESIS

DETERMINANTS OF CAPITAL ADEQUACY RATIO IN COMMERCIAL BANKS IN SLOVENIA

Ljubljana, 20th March, 2019 DANIEL DAMJANOSKI

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ABS – Asset-backed securities
ALCO – Asset-liability management committee
AMA – Advanced management approach
ASBH – Agency for rehabilitation of banks and savings banks
ASR – Asset Quality Report
BAMC – Bank Assets Management Company
BCBS – Basel Committee on Bank Supervision
BIS – International Settlement Basis
BS – Bank of Slovenia
CAR – Capital Adequacy Ratios
CB – Central Bank
CDO – Collateralized debt obligations
DAR – Deposit to asset ratio
EBRD – European Bank for Reconstruction and Development
EC – European Commission
EMU – European Monetary Union
ERM – Exchange Ratio Mechanism
EU – European Union
GDP – Gross domestic product
IFRS – International Financial Reporting Standards
IRB – Internal based approach
IRR – Interest rate risk
KBM – Kreditna Banka Maribor
KZTI – Credit Institution for Trade and Industry
LB – Ljubljanska Banka
LDR – Loan to deposit ratio
LKB – (slo Ljubljanska Kreditna Banka)
NB – National Bank
NBY – National Bank of Yugoslavia
NIM – Net interest margin
NKBM – (slo. Nova Kreditna Banka Maribor)
NLB – Nova Ljubljanska Banka
NPL – Non-performing loans
RAR – Risk Asset ratio
RAROC – Risk Adjusted Return on Capital
ROA – Return on assets

ROE – Return on equity
RS – Republic of Slovenia
RWA – Risk-weighted assets
SIT – Slovenian Tolar
SFRY – Socialist Federal Republic of Yugoslavia
SHS – The Kingdom of Slovenes, Croats and Serbs
SSM – Single Supervisory Mechanism
TARP – Toxic Asset Relief Program
UNEM – Unemployment rate
VAR – Value at Risk
ZUKSB – Act of Strengthening Bank Stability

INTRODUCTION

The regulation of financial markets has become one of the most important and discussed topics in recent years. The main purpose of bank regulation is to stabilize the banking sector, to make sure the banks keep enough adequate capital for the risks that they take in order to create a stable economic environment where entities will have confidence in the banking system.

For any bank or financial institution, the most crucial requirement is adequate and sufficient capital in order to ensure balance between the available assets and risks. In the 1970s the banking industry started to progress rapidly. Product and service offerings broadened with the introduction of rapid lending activities, while the capital requirements and ratio remained the same (Bateni, Vakilifard & Asghari, 2014).

Capital, as can be defined by Sharp (1978), represents the difference between assets and deposits. Proportionally to this, the larger the capital to asset ratio, smaller the influence on the deposits. The general idea in his research was that, regardless of the movements in price of financial institutions assets, the deposits should be safer if adequate ratio of capital to deposits is being propagated.

"Banks must be able to demonstrate that chosen internal capital targets are well founded and these targets are consistent with the bank's overall risk profile and its current operating environment. In assessing capital adequacy, bank management needs to be mindful of the particular stage of the business cycle in which the bank is operating. Rigorous, forward-looking stress testing that identifies possible events or changes in market conditions that could adversely impact the bank should be performed. Bank management clearly bears primary responsibility for ensuring that the bank has adequate capital to support its risks" (Bank for International Settlements, 2001a).

However, even though Basel Committee on Bank Supervision (hereinafter: BCBS) designed complex rules regarding what sufficient capital should be, during the financial crisis of 2008, many large banks not only have failed to comply with these standards, but instead some even declared bankruptcy and the majority of them had to be recapitalized and sponsored by the government. The larger European banks demonstrated a serious supervisory problem where there was a significant discrepancy between the market and the regulatory measures of risk and capital adequacy (Acharya, Engle & Richardson, 2012; Hasan, Siddique & Sun, 2015). Moreover, the pressure that was imposed on the governments to support these banks showed to be quite capital intensive, just in period 2008–2011 the European government support for these banks was 1084.8 billion Euros or 8.6 % of European Unions' (hereinafter: EU) Gross domestic product (hereinafter: GDP).

The Slovenian banking system was never the lesser part of this process, especially during the period of the financial crisis, when most domestic banks in the system were adversely affected as a result of high levels of non-performing loans (hereinafter: NPL), bad risk

management, robust supervision and bad implementation of regulatory policies, which led to capital adequacy and liquidity issues. Some of the key segments which contributed to the development of the banking crisis in Slovenia were the rapid and unbalanced growth before the crisis, the uncontrolled excessive debt of non-financial corporation, the privatization model (financed through borrowing) and the accumulation of NPL loans during the crisis (Bank of Slovenia, 2016).

The financial crisis besides the lack of trust, initially led to a suspension of interbank financing and this suspension furthermore led to an exceptional increase of liquidity and solvency risk in the Slovenian banking system. The solvency risk, as measured by the Capital Adequacy Ratio (hereinafter: CAR), was with years consistent in the Slovenian banking industry. Even though, Slovenia had been stable and up to the EU average CAR, since the beginning of 2008 the CAR started to stagnate, despite the Bank of Slovenia (hereinafter: BS) requirements to increase capital. This has led to enormous gap and need for recapitalization which ended up of being EUR 3.2 billion just before 2013, which automatically increased the capital adequacy of Slovenian banks on the short term, but on the long it did not solve the main issues and a lot more work and adjustments had to be done.

All in all, since the CAR and capital requirements represented a real challenge, especially in the past decade with the economic crisis and not just in the Slovenian banking system, but almost every financial system in the world was influenced by it. Being intrigued by this topic, my main focus of my master thesis will be the research of the determinants of CAR in Slovenian commercial banks, given the period from 2008–2015.

The main goals of this thesis are to get better understanding of the Slovenian banking system, risk management and capital requirements in the banking industry, by analyzing the factors and obstacles that mostly influence the CAR in the commercial banks in Slovenia.

Given the prospect that different influences may distort and have serious impact on the banking system as a whole, different variable will be used, originating from macroeconomic factors such as GDP, inflation and unemployment to bank-specific factors such as liquidity, profitability (Return on assets (hereinafter: ROA) / Return on equity (hereinafter: ROE)) and size of the banks. Both of these types of factors will be examined in my thesis, with the main goal to acquire deeper knowledge of the capital requirements and regulations, which will help me to better understand the risks that banks overtake, how banks respond to these regulations and propose possible recommendations.

The main research questions that will be examined are:

1. How does bank regulators and risk management respond to new capital adequacy requirements?

2. Does strengthening the regulatory pressure induce Slovenian banks to increase or reduce their capital and risk?

3. Is CAR mostly dominated by macroeconomic or bank-specific factors?

To answer these questions a multiple linear regression will be used incorporating all the relevant variables and with estimation we wound answer part of my specified questions. The statistical significance will give us relevant information, explaining which bank specific and macroeconomic variables mostly influence CAR, as well as the suitability of the variables in the model and their correlation with the CAR.

My research method will be a combination of theoretical and twofold. The first part will be focused on the Slovenian banking system since its beginnings, up until the EU and European Monetary Union (hereinafter: EMU) acceptance, including the financial crisis as well and the current situation in the banking industry. In addition, deeper knowledge of the core of the thesis that will be included in the theoretical part are: review on the risks that banks are mostly influenced by, the risk management processes and the capital requirements in the commercial banking with the CAR.

For that purpose, various literature review, regarding my research is used. Incorporating scientific articles, books, research papers and from different and similar nature. Deeper knowledge of the core of the thesis will be included in the theoretical part, where better understanding of the basics of the capital requirements, CAR, commercial banks in Slovenia and risks will be examined and explained.

The empirical part as already mentioned will be based on a statistical model where the statistical software SPSS is used. Primary and secondary data will be used for the 9 biggest Slovenian commercial banks, which partially will be extracted from the pre-selected financial statements of the individual commercial Slovenian banks as well as from National Central Bank (hereinafter: CB), World Bank (hereinafter: WB) and Fitch Connect. The statistical analysis will be performed based on data covering the period between 2008 and 2015.

The analysis will include the CAR as a predictor variable while the explanatory variables include: size of the banks, NPL, for the profitability ROE and ROA, deposit to asset ratio (hereinafter: DAR), loan-to-deposit ratio (hereinafter: LDR), net interest margin (hereinafter: NIM), GDP, public debt as % of GDP, unemployment and inflation rate.

1 THEORETICAL REVIEW

1.1 Chronological development of the Slovenian banking industry

Slovenia represents a country with rich banking history. Its beginnings date since 1862 when the first savings banks were established. It started with City saving Bank Maribor in 1862 which afterwards became Nova Kreditna Banka Maribor (hereinafter: NKBM) (Kranjec, 2009). In 1865 City saving Bank Celje and City saving Bank Ljubljana were established as well (Štiblar, 2004).

At the beginning of the 20th century the banking system in Slovenia was in general successful. On one side there was tendency to concentrate the financial capital which predominately was in the hands of Vienesse banks, while on the other side there was a market increase in corporate banking, especially in the "non-German" territory of the Austro-Hungarian Empire to which the Slovenian region was part of. First domestic bank that was established was Ljubljanska kreditna Banka (hereinafter: LKB) in 1900 which continued with Adriatic Bank in 1905 and Ilirska Banka in1916. All three banks provided both short-term commercial loans and funds for long-term corporate financing services. At the same time period, two Austrian banks opened branches in Ljubljana, namely “Creditanstalt", only after they have bought a local private bank from LCLuckmann in 1906 and Verkerhrsbank. In 1912 Slovenian banking accounted for 3.5 % of Austria's core capital, excluding Vienna (Štiblar, 1994).

With the collapse of Austro-Hungarian Empire, the Kingdom of Serbs, Croats and Slovenes (hereinafter: SHS) was formed on 1 December 1918, by merging the countries between themselves. Nationalization took place, expansionary monetary policy and new opportunities for collaboration on the large Yugoslav market. Companies have merged, new corporate banks were established in Ljubljana, with around six foreign branches in Ljubljana area. After the First World War the Ljubljana branch of Creditanstalst was transformed into a Slovenian institution called the Credit Institution for Trade and Industry (hereinafter: KZTI), which played crucial role in the financial crisis in the 1930s and continued operating after it. During this financial crisis Slovenian banks suffered great losses which were linked with Austrian and German banks. With the beginning of the Second World War the Slovenian territory was divided among three occupiers: Germany, Italy and Hungary. Despite their superiority during this period the Germans controlled only 5 % of Slovenian banking assets, numerous branches of Italian banks were opened and together with the Austrians, controlled the majority of the financial sector in Slovenia (Štiblar, 1994).

Table 1: Basic banking data in Slovenia during the years 1918–1937

Year	No. Slovenian	Foreign subsidiaries	Total	Capital	Assets	ROA	ROE
1918	10	9	19	_	_	_	_
1919	10	9	19	7.5	107.3	0.007	0.10
1920	14	15	29	24.0	295.7	0.014	0.18
1921	14	20	34	37.6	593.0	0.013	0.21
1922	14	33	47	66.3	912.7	0.011	0.15
1923	15	43	58	103.2	1 092.7	0.001	0.01
1924	16	41	57	117.0	1 284.1	0.013	0.15
1925	15	40	55	118.0	1 498.3	0.010	0.13
1926	13	28	41	112.6	1 542.0	0.008	0.11
1927	12	26	38	98.3	1 512.1	0.008	0.12
1928	12	26	38	98.3	1 601.5	0.008	0.12
1929	12	26	38	101.3	1 688.3	0.007	0.11
1930	12	26	38	101.3	1 836.2	0.007	0.12
1931	13	26	39	103.3	1 520.6	0.007	0.10
1932	13	24	37	103.3	1 312.7	0.007	0.09
1933	12	21	33	98.3	1 193.8	0.007	0.09
1934	10	21	31	74.7	1 076.3	0.004	0.05
1935	10	18	28	84.7	1 072.8	0.007	0.09
1936	10	18	28	84.7	1 104.9	0.006	0.08
1937	10	18	28	84.7	1 116.7	0.009	0.12

Source: Adapted from Štiblar (2004, p. 204).

1.1.1 The Banking system after the Second World War (1945–1989)

From 1945, Slovenia was under Socialist Federal Republic of Yugoslavia (hereinafter: SFRY). This was known as period of the administrative system (1945–1952), which was characterized by the state ownership, the simplicity of the credit system and the short-term

loans were small. There was gradual centralization of the banking functions in the National Bank (hereinafter: NB) which until 1947, NB operated as an issuing bank, from 1947 to 1952 as an issuing and depositary bank and from 1952 to 1954 as an issuing-depositary and investment bank. From 1946 onwards, it possessed almost all short-term banking operations and payment transactions. Long-term operation was divided among the other banks that operated in that time period: the National Bank for Crediting Agricultural Cooperatives, the Yugoslav Export Credit Bank, the National Investment Bank, communal and savings banks, which in 1952, almost all banks were merged into the NB, transferring their assets and operations (Mramor, 1985).

In the first decentralization period (1953–1965), with the self-management act of 1950, communal and savings banks began being massively established. The Yugoslav Bank for Foreign Trade (hereinafter: Jugo Banka) was founded in 1956, Yugoslav Investment Bank and a year later Yugoslav Agricultural Bank, which took over some short and long-term agricultural loans from NB. In order to avoid the monopolistic influence of socio-political communities on the functioning of banks, the Law on Credit and Other Banking Operations (Official Gazette of the RS, No. 10/1961) was adopted, changing the methodology of determining the members of management committees. With discounting the investment banks, changes were made in the banking system in 1963, this was the second decentralization period (1966−1971). The credit system drastically changed, since the banks have been able to refuse an application for a loan in which the applicant might have been creditworthy, but did not meet economic requirements (Mramor, 1985).

The period of constitutional amendments (1972−1976), was all about new ideas and development of a self-governing economic system. With the self-managing banking system, banks were defined as self-managing financial organizations, where the economy was supposed to manage and guide them, while the social-political and banking communities were supposed to lose their decision-making power. New amendments, laws and constitution were established. The economic system was under constant changes, where most innovations were directed towards the new institutions which were associated with the organization of labor, social agreements, self-governing interest community and banks. In addition to the National Bank of Yugoslavia, eight other banks were formed, while the state was divided into six socialist republics and two provinces. New principles of governance in the commercial banks was introduced, with the new constitution in 1974, where namely everyone who invested his assets in the bank, had the right of managing in it (Štiblar, 2004).

Entirely new form of banking was introduced, especially in the area of business banking from the period 1977−1983 also known as period of the law on a joint work. Internal bank was envisaged, as a new form of banking. The foundations of labor organizations and workers were formed and allowed to make decisions. Besides basic monetary and credit transactions after 1981, operations of the internal banks expanded and novelty from the new system was that merged banks were not allowed to make all the transactions as

commercial banks, since a significant part of the operations were fully taken by the parent banks. Transformation of the banking system in 1977−1978, self-managing socialist relations were introduced as well in the financial sector. This changes were represented in the law on the foundations of the credit and banking system, where under this act, the banking system was conceived as a three level system with internal, core and merged banks. The main goal was to automatically prevent the closure of banks into narrower regional frameworks and to ensure effectiveness in the banking system (Štiblar, 2010).

Period of international and economic conflict had started from 1986. Major legislative and regulation changes were implemented in the banking and monetary system. In reality, the application of laws had shown that the solutions were not in line with the degree of development of economic and social relations and almost useless when it comes to the area of banking and credit system. The Federal Assembly of SFRY, after few years of discussion have adopted the Act on the Foundations of the Banking and Credit System, which was an upgrade on the previous one, where banks were considered as internal, parent and merged banks. Banks then had to coordinate and plan their organization, management, decision making processes and risks. After this in 1986, the whole management system of Yugoslavia changed, changing the foreign trade legislation for more active collaboration with foreign markets and trade exchange. A few acts were imposed which regulated this transition (Štiblar, 2010).

1.1.2 Banking system in Slovenia since its independence

Since Yugoslavia disintegrated and Slovenia proclaimed its independence in 1991, problems started to occur. One of the main one, the succession system among the successor states which represented a serious issue, where guarantees of the former federation needed to be made for the foreign currency savings of each saver. These savings were deposited within a commercial bank or its branch in the territory of any successor state before the date of declaration of independence. In absence of any agreement between the successors, it was expected that every successor country at the beginning should to independently provide the elements of the rule of law. An appropriate contract had to be signed between the saver and the bank in the place where the funds were deposited and this territorial principle was confirmed from commercial banks and branches from the all former SFRY countries except Republic of Croatia and Bosnia and Hercegovina. The problem of foreign currency deposits in banks in the former republics of the former SFRY states was regulated after long negotiations with the Agreement on Success Issues, ratified by Bosnia and Herzegovina, the Republic of Croatia, the Republic of Macedonia and Republic of Serbia (with Montenegro which was part of Republic of Serbia at that time). This agreement was ratified and valid from 2004, binding international treaty for all signatory states. Under the patronage of the Bank for International Settlements (hereinafter: BIS), the states should have begun to negotiate without delay, the guarantee of the SFRY or the NBY for foreign

currency deposits of savers in commercial banks or any branch. Despite this obligation, Republic of Croatia so far has not given its consent to continue the negotiations (Kranjec, 2009).

1.1.3 Process of Restructuring and Privatization of Slovenian Banks

Bank rehabilitation represents a full set of fully organizational, financial and legal measures being imposed for eliminating any possible risk which might lead to insolvency or over indebtedness of the bank. In the case of the Slovenian banks rehabilitation process was aimed at the old banks which had problems even before its independence, mainly with its solvency, insufficient capital adequacy, profitability and liquidity. Foreign currency deposits were frozen at the central bank in Belgrade, financial links and investments were lost with the ex-Yugoslavian countries and additionally sincere affection on the Slovenian economy since 40 % were lost from the old market. In 1992, out of 26 banks 13 had severe losses, which represented over 70 % of all deposits in the banking sector. Bank rehabilitation can be carried out in a centralized manner which is characterized by elimination of bad loans, which then will be transferred to the central agency, leading to the process of rehabilitation through recapitalization. In the centralized way, themselves lead the process of rehabilitation and the state provides them with assistance, implementation of such model can be found in Poland and Hungary (Štiblar, 2008).

The monetary independence and the new market economy in 1992, disclosed the weaknesses of the Slovenian banking system. High costs of financial intermediation and the unresolved issue of frozen foreign currency savings deposits led to NBJ being the largest debtor, causing insolvency and losses to the two largest Slovenian banks LB and KBM. With such debt inheritance, it was impossible to obtain any credit ratings from international rating agencies. That's why negotiation was made with London club, where 18 % of the aliquot part of the external debt of the former Yugoslavia was taken out, while LB and KBM, with the constitutional law in July 1994, were transformed into two parts: the old bank, with debts and claims on entities in the territory of the former Yugoslavia and new banks, Nova Ljubljanska Banka (hereinafter: NLB) and NKBM, with the rest of the balance. The Slovenian model was a mixture of both centralized and decentralized approach. The state changed its bad assets for bonds, which would ensure their solvency but not in their full extent, preventing a moral hazard problem. On this way, banks were forced to contribute to their self-regeneration, while the central bank contributed to the banking rehabilitation by supplying them with additional liquidity. Slovenia due to high level of development, could afford this kind of state self-financing through budget expenditures and Slovenian banks were amongst the only ones that did not sell them to foreigners, as was the case with other banks from the region during the transition period. In this restructuring three Slovenian banks were included (Ljubljanska banka (hereinafter:

LB), Kreditna banka Maribor in January 1993 and Goriška banka in January 1994), where first they were nationalized by the state and then recapitalization process was done (Štiblar, 2010).

Prior to the rehabilitation, LB was 82.8 billion Slovenian tolars (hereinafter: SIT) in debt and had negative capital guarantees in the amount of 50.8 billion SIT. The replacement of bad asset, for the rehabilitation bonds from BS meant a serious financial injection that would gradually ensure banks liquidity and not to jeopardize banks working. This process started in 1993, where the bad assets were transferred to a special Agency established for rehabilitation of banks and savings banks (hereinafter: ASBH) in exchange for the government bonds. The BS has defined a number of conditions for completing the rehabilitation process in NLB and NKBM.

Namely the banks had to fulfil the following conditions:

1. Maintain liquidity,
2. Comply with monetary policy measures,
3. Have at its disposal at least guarantee capital which is necessary to maintain its current level of permitted banking activities,
4. Align the volume of operations in such a way that the volume of the guarantee capital reaches at least 8 % of the total assets and active off-balance sheet items, arranged and weighted by risk levels.
5. Establish all necessary long-term provisions for insurance against potential losses,
6. Comply with the suggested requirements regarding maximum exposure to one client.
7. Respect the permitted framework of investments in land, buildings, business equipment and equity holdings in banks and non-banking organizations.

NLB had fulfilled all the requirement that were imposed by BS, with the exception of one, achieving the agreed 60 % ratio of investments in fixed assets and equity investments with respect to the bank's guarantee capital (NLB, 1997).

The decision by the BS governor, was carried out by ASHB, with main task of restructuring the bank and prepare it for privatization process. The upper limit of the government bonds was in amount of 129 billion SIT for the bad receivables and 20 billion SIT for potential liabilities. ASHB issued bond in amount of 61.7 billion SIT, while overall the state took over from LB bonds in amount of SIT 17.6 billion. The estimated amount of resources that were needed for this recovery were significantly lower for NLB quick recovery. Even after this program NLB still retained SIT 31.6 billion of bad receivables in assets and SIT 18.1 billion in the off-balance sheet work, representing around 17 % of the

Bank's total assets. This was a significant transformation that changed the balance sheet, the profitability and the loss account of the bank. Everything was standardized in DEM, linked to the middle exchange rate of BS with maturity of 30 years and interest rate of 8 %. The unbalance currency structure of assets and liabilities, the mismatch of the investment maturity and uneven rise of the exchange rate, caused the bonds of ASHB to be replaced to RS bonds by the end of 1995. This improved the quality of the bonds, the maturity period was shorter and the bonds offered the option of selecting a revaluation in SIT or DEM, transferable, with interest rates ranging between 4.5 % and 6.5 %. On 6th of July 1997 BS announced a decision on the completion of the remedial procedure in NLB, obligated to adopt the status and set up a control and risk management bodies (NLB, 1997).

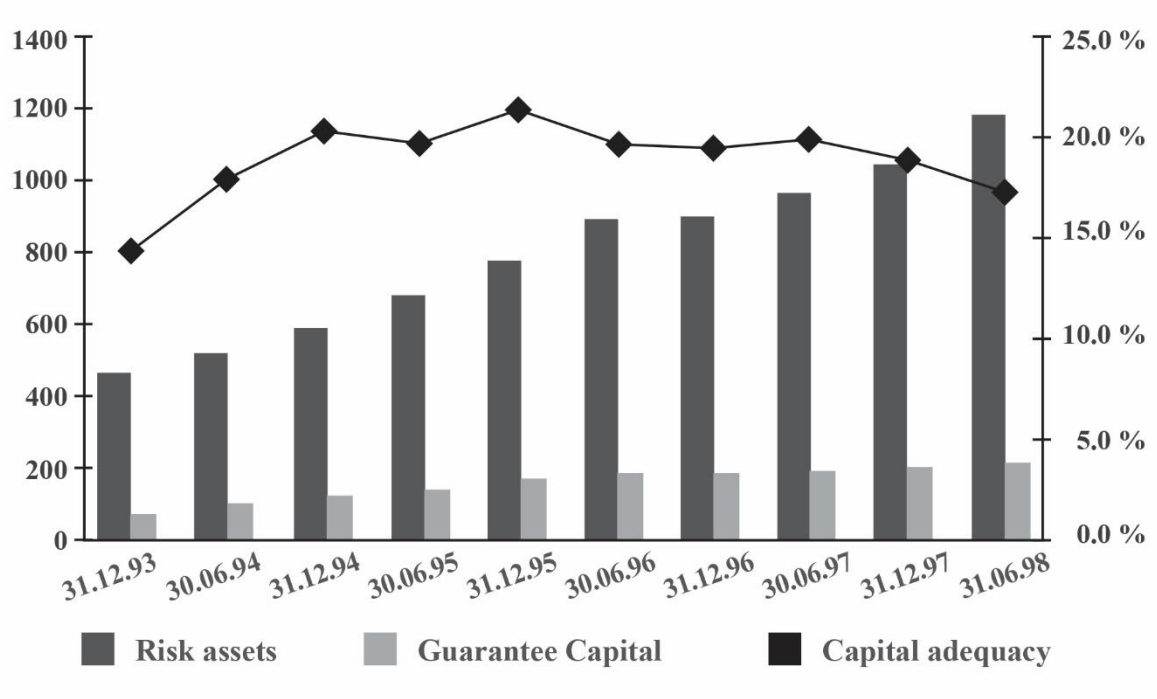
In comparison with NLB, NKBM was treated with privilege and had advantage to decisively resolve its liquidity problems. By 1995, it was decided that NKBM was ready to exit from the rehabilitation process, while NLB was treated with delay. The BS additionally used its discretionary power and enabled tolar liquidity for NLB, with the monetization of large foreign currency surpluses without the need for further special support.

By the end of this process, public debt temporarily increased by DEM 1.9 billion, which represented around 8 % of Slovenia's GDP. Later around 30 % of this amount was recovered through the collection of bad debts by ASBH. The banks showed significant improvements and NLB started to spread its business on foreign markets. After this, the government started to prepare the banks for the privatization process. Privatization represents a process of transition of the property rights from the state to the private sector. The most important reasons for this privatization have economic and political background. These economic reforms were typical for the countries in transition, where hopefully, would increase the economic performance of operations which were much more restricted as different political objectives had different strategies. Besides this benefits, the revenues from the acquisitions covered a big part of the net costs from the rehabilitation process and greater independence from the state control and greater entrepreneurship was expected (Štiblar, 2010).

As can be seen from figure 1, there was a noticeable growth in the capital adequacy ratio and the guarantee capital by the end of 1995, which mainly was a result of Bank of Slovenia's capital requirements for the higher guarantee capital of banks. Due to the "recapitalization" of most banks, the capital adequacy of the banking system fell to 19.7 % by the end of 1996, but at the end of June 1997 it again rose to 20.1 %. Additionally, the decline in capital adequacy was due to faster the growth of weighted risky assets in comparison with the guarantee capital, while the increase in capital adequacy by the end of June 1997 was due to a higher growth of the guarantee capital compared to weighted risk assets. On average, CAR in Slovenian banking system was high, enabling the banks to manage new risks and increase the security threshold against potential non-profitable

assets using their capital. After 1997, none of the banks had capital adequacy below 9.6 % (Banka Slovenije, 1997).

Figure 1: Movement of weighted assets, guarantee capital (in millions of SIT) and capital adequacy



Source: Adapted from Štiblar (2010).

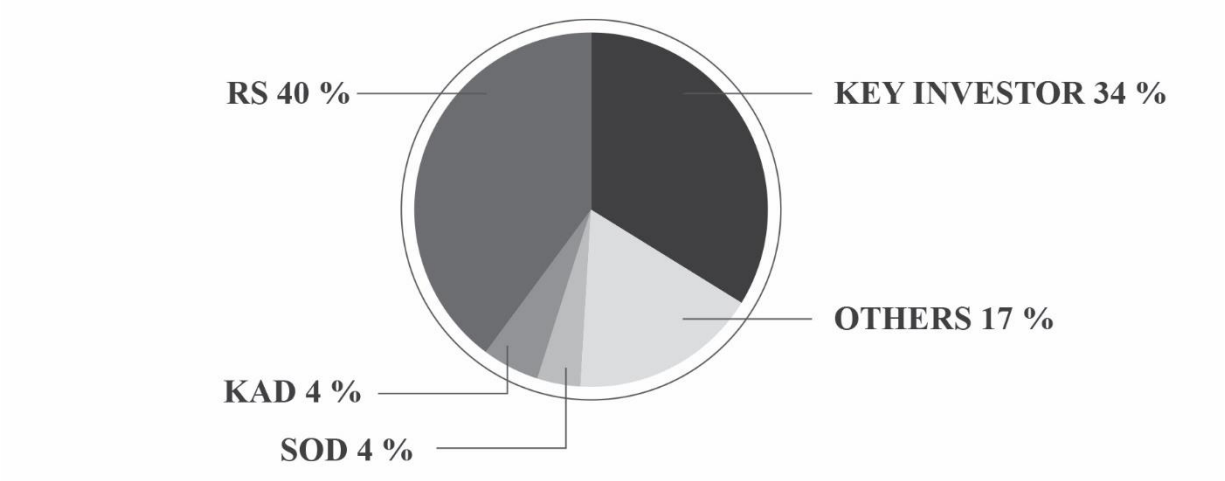
From aspect of "corporate governance" and the performance of Slovenian banks, in 2000 Franjo Štiblar analyzed 16 domestic private banks, which accounted for 16 % of the market, 3 state owned (NLB, NKBM and Poštna Banka) representing 42 % and 5 foreign banks (BA-CA, Societe Generale, Hypo A-A, SKB and Volksbank) with market share of 16 %. The analyses of the bank performance had showed that the profitability was smallest in the foreign banks and the largest domestic ones. Mainly this low profitability in the foreign banks could be because of the transfer pricing abroad, in order not to be taxed, added to the fact that on the small profit, foreign banks already had small taxation. Return on capital was highest in the state-owned banks, assets are in domestic private banks, while foreign ones were below the level of the international standards with lowest interest margins (Štiblar, 2010).

The privatization process began in April 2000 and in 2001 a privatization plan was announced by the Ministry of Finance. The main goals were, to achieve the highest possible purchase price for the state, reduce the public debt, and strengthen the efficiency and competitiveness of the banks and the banking system, by improving its operations and a more appropriate ownership structure. With this, the Slovenian government with the new investors, expected penetration on foreign markets, increased competition and effectiveness. NLB was organized as a joint stock company with share capital, which was

divided into 6,905,121 ordinary shares, 83 % of which were in RS ownership. NLB was privatized in several phases. The primary program stipulated that foreign owners in the first step to own 34 % (as individual or several banks together) and by the end of this step, the state should have retained 25 % shares. After this, Privatization Commission of NLB, updated the plan to sell 34 % of the shares to only one key investor. In addition, these changes have accelerated the second phase of NLBs' privatization (selling a 14 % stake to portfolio investors: 5 % to the European Bank for Reconstruction and Development (hereinafter: EBRD) and 9 % to domestic portfolio investors) and also set 15 % of the capital increase of the bank by issuing additional emission shares, both selling 34 % to a key investor (Ministrstvo za Finance, 2002).

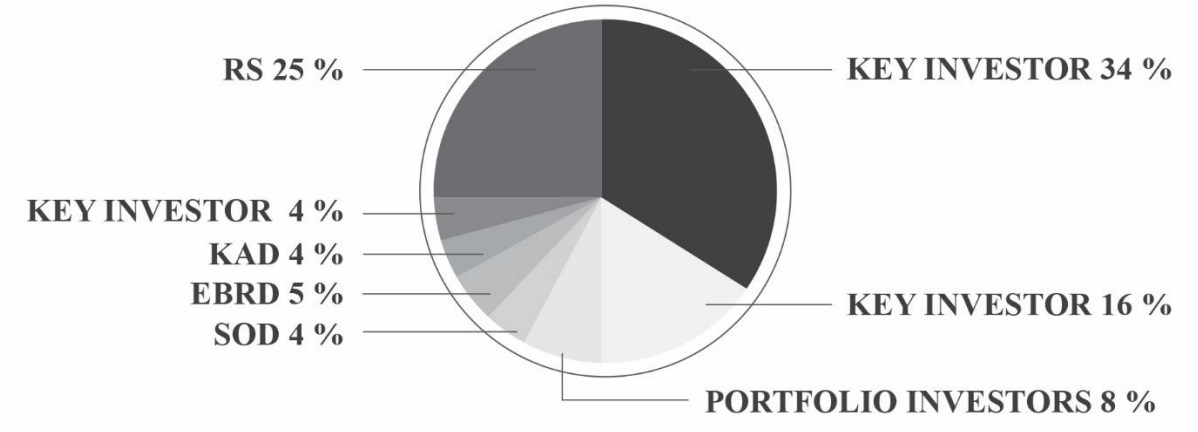
NLB received three non-binding offers from Erste Bank, KBC and EBRD, where the key investor had to have at least EUR 10 billion (SIT 220 million) of the balance sheet total and the size of its capital should not be less than EUR 1 billion. On May 8, 2002, Belgian KBC acquired 2,611.885 ordinary registered shares or 34 % of the NLB from the Republic of Slovenia (hereinafter: RS). The purchase price was 435 EUR million. The EBRD bought a 5 % stake in the NLB from the RS for 14.5 billion SIT at a discount of 10 %. This represented 384,101 listed registered shares with a nominal value of 2000 SIT per share. Second phase started with public announcement for bids, for the sale of 9 % stake in domestic investors, where domestic financial institution could purchase up to 2 % of all NLB shares, if this condition wasn't met, by an agreement EBRD had the option of buying unsold shares in institutional tranche and in the years that would come, offer them to other investors to make structure of ownership. By the end of the deadline, the Commission received eight offers, which together were willing to buy 23,050 NLB shares or 0.3 % of NLB. Only 8.7 % out of the 9 % of NLB shares were sold and the remaining were not sold to EBRD. Because of these reasons Governing Board of the BS decided that this privatization phase was unsuccessful. The program also accounted for 15 % recapitalization of NLB by public offering in which would make the target ownership structure of 1/3 country, 1/3 key investor and 1/3 portfolio investor. In 2007, the Holding of Slovenian Power Plants (hereinafter: HSE), without government knowledge sold its own 0.77 % of NLB Raiffeisen Krek's shareholding, which subsequently sold the shares to Bank Austria Creditanstalt (See Figure 2 and 3. Thus, the state was in the ownership structure of NLB with 55.23 % share (Štiblar, 2010).

Figure 2: Ownership structure after the 1st stage of privatization



Source: Adapted from Kranjec (2009).

Figure 3: Ownership structure after the 2nd stage of privatization



Source: Adapted from Adapted from Kranjec (2009).

By a government decision in 1999, RS initiated privatization process of NKBM, which was slightly different from the NLB model. RS expectancy was to sell 65 % of NKBM shares to a strategic investor, and the remaining 24 % to be increased by 1 share. The main goal was to achieve the highest possible purchase price, reducing public debt and strengthening the efficiency of the bank with the newly achieved ownership structure. With the announcement to submit offers for the purchase of NKBM shares, subject of sale were 1,819.999 shares with a nominal value of SIT 2,000, which represented one share less than 65 % of NKBM shares. NKBM received ten non-binding bids. In the narrower circle, three offers were included: Italian Uni credit, Slovenian consortium Aktiva Group and Bank Austria Creditanstalt. Besides that, all interested parties submitted their offer for the

purchase of NKBM shares. In March 2002, the privatization commission decided that no tender was appropriate in order to continue. In 2004, by the decision of RS privatization process for NKBM was stopped, introducing new development program, while during that time period no shares were sold. In 2007 NKBM before launching the new privatization program was in ownership share of 90.4 % by the RS (Bank of Slovenia, 2002).

The new program was planned in two phases, each small investor was entitled to 20 shares, where 110,256 citizens have shown interest which together paid 749,48 million EUR and 24 % of the shares were sold to small investors for a total of EUR 151, 35 million. The result was an offer of 9,771,752 shares or 41.8 % of NKBM's share capital in which 48 % out of these 41.8 % were allocated to small investors and 52 % to domestic and foreign well-informed investors. From this the RS received EUR 263,8 million and by default, reflected on the market capitalization price of NKBM in amount of EUR 630,7 million. Shares were traded at the Ljubljana Stock Exchange, with starting price of EUR 23 and by the end of 2007, the price roused to EUR 44.50 (Vlada Republike Slovenije, 2008).

1.1.4 Preparation of Slovenian bank legislation on entrance in the EU and EMU

Major changes took place in the Slovenian banking sector, reducing capital costs, improving efficiency and competitiveness of the banking system to prepare the country for joining the EU. With the intention of doing so, the Slovenian government adopted new law of banking, introduced reforms in the banking system and started to implement the new international accounting standards. The implementation of the euro took place in four phases: pre-accession phase, the phase after accession to the EU until joining ERM II, the phases of participation in ERM II and the introduction of the euro, which began on 1 January 2007. Policy conflicts emerged as a result of both dual legislation and the control gap, moreover due to discrepancies in the supervisory practices the European commission wanted to solve this by full harmonization of the rules. Because of the problem of difference, EC introduced a minimum harmonization approach by implementing legislations with minimum common standards. A minimum legal framework for governing the scope of operations had to be implemented by directives and in predetermined time period to be implemented in the Slovenian legal system (Štiblar, 2010).

The initial directive was a first major step towards liberalization, defining the concept of banking, introduced the foundations for supervising banking operations and minimum business requirements. The second directive was an extension to the previous one, introducing the principles on which internal banking market is based, the principle of the state as a controlling body, recognition of domestic regulations and a uniformly banking license. More directives were added, which had to be amended and clarified, so for better clarification and rationality, directives were merged and a consolidated directive of commencement and performance of banking activities was created. Basel capital accords

were finally adopted in 2004, as well as CAD 3 directive which introduced the rules of the Basel Capital Standard of EU (Novak, 2002).

The accession in the EU constituted of several phases, where the pre-accession phase started on February 1st, 1999, following the adoption of the European Agreement between the RS and the EU Member States, which lasted until its accession in 2004. In this phase, Slovenia met all the criteria for EU membership, namely the Copenhagen criteria that stipulated the country becoming a member in which some of them were to have functioning market economy, democracy, the rule of law, human rights and capability of taking on the obligations of membership. After the banking act in 1999, ZBan (banking law) set eighteen-month adjustment period, where by the end new regulations supposed to be established. Some adjustment was made in 2004 and 2005, mainly for acquisition of bank shares, the CAD and the so called "netting" directives for safer and more prudent operations. In the second pre-accession phase, RS demanded to protect the scope of the deposit guarantee system for banks. The deposit guarantee which were already adopted by ZBan, were extended to legal entities up to a certain size and coordinating the individual insured money deposits, abolishing the guarantee of RS. With the new deposit guarantee scheme, the Slovenian banks did not have the ability to compete with EU bank, requiring the minimum banking guarantees, because they had to provide additional liquid assets for the payment of guaranteed deposits (Novak, 2002).

In the period after the accession of RS in EU and before joining the ERM II (exchange rate mechanism), Slovenia participated in EMU, but it had derogation status regarding the implementation of the euro. As an EU member, Slovenia had to work hard to meet all the convergence criteria, and until the introduction of the euro, monetary policy was a responsibility of the Central Bank, controlling over inadequate exchange rate levels that could harm other EU members. In addition to that, the European Commission banned devaluing the exchange rate in order to achieve competitive advantages in trade or exporting, while since 2004, foreign bank that provided their services directly or through their branches, were no longer required to consent with BS but only to notify a competent supervisory authority of an EU Member State (Majcen, 2002).

The ERM II replaced the then European monetary system of 1979. This new mechanism was supposed to ensure stability of the exchange rates and coherence between the euro and the currencies of the member states that did not yet adopt the euro. The currencies in the system were tied to the euro with exchange rate fluctuation within a certain range. The standard fluctuation band was +/- 15 %, but the participation was voluntary until the member country joins ERM II where it was expected to tie their currency to the euro within ERM II. The right for application was given by default and as soon as the country enters in EU. Ensuring the stability of the EUR / SIT exchange rate as one of the Maastricht criteria was one of the main reasons Slovenia joined ERM II. The main focus was on stabilization policies, achieving convergence and to prepare the country for gradual adoption of the euro. The entry threshold was the country to participate in the ERM II for

two years, without devaluing its currency. With the incorporation of the Slovenian tolar into ERM II in 2004, interest rates were lowered at banks, capital inflows increased and loan quality changed (Bank of Slovenia, 2007).

The Maastricht treaty or criteria (See Table 2), was the last step that Slovenia fulfilled in order to introduce/adopt/accept the euro. Some of the other conditions were harmonization of the national legislation with the founding treaty of EU and the statute of the European central bank, where the Council of the EU was mostly responsible of its approval. This implementation required many changes at national level, where the ministry of finance issued a list of amendments and regulations that needed adoption. Among the many, the Act on the Introduction of the Euro and the Law on Double Pricing of Prices in tolars and euro, were also required. Companies had to convert their share capital from tolars to euros, all their financial statements, annual reports, regulations on tax payment and tax deduction had to be in euros. EUROBOR reference was introduced, additional regulations on Slovenia's security market were added because of the euro, and state administration arranged bond markings and the exchange of securities. The final stage of economic integration of Slovenia was the admission to the EMU in 2006. BS became a part of the euro system with the power of managing the monetary policy of the euro system and BS governor became a member of the governing council. By 2007, the euro became official and Slovenian tolar was SIT 239.64 for 1 EUR (Štiblar, 2010).

Table 2: Compliance with the Maastricht Monetary Convergence Criteria

	CRITERION	SLOVENIA
Inflation (% March 2006)	2.6	2.3
Long-term interest rate measure (% March, 2006)	5.4	3.8
Public deficit (% of GDP, 2005)	-3.0	-1.9
Public debt (% of GDP, 2005)	60	29.1
Course Stability (28 June 2004 – 28. Apr. 2006)	(+0.1 % – 0.2 of central parities)	(+0.1 % – 0.2 of central parities)

Source: Adapted from Štiblar (2008, p. 9).

1.1.5 Bank Performance Before and After the Global Crisis

Before the crisis period, Slovenian economy was characterized by high GDP, exceeding the growth rate of the EU. As a result of steady growth, without rapid expansion it reached 88.4 % in 2004 and 123.6 % in 2008. The average ROE was increasing over the years with a steady growth of 11.9 % in 2000 to a 16.7 % up until the crisis period. Banking represented the most important financial sector by their scale of activity, which if measured by the share of the balance sheet total, of all banks in GDP, the banking sector roused from 79 % to 126 % from 2000−2007 period alone. Slovenia banking system was mainly influenced by the movement of the international money market, primarily of the interest rates, which was felt as well throughout the financial crisis. By expanding the range of product and services, mostly for the non-monetary financial institutions, banks have managed to increase their scope of business and strengthen the link between banks and non-monetary financial intermediaries (See Table 3) (Štiblar, 2010).

Table 3: Bank performance indicators in percentages

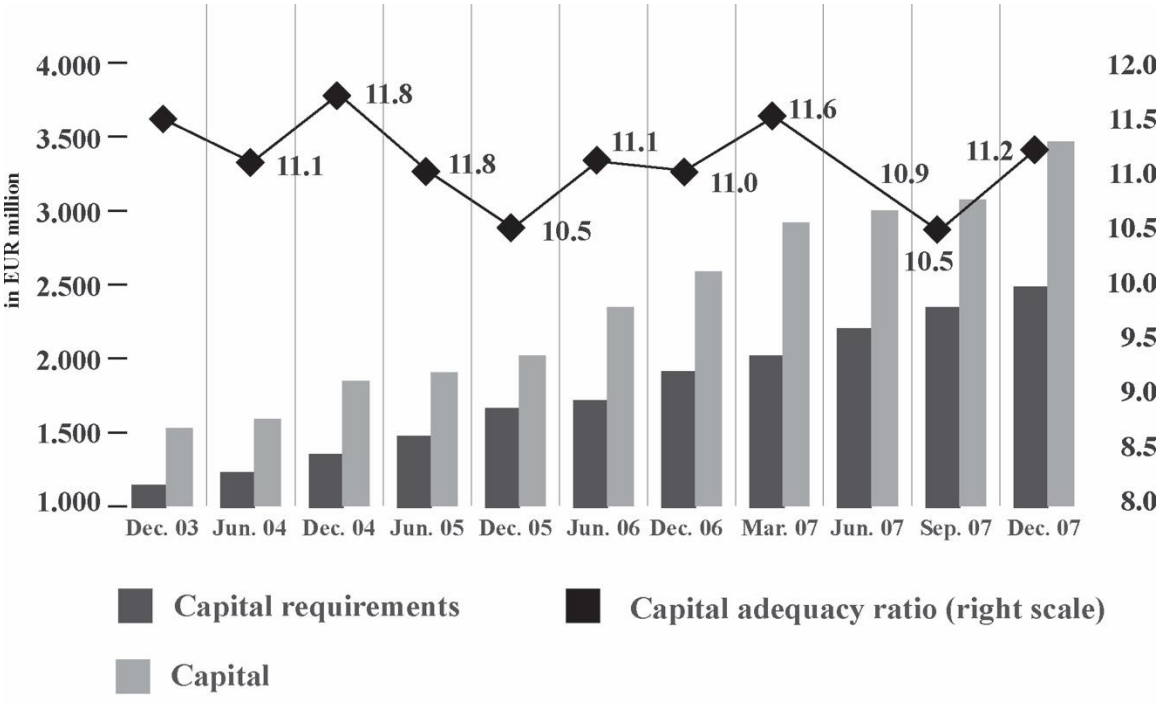
%	2005		2006
	Medium-size EU banks	Small EU banks	Slovenia
Net interest/total assets	1.77	2.69	2.18
Non-interest income/total assets	1.19	2.0	1.67
Gross income/total assets	2.96	4.69	3.85
Operating costs/total assets	1.69	2.92	2.22
Operating profit/total assets	1.27	1.77	1.63
Provisioning and impair-ment costs (and other)	0.27	0.23	0.38
Pre-tax profit	1.00	1.54	1.25
ROE	11.89	12.51	15.03

Source: Adapted from Bank of Slovenia (2008).

The credit risk started to grow, being in line with the GDP in 2006. The majority of the foreign banks ownership were the ones that achieved highest loan growth to non-banking sectors. The small ones managed to get higher loan growth with the same total assets level, which was gave BS an indication that they were more exposed to credit risk in accordance with the International Financial Reporting Standards (hereinafter: IFRS). Larger banks were more conservative in approving new loans, while the smaller ones had more

unsecured loans. Due to the financial injection in 2006 given to the Slovenian banks, capital adequacy recorded a slight growth until the end of 2007 (Bank of Slovenia, 2008).

Figure 4: Capital adequacy, capital and capital requirement of the banking system



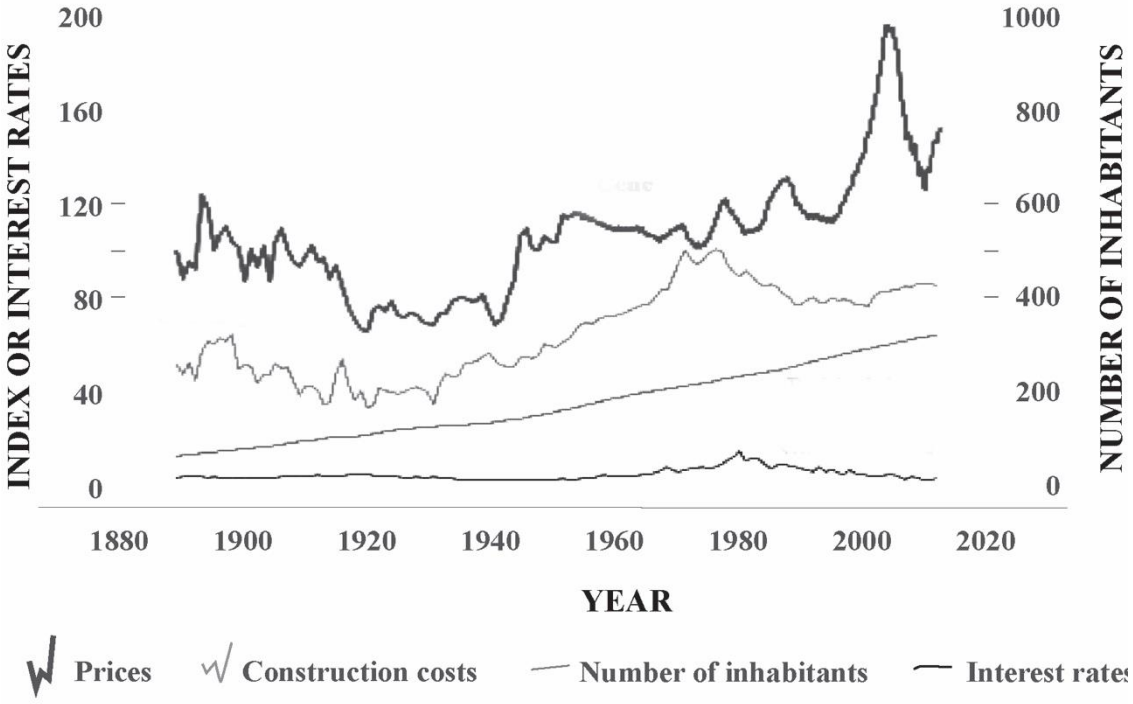
Source: Adapted from Bank of Slovenia (2008).

This capital increase was due to increase of ordinal and additional capital, where the capital requirement for credit risk represented 96.1 % of the capital requirements by the end of 2007. Because of the IFRS requirements, regulatory capital was growing, increasing the supplementary capital, which was outstripped by that of the core capital (See Figure 4). Small banks were the most behind the EU average in core capital under majority of foreign ownership and by the end of 2007 all banks have managed to meet minimum capital requirement (Bank of Slovenia, 2008).

Economic and financial crisis started in mid-2007 in USA, caused by the bubble burst of the real estate prices (See Figure 5). This was followed by a drop in prices of securities which were tied to them and the most relevant mortgage-backed securities. After Lehman Brothers went bankrupt and liquidated in 2008, TARP (Toxic Asset Relief Program) was formed with USD 700 billion in order to prevent future bankruptcies in the USA. The majority of the other financial institutions were highly in debt as well, with insufficient capital to be able to absorb the losses of their holdings. Since the mortgage borrowers discovered that their credit became much larger, market value of the real estate started to rapidly drop and they lost the ability to repay their annuity loans. Banks and other financial institutions started to sell quickly their CDO trances, no one however was interested to buy them. Consequently, as a result of liquidity reasons, they had to borrow more from the

credit market until banks were no longer willing to lend money to each other even at a higher interest rate (Bank of Slovenia, 2009).

Figure 5: The bursting of the real estate bubble



Source: Adapted from Bank of Slovenia (2014, p. 2).

This mirrored into both the Slovenian economy and the banking system, were excessive debt was accumulated without enough awareness of the risks. The overheating of the economy and bad risk assessments were additionally harder to detect in the next period, especially in 2007 when Slovenia achieved a record economic growth and GDP of 7 %, in comparison up until 2012 GDP was deteriorated to -2.5 %. These vulnerabilities got exposed in 2008, when Slovenia was in a reduced cycle of credit activity, cutbacks in investments, deleveraging and above normal rise in NPL. This caused a recession cycle, where starting from 2009 drastic measures had to be taken, with the Excessive Deficit Procedure imposed by the EC, requiring medium and long term fiscal consolidation efforts (Jazbec, 2014).

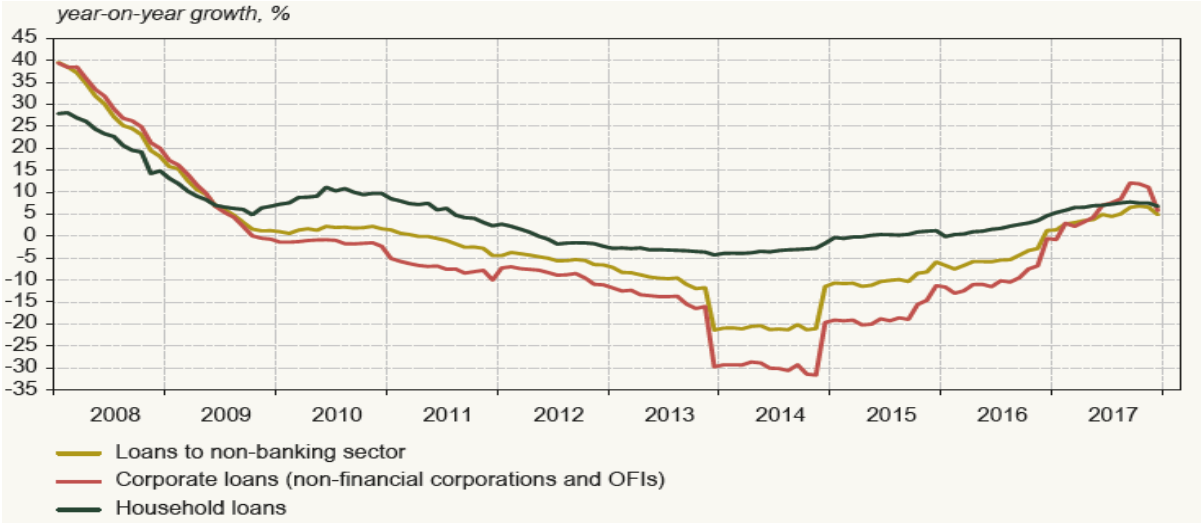
NLB and NKBM had to be recapitalized again. In 2008 NLB was recapitalized in amount of EUR 300 million, which was necessary step for further growth and liquidity restauration. In addition to this, BS demanded greater capital adequacy for better financial system, increasing the safety of the savers, adding to the fact that NLB already had a large market share and large influence on the banking stability. After the recapitalization process, RS still remained a majority owner of NLB with 33 %. The recapitalization of NKBM happened in the same year, amounting to EUR 150 million and in order to disperse ownership, the shares were first offered to the general public, so citizens could participate.

Similar to NLB, at the end of recapitalization RS was majority owner of NKBM with 42.31 % (Štiblar, 2008).

Another factor influencing the overheating of the economy was the period after entering ERM2 in 2004, while adjusting the tolar against the euro, began the process of lowering the domestic interest rates and BS started to lose control over its sovereignty. One of the most critical growth on loans, especially the short term corporate loans, were increasing exponentially before the crisis started. Intrigued by the high interest margins, competition between banks was high, lowering the most important loan standards and by that, lowering the amount of capital that was required. This resulted in rapid and unbalanced accumulation of non-performing loans.

Thus, the non-banking sector, experienced a fall of economic activity and vulnerability to the domestic banks. In addition, LDR was 122 %, indicating potential liquidity risk, in case of failure refinancing their mature liabilities to their foreign creditors. And as can be seen from Figure 6, the market competition between banks made foreign owned banks more indebted, acquiring cheaper capital from their parent banks, thus lowering their interest rate. This caused total chaos on the credit and capital market, borrowing stopped and investments dropped due to the higher risks (Bank of Slovenia, 2015).

Figure 6: Year-on-year growth in loans to the non-banking sector



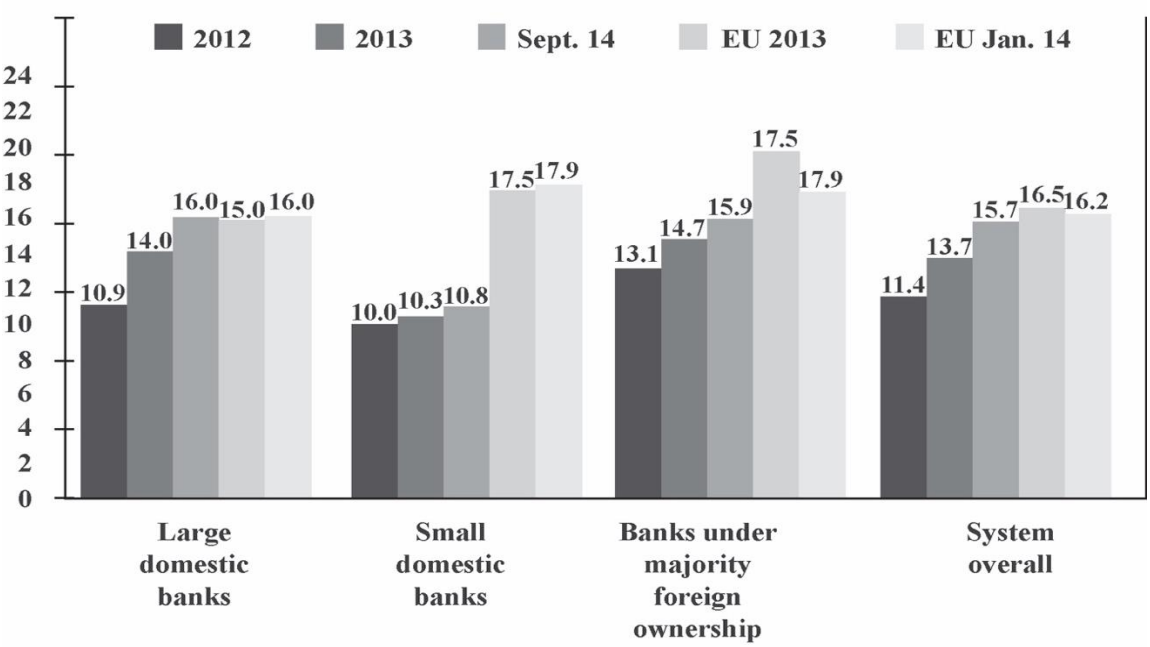
Source: Adopted from Bank of Slovenia (2018).

After a serious tightening of the lending conditions, from 2010 to 2014 demand for loans drastically fell to EUR 4.6 billion from 18.2 billion, recapitalization and serious changes had to be made during the recession period. Banks needed financial injection in order to restructure their claims, so despite the requirement by BS of EUR 844 million, the three largest banks were recapitalized in amount of EUR 354 million. With the Act of

Strengthening Bank Stability (ZUKSB), the Bank Assets Management Company (BAMC) was created in 2013. BAMC was entirely in state ownership, with main goal of restructuring, transferring the NPL and managing the bad assets. From 2014 almost EUR 4 billion was used in the recapitalization process. The most critical banks (NLB, NKBM, ABanka) transferred their loans to BAMC, and after restructuring them, they were supposed to be able to sell them after the market has stabilized and recovered. The condition, prices and the procedure between BAMC and the banks had to be approved by the European Commission. Stress test and Asset Quality Report (hereinafter: ASR) was performed in 2013 to of the 8 largest banks, in order to reveal any additional capital shortfalls or surpluses that can happen under different situations. Under this report, adequacy of bank claims are being assessed in order to prevent any impairments shortfalls that can reduce banks capital. Top-down and bottom-up approach were used. The results indicated a potential capital shortfall between EUR 2,725 million and EUR 4,779 million from both approaches, under the Core Tier 1 capital of 6 % (OECD, 2015).

Before implementing the new Single Supervisory Mechanism (hereinafter: SSM) In order to build trust in the European banking system and promote transparency, another stress test was made in 2014, in which three banks from Slovenia were included (NLB, NKBM and SID Banka). The purpose was to assess the risks and to see if there are any impairments in the claims and throughout banks portfolios. Using conservative scenarios, each one of them had to retain Tier 1 capital of 8 % in the baseline scenario and 5.5 % in adverse one. The results revealed that the recapitalization and the cleaning of the balance sheets in the past few years had a positive effect with a surplus of EUR 754.7 million. Despite the credit risk which remained high to some degree, the banking operations were again in normal condition, financial markets were again opened for cooperation and non-performing claims besides BAMC transfer were lowered (See Figure 7).

Figure 7: CAR in different bank groups compared with the EU average

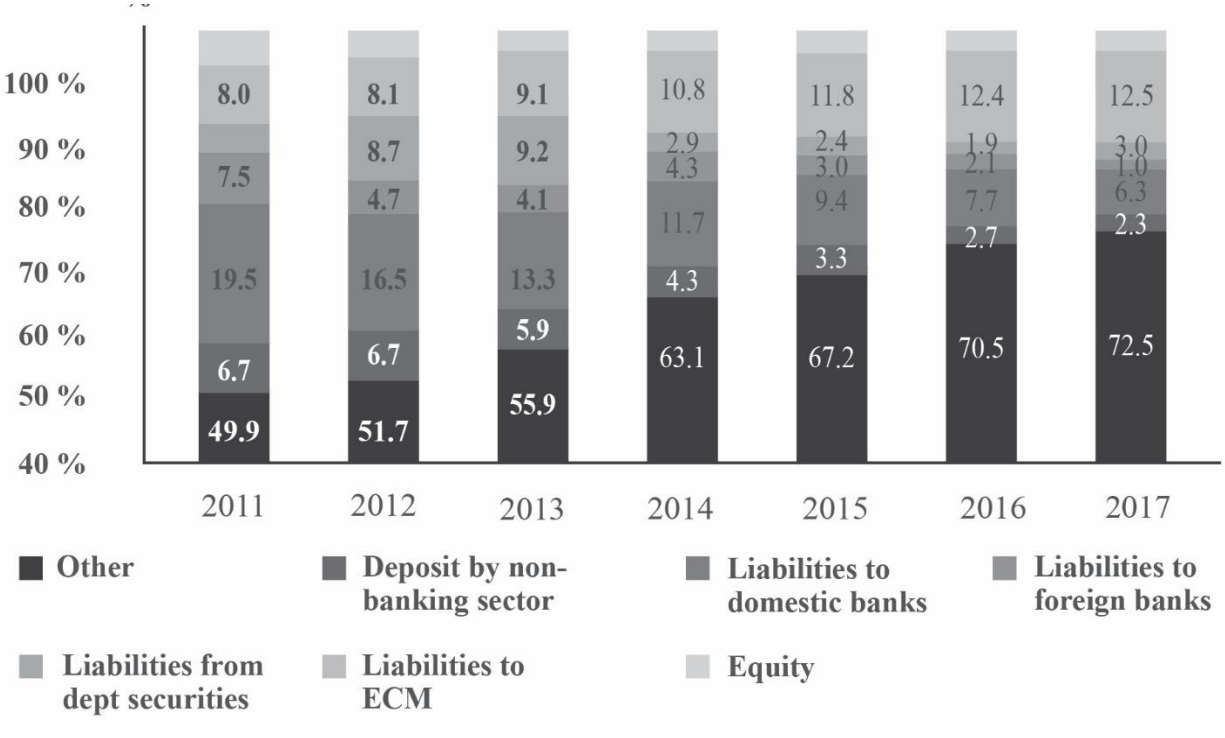


Source: Adopted from Bank of Slovenia (2016).

The CAR since the recession started, contrasted to the EU average with a serious gap between them. After the government intervention, the recapitalization, the upgrade on the risk management and the new capital adequacy assessment process was implemented in 2013, thus firm growth was expected in the years upward. More requirements were needed, with new capital buffers but the CAR gap was narrowing to the EU average and the solvency risk was significantly improved (Bank of Slovenia, 2015).

Even though a lot more changes have to be done in order to maintain stability and future progress of the Slovenian banking system, a positive outlook can be seen at the period of writing this thesis (2018). A balanced growth can be seen in overall economy with steady forecast growth of GDP to be 4.2 %, the banking sector has made significant changes and the NPL have gradually been declined (mostly due to BAMC transfer). The banks in Slovenia currently hold 93 % of the market, with total of 12 banks, three savings banks and three branches of foreign banks. There was slight growth in loans in 2017 mainly from the households and lending conditions have been significantly strengthened from the past period (See Figure 8). In order for the banks to maintain their profitability, besides lending new sources of income had been implemented. Due to changes in the real interest rate, credit risk and the banks inability to reduce their operational cost, net income has been declining. Regardless, the profit margins had large influence on the profitability and serious improvement since 2014 can be seen (European Commission, 2018).

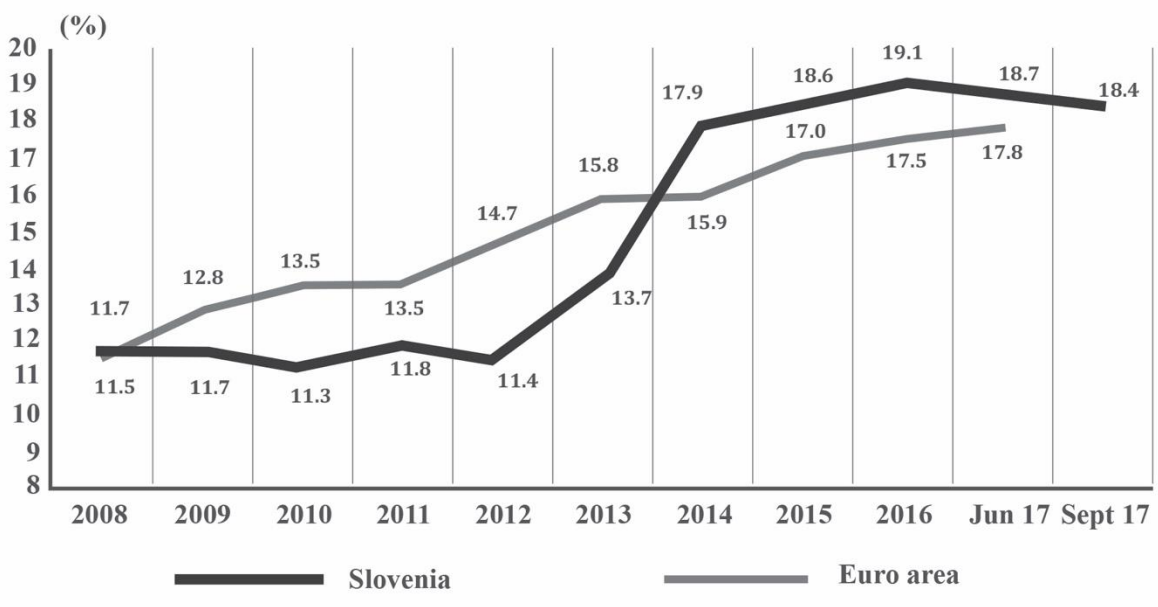
Figure 8: Breakdown of bank funding (in %)



Source: Adopted from Bank of Slovenia (2018, p. 30).

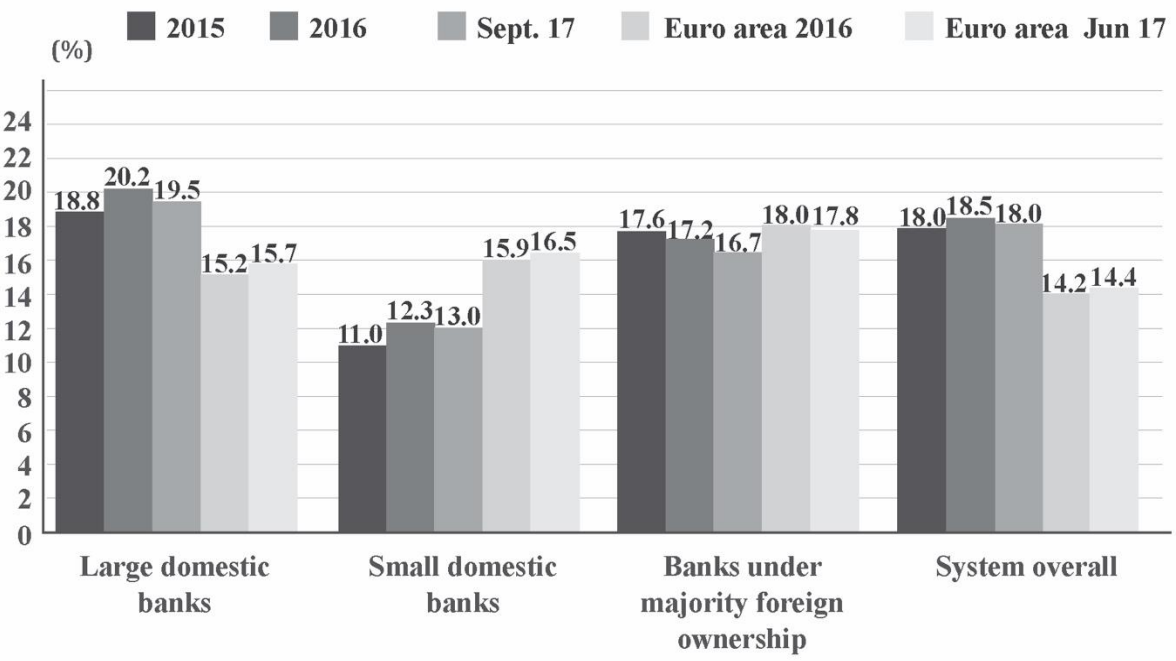
The banks solvency level was firm and the capital adequacy, even though was slightly different between banks they were all at required level. As already mentioned, due to slight growth in loans, capital adequacy has increased, proportionally increasing the credit risk which accounted for 70 %. Capital adequacy was at 18.1 % at the end of 2017 and the slight drop was due to fact that the capital requirements were growing faster than the regulatory capital (See Figure 9). The common equity Tier 1 and the Tier 1 capital, due to the same credit activity have well have declined, remaining at 18 %. Comparing to the euro area, CAR was above the average level, with the smallest banks being the weakest ones in capital, while the quality of the Slovenian capital structure in the banking system was solid, but with higher risks which is evidenced by the capital requirements (See Figure 10). In future banks will have to continue maintain their CAR, which will gradually continue to grow proportionally with the credit risk. Maturity mismatch between liabilities and banks assets, income risk as one of the more significant ones, can cause shocks in the financial sector in the future. Despite this, the low interest rates which have already caused increasing of the level of investments in the past few years, will hopefully reflect to the economy and the banking system with taking new risks and investments (Bank of Slovenia, 2018a).

Figure 9: Total capital ratio compared with euro area.



Source: Adopted from Bank of Slovenia (2018b, p.5).

Figure 10: Common equity Tier Capital (CET1) by Bank group, comparison with Euro Area



Source: Adopted from Bank of Slovenia (2018b, p. 50).

2 Overview of Banking Risks

The Banking and financial markets have been drastically changing throughout the years. New products and services allowed banks to constantly evolve with wider access to new funds and opportunities, especially with the implementation of the securitization as a well-known derivative and other products. The main problem with this is the deregulation and internationalization process, where many of these derivatives are not always shown by the banks on the assets or liabilities side, exposing them to major risks. With size of banks and their development growing, the variety of banking risks is proportionally increasing as well. Today, banks have a high business risk, coming from banks operations in order to increase their profitability. The competition between banks is another variable that adds to the increased bank exposure, thus banks have to be more innovative and offer more value added services, satisfying the variety of client's needs. The complexity in this competitive environment changes, where even one activity of the bank can have many risks which cannot be accounted for (Madhav, 2010).

One way of classifying risk is by its probability of happening. In other words, it is very important for the financial experts to distinguish between risk and uncertainty. The risk can be identified and differentiate under different scenarios and more importantly it can be measured. With uncertainty we have 'risk' with unknown probability or uncertainty of what will happen, which by itself represents additional risk which cannot be measured. The nature of uncertainty can be versatile, like the inability of borrower to repay his instalments or failure of the bank to reach its objectives, most of them are financial with an uncertainty of future economic or political changes in the country that might seriously affect them (Jamal, 2001).

The banking system has been through major changes during the past 30 years. The bank's risk management and corporate governance changed in every aspect of their work, from regulation and supervision processes to different management techniques and volatility measures for better risk control. This is highly expected, additionally considering the latest global financial crisis, which started as a consequence of the real-estate bubble in the USA. Even though there are vast majority of risks, depending on various bank activities, in general they can be divided in three categories: financial, operational, and environmental risks. Financial risks furthermore consist of two types of risks. Traditional ones, that include income statement, balance sheet, credit and solvency risk. The others are treasury risks, which in the core are based on financial arbitrage, which with high performance results in profit, or with loss if incorrect. These are the interest rate, liquidity and market and currency risk (See Table 4).

Financial risks are very specific by the correlation to the other risks, even if the bank for example is exposed to the currency risk because of some business operations, a mismatch can occur since it will be exposed to liquidity risk.

Operational risks are accountable for the technical aspect and overall business processes. All security measures (information and mismanagement), procedures, strategic planning, protocols, organizational structure and even responsibilities regarding staff careers and customer relation are incorporated in it.

Environmental risks, as obvious are more related to the business environment of the bank. Every macroeconomic policies, all of the financial structure, payment system and legal issues fall under these risk, which are crucial for the effectiveness of the banking operations (Greuning & Brajanovic, 2009). The following graph, represents a summary of the most important risks in the banking sector.

Table 4: The Banking Risk Spectrum

FINANCIAL RISKS	OPERATION RISKS	ENVIRONMENTAL RISKS
Balance sheet structure	Internal fraud	Country and political risks
Earnings and income statement structure	External fraud	Macroeconomic policy
Capital adequacy	Employment practices and workplace safety	Financial infrastructure
Credit	Clients, products and business services	Legal infrastructure
Liquidity	Damage to physical assets	Banking crisis and contagion
Market	Business disruption and system failures (technology risks)	
Interest rate	Execution, delivery and process management	
Currency		

Source: Adopted from Greuning & Brajanovič (2009, p. 4).

The Basel Committee issued the Basel Accords, which later on in my thesis are explained more thoroughly and with more detail. Basically, the Basel Committee of Bank Supervision focuses on the broadest types of risks: credit, market and operational risk. These are part of the first pillar and in the second one the other types of risks are being analyzed. Briefly I will explain the most important ones.

Credit risk for several reasons is one of the most important ones that banks have to be aware of. In context of liquidity, as the low rated-credits are getting thinner on the market comparing with the higher-rated credits, the liquidity of assets can be a problem because of the low credit ratings.

The failure of fulfilling the lending contracts (operations) can seriously influence the credit quality of the bank, if the borrower fails to meet his obligations. Credit risk represents the risk of default, where it instantaneously it rises in the banking books whenever borrower is unable to repay, the quality of assets and the probability of default arises. More importantly the current and future earnings of the bank depend on this, raising the possibility of equity risk with depreciation of banks investments. This is why diversification represents a very effective risk management tool in order to minimize the vulnerability of a banks portfolios. The basic framework of measuring the credit risk is standardized throughout the banking industry, including many pricing tools like RAROC (hereinafter: Risk Adjusted Return on Capital), which was one of the first tools in the risk management environment for measuring credit risk (Hull, 2015).

Market risk refers to the volatility and fluctuations in prices of money and capital markets, with a high sensitivity to foreign exchange fluctuations. Additionally, this volatility is connected to the equity, fixed income instruments, commodities and off-balance sheet contracts. Assets, capital and liabilities can be highly influenced due to interest rate risk (hereinafter: IRR), with unstable bank earning and potential losses. IRR management is responsible for the controlling and using adequate measurements to prevent this, in the banking, as well as in trading books. Due to the volatility of some financial products like futures and commodities, commodity risk arises. The changes in prices on commodity markets happen more often than on financial markets thus making them less liquid. Models of measuring market risk are dating since the 1980s and the most common used method is Value at Risk (off balance VAR), where since the Basel Accord was authorized, VAR became widely used in order to measure market risk (Crouhy, Galai & Mark, 2013).

Liquidity risk is caused when the bank is unable to meet its obligations that can appear in many forms, from unexpected delays in repayments, withdrawal of credit lines to structural liquidity risk where necessary transactions cannot be carried out. Unexpected market liquidity risk can especially put banks in bad position, since in illiquid markets the derivatives and securities cannot be sold that easily. An effective risk management should help insure liquidity and meeting the cash flow obligations, since any shortfall can have serious consequences. The core of liquidity risk management lies in the ratio of the TIER 1 capital to bank assets that is in range 20:1. Often a mismatch can happen, since the maturity of the assets are larger than those to liabilities, which can affect to the inflow and outflow of bank funds, with possibility that the banks might not meet some of its commitments when they will come due. Since market liquidity is much more important liquidity, the asset-liability management committee (off balance ALCO), is responsible for effective managing the liquidity on the market and the amount of liquid or of readily marketable assets that a bank should hold (Greuning & Brajanovič, 2009).

Operational risk represents a real challenge for the banks. Different failure to the internal processes systems or people are part of this risk. Beside this, the main risk management

framework consists of providing early warning, anticipating and monitoring this risk. Moreover, reducing vulnerability, providing measurement tools and influencing business decisions are key in order for the management to accomplish these objectives. The Basel committee in its core principles have addressed this risk and it is expected from the regulators to properly identify, assess and monitor them (Hull, 2015).

2.1 Risk Management in Commercial Banking

The growth of the banking industry, complexity of the operating environment, changes and competition, endangers banks survival on the market. All of this represents a risk, where banks should constantly adapt, be innovative and find ways to reduce this risk in order to ensure their profitability and survival. The only way to ensure their ongoing functionality is through effective and rigorous risk management. Proper supervisory and regulation process is a must, since the banking sector is one of the more complicated one, in the financial world. As different bank operations require different measures with each of them having different type of risks, the risk management departments are constantly evolving, analyzing identifying and monitoring risks on different level (Pyle, 1997).

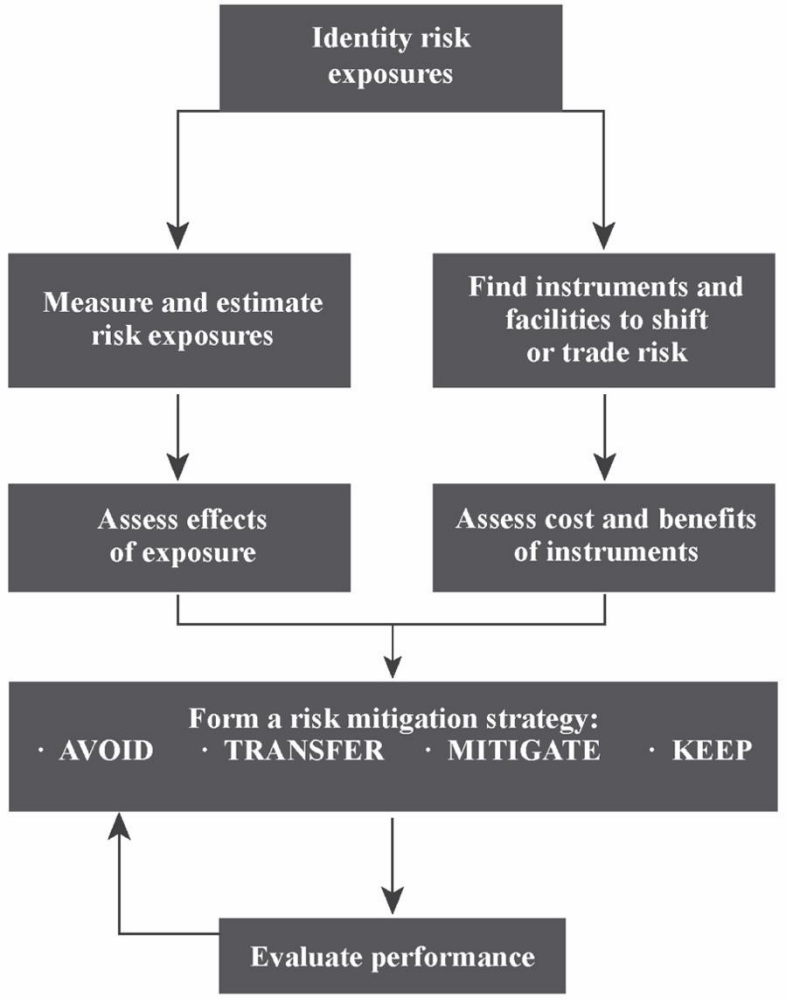
Even though bank regulator cannot prevent catastrophic failure, their primary role it to enhance the monitoring and set framework on which risk management is undertaken. Risk management is as well part of the corporate governance. The board of directors must set strategic direction and the executive management need to make sure the board polices are being fulfilled. The audit committee with internal auditors, represent an extension of the board's risk management assessment, conducting appraisal on the internal control and using different accounting practices and systems assisting the management in identifying potential risks. The evolvement of supervisors' practices is necessary to meet the challenges that innovation and new practices are bringing in order to maintain low risk and sufficient capital requirements. Some of these measures include ratios. The easiest way to make quick analysis of the banks stability is to check the liquidity and capital adequacy ratio in addition to the loan portfolio. Even though these ratios are good source to examine the current financial stability, the most important aspect of it, is if they are transparent and accurate (Crouhy, Galai & Mark, 2013).

Indication with a risk analysis, will tell us whether a financial institution is working in accordance with the latest industry norms and practices, especially if having issues with profitability or capital adequacy. Any change from a material character in the banks risk profile, might indicate that potential problem may be on smaller individual scale, or it might follow trend that can potentially impact the banking sector as a whole. Every analysis is different including every aspect of on-site evaluation, surveillance and evaluation by the risk management professionals. Provided to them are various tools that will assist them in collecting data. Data input tables is one of them, where combinations of graphs and financial data can be implemented with details about the income statement and balance sheet. This later can be used for more detailed analysis of banks risk conditions.

Questionnaire is another tool for facilitating the risk based analysis of the bank. This questionnaire should provide better understanding of the banks financial sector and regulation, internal and accounting controls in addition to the basic financial statements. Graphs are as well a powerful tool for analyzing current trends, performance and making detail comparison of a bank's profitability, financial condition and to better illustrate the current risk exposure (Greuning & Brajanovič, 2009).

Risk management represent a process of identifying weaknesses using various methods, with a well-structured approach, with strategic and capital planning, in order to avoid or manage bank's financial and business risk. These steps include risk identification, analysis, monitoring, measurement, mitigation, control and risk avoidance. Risk identification is the ability to make a difference between core business risks and the other ones, which will help the banks understand the activities which led them to those risks. Proper risk measurement procedure is essential depending on the risk size and making evaluation by the received data, which risks to eliminate and which to mitigate. Changing the risks profile over time requires constant monitoring and after assessment of different risk factors, control it in dependence of the exposure level (See Figure 11) (The Institute of Risk Management, 2002).

Figure 11: The Risk Management Process



Source: Adopted from Crouhy, Galai & Mark (2014).

2.2 Capital adequacy and the Basel accords

Primary function of the financial regulators has always been the capital adequacy. After the Second World War and till the end of the 1980s, capital adequacy was just a basic factor to determine the momentary financial condition of the bank. After many developments, growth and the drastic rise in risk, banking regulator had to develop specific capital adequacy rules, since it became very important measure of banks' performance and risk. In addition, the core definition, together with the minimum capital requirements have drastically changed over the years, approaching it with different measures, treating assets and liabilities differently and setting up new rules to prevent future portfolio imbalances and liquidity problems. This capital is crucial for the banks, since it represent a cushion that will absorb all the possible losses and provide a confidence to the bank. Another aspect of it is the competition, where normally at one side, the shareholders expect their dividends or high return on their equity while on the other side, banks need to ensure good pricing and products in order to be prospective on the market. This confidence in the bank

is maintained by well-established capital buffer, if faced with shortage of capital or its cost is high, the risk of losing the business to the competitors is high (Greuning & Brajanovič, 2009).

Another important aspect that regulatory agencies need to address is an effective cost-benefit analysis alongside to the regulations. An inadequate capitalization of the banks as we could see from the financial crisis in 2007–2008, raises the question what sort of analysis and precaution can banks make to protect themselves from such failure. According to many financial analysts, if the bank regulators have made a proper cost-benefit analysis and have adjusted their capital requirement accordingly, the global crisis might even not have happened (Admati & Hellwig, 2013).

Different assets have different cost of capital and thus, on this way a capital requirement is determined, depending of the riskiness of asset. On this way banks can favor the ones that have higher return, which will change the regulatory arbitrage towards riskier assets. Even though the banks should in these cases choose the most appropriate risk-weighting system, not all banks evaluate their loans the same way. Therefore, it's very complex to answer how high the capital ratios should be. According to the Modigliani-Miller Theorem, the institution value should be interlay independent of the debt and equity mix. According to their theory, pressuring the banks to hold more equity, should imply that there is not any economic cost of doing so. Regardless, since this theory presumes perfect conditions, with zero cost of bankruptcy and taxes, in the reality the costs of acquiring equity is high, it should represent as a useful starting point towards an effective capital structure analysis (Modigliani & Merton, 1958).

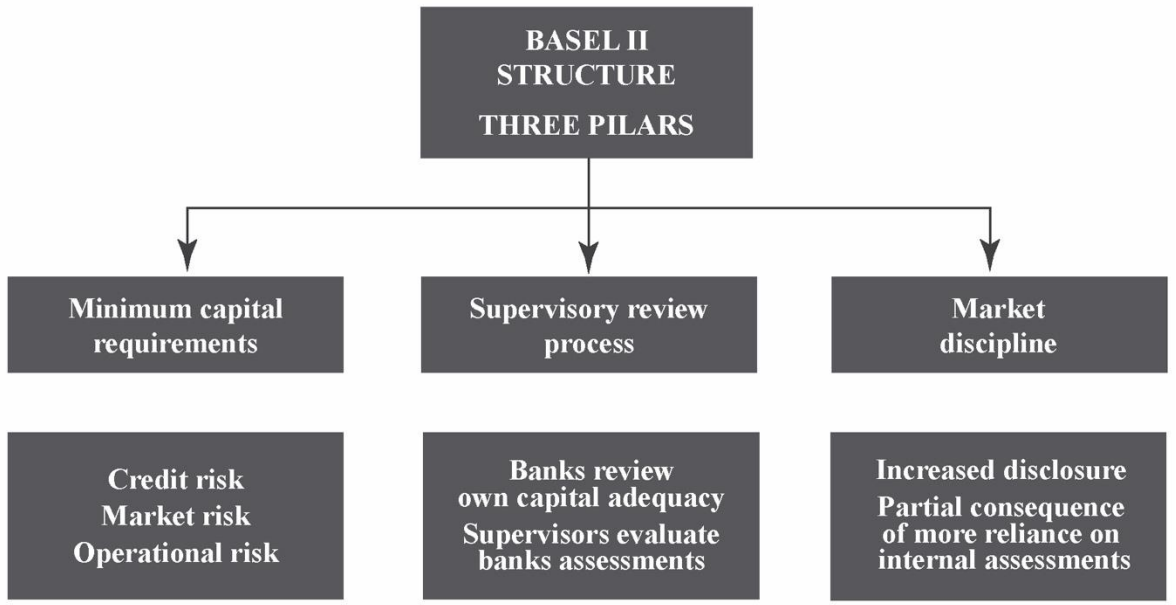
In 1975, the Basel Committee or the Bank Surveillance Committee was established by the governors of the ten most influential and developed economies called the G-10. These Basel recommendations represent minimum standards that are published by the committees, targeted towards member states of the BIS. They are not obligatory by nature if the country wants to implement the legislations, whereas the standards are already internationally recognized and used by the whole world. Basel Committee's efforts to unify the minimum capital requirement for the banks was the primary reason for the Basel Capital Agreement of 1988. Stability was an important issue of the bank governors of the G-10, since the capital of some of the largest banks began to decline, imposing serious threat to the whole banking systems. Increase of the stability, establishing capital agreements and strengthening the capital structure of the banks, were primary goals in order to have international financial system with equal conditions for all market participants. Primary, the credit risk needed to be covered and in 1996 the capital agreement was modified towards the market risks, which included the interest and currency risks. This was enacted by more than 100 countries, where the primary advantage was its simplicity for measuring the risk (Bank for International Settlements, 2001).

Considerable changes could be felt since the introduction of Basel I Accord. Financial markets have increased, but the risks became more complex as well. Since the risk management had to be improved, later the Basel II was introduced. According to Basel I, banks needed to hold capital equal to 8 % of their risk-weighted assets (hereinafter: RWA), or by calculating the cookie ratio, which consisted of on-balance and off-balance sheet items. This capital consists of three components. The tier 1 capital, consisting of items like non-cumulative perpetual preferred stocks and equity, the Tier 2 (also known as supplementary capital) including cumulative perpetual preferred stocks, debenture issues and Tier 3, consisting of Short-term subordinated liabilities (Hull, 2012).

$$Capital\ Adequacy\ Ratio = \frac{Total\ Capital}{\text{RWA}} \quad (1)$$

With the increasing options form market liberalization and new products, banks risks proportionally enlarged and were not accounted for. One of the biggest critics regarding the Basel I was the non-credit risk, which was ignored and in recent years has become very important. Additionally, the quality aspect of measuring the capital adequacy was neglected, focusing more on the quantitative one. With this in 1999 the Basel Committee started with consultation for Basel II, which will provide new framework, with more complex approach towards measuring banking risks. By 2006 Basel II was completed and established, with new calculations for the CAR and new risk management practices towards credit and operational risk requirements (Štiblar, 2010).

Figure 12: Conceptual Framework for the Basel II Accord



Source: Adopted from Greuning & Brajanovič (2009).

The Basel II is based on three pillars (See Figure 12). Besides the new assessment and CAR calculation (Pillar 1), two more pillars are included for supervisory review process (Pillar 2) and effective use of market discipline (Pillar 3).

The first pillar consists of three main risk components that determine the measurement of CAR: credit, market and operational risk, in which different models and practices are used for each of them. New way of calculating the minimum capital requirements for credit risk is used in order to reflect the credit ratings of the counterparties, were the capital requirement from 1996, banks to hold a total capital equal to 8 % of RWA remains the same and new capital charge for operational risk is implied. If some specific risks calculated that does not incorporate RWA, it's multiplied by 12.5 % in order to convert it to be RWA equivalent.

$$CAR = \frac{Tier\ 1 + Tier\ 2}{Credit\ risk + 12.5\ x\ (Market\ risk + Operational\ risk)} \quad (2)$$

Since the credit risk is one of the most important, a broader set of measurements are used by the supervisors in dealing them. The standardized approach, which focuses more on the assessment by external rating agencies. They provide basic summary of the risk-weighted options and put them in different categories (ratings). Under this approach the national supervision is responsible for the quality of assessment, the off-balance sheet, needs to be converted to credit exposure and for capital adequacy assessment, the derivative instruments have to be converted as well. By the internal based approach (hereinafter: IRB), banks have freedom to use their own estimates and models for determining the capital requirement, depending of the risk exposure. With this self-estimation, it is assumed that lower capital charges might be calculated and in contrary the IRB should be more accurate, but using this methodology will increase the volatility in the capital requirements (Hull, 2012).

For the market risk under Basel II two approaches are implemented: standardized framework and internal model approach. The standardized approach arises from the different banking operations, where the capital requirement is calculated differently depending if the risks. Some of them are the interest rate, commodity or equity risk, which when quantified are calculated by weighting them to the market risk, calculating the Tier 3 capital as well. The internal model approach or the value at risk (hereinafter: VAR) model, measures the bank riskiness or financial portfolio for a specific time frame. Most commonly are used by the risk management for investment purposes, determining the ration of potential losses in their portfolio (Hull, 2015).

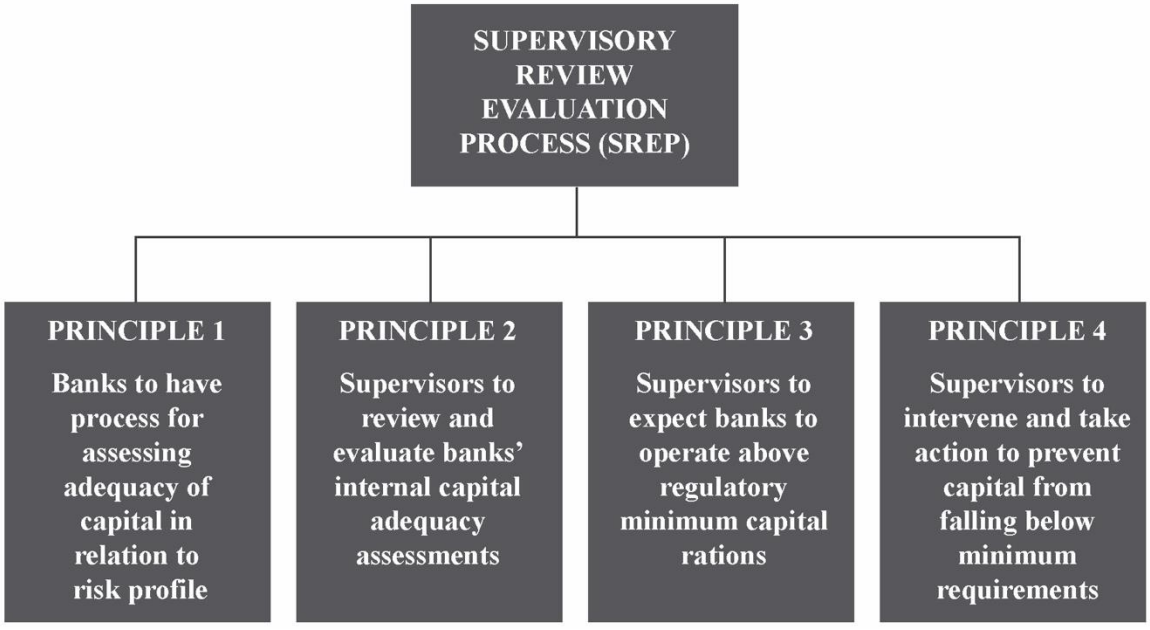
In Addition to the credit risk, Basel II requires the banks to have enough capital for operational risk. Operational risk comes from the inadequate procedures, failures or losses regardless if it comes from external nature, people or from the internal processes of the

bank. While with the credit risk calculation, the credit capital requirements should be reduced under Basel II, the operational risk should restore the capital level as it was under Basel I. The basic framework of calculating the operation risk lies on three approaches: the basic indicator approach, the standardized approach and the advanced measurement approach.

The basic indicator approach uses a proxy for the operational risk exposure. This indicator must set proportionally capital for the operational risk that would be equal to the average annual gross income for the last three years. The standardized approach is quite similar to the previous one, where different factor is used to the gross income that originate from different business areas. Under the advanced management approach (hereinafter: AMA) the capital requirements should cover for the operational risk, which is calculated by using different criteria, determined by the type used. AMA uses own internal model to calculate the operational loss, with a 99.9 % certainty that will not exceed within one year (Greuning & Brajanovič, 2009).

The second pillar is focused on the supervisory review processes. Appropriate internal risk management is required, with fulfilment of the minimum of 8 % CAR, which not only is necessity but in many cases not sufficient in order to ensure safe operation of the bank. Thus, the supervisors have the appropriate power to require additional or higher capital adequacy, if by the banks calculations is determined that this could endanger the stability of the financial system. The main goal of the supervisors is to ensure that enough capital is consistent to the bank's business and should intervene at early stage in order to prevent capital falling below the minimum lever required (See Figure 13).

Figure 13: Supervisory revue under Pillar II



Source: Adopted from Crouhy, Galai & Mark (2014, p. 144).

The third pillar represents the market discipline, where under Basel II, banks are asked for disclosure of reliable information and to assess adequate capital adequacy. These disclosures that are related to the banking operations and the risk profile of the bank, should give better overview of the banks operations. These data should be published every six months, even though a shorter period would be better for the supervisors, lowering the discretionary interventions (Štiblar, 2010).

The large losses that distorted the financial sector during the crisis, made the Basel committee of Banking Supervision to implement the Basel 2.5 in 2011 and the Dodd-Frank act. Some of the necessary changes were the calculation of the market capital, calculation of a stressed VAR, incriminate risk change and a comprehensive risk measure for instruments that are depended on credit correlations. The main change with the stressed VAR calculation was the calculation period, on every 250 days, rather than on four years, as it was previously done. The incremental risk was supposed to adapt to the trading book exposures, which attracted less capital than similar ones. Because of this, a calculation of a one-year 99.9 % VAR was required for the losses of products that are credit sensitive in the trading book, While the comprehensive risk measure was accounted for financial instruments like collateralized debt obligators (hereinafter: CDOs) and asset-backed securities (hereinafter: ABSs) (Hull, 2012).

With Basel 2.5 increasing the capital adequacy for the market risk, Basel Committee wanted to increase the capital requirements for credit risk as well, especially after the credit crunch in 2007/2008. Basel III was supposed to strengthen and more importantly to protect the overall stability of the financial system by implementing micro and macro regulatory interventions. Basel III was issued in 2011, with an implementation period that started from 2013 and is planned to be finalized in 2019. One major change is in the capital calculation where to the basic Tier 1 capital, additional Tier 1 is added, while Tier 2 remains the same and Tier 3 has been cancelled. The tier 1 equity capital must be at least 4.5 % of the RWA, the total Tier 1 must be 6 % of the RWA and total capital (Tier 1+ Tier 2) must be at 8 % at all times. In addition to this, a capital conversation buffer is required of core Tier 1 equity capital to be equal to 2.5 % of RWA. The main reason for this is to ensure that banks will build enough capital in prosperous periods and use that capital when facing financial difficulties. Similar to the conversation buffer, countercyclical buffer was added. This buffer should serve as security against cyclicality in the bank earnings (Bank for International Settlements, 2011).

3 EMPIRICAL LITERATURE REVIEW

A lot of studies have been made that analyze the determinant of banks capital and capital adequacy ratio. Particularly during the latest financial crisis, revealing the weaknesses of the supervisory regulators, risk managers and in the international financial institutions-

mostly banks. This raised the attention towards capital adequacy, where in order to stabilize the banking system the Basel Committee on Banking Supervision (hereinafter: BCBS) and the EC, have approved almost 60 measures in the Basel III and CRD IV directive for capital adequacy (Zurk-Butkuvienė, Vaitulevičienė & Staroselskaja, 2014).

the determinants of bank capital adequacy ratio has become a very important tool for regulators, helping them to predict possible negative scenarios, prepare measurements and interventions, for better confrontation with the banks' problems (Francis and Osborne, 2010). Besides for proper functioning of banks, these variables are crucial for the economic role as well, where better understanding of the main factors that influence banks capital structure, with an adequate supervision can prevent negative outcomes from a much larger scale.

Kahane (1977) argues that, unless the composition of bank's portfolio is as well subject to regulation, the capital regulation cannot reduce the banks overall risk, while Harr & Rønde, (2003) by studying the regulation in multinational bank subsidiaries, have concluded that the capital requirements may increase, only if the subsidiaries are subject to two regulators. In research study Alonso-Ayuso, Escudero, Garín, Ortuño and Pérez (2003) argued that, large banks can indeed operate with low levels of capital because they can benefit from their diversification, hence work with lower capital ratios. This, contradicts with a working paper made by Gropp & Heider (2009), who claimed that banks who are more profitable and have the ability to have more capital set aside, in fact tend to have larger regulatory capital then others.

A study made on Turkish banks by Buyuksalvarci & Abdioglu (2011) in the period 2006−2010, has concluded that ROE, loans and the leverage ratio had a negative impact on CAR, while ROA and loan loss reserves a positive one. Another aspect of the capital adequacy, is as well its connection to the risk behavior, as an important factor. Ahmad, Ariff & Skully (2008) has made empirical study with factors mostly influenced in Malaysians banks, using panel data from 1995 to 2002. Among others he used risk index, non-performing loan, size and profitability, with a conclusion that the risk index with the profitability had impact on capital adequacy, while size and profitability a negative one.

Similar to this, Fiordelisi, Marques-Ibanez and Molyneux (2011) were comparing the connection between capital and efficiency with capital and risk. They used panel data from European banks from 1995 to 2007, with a conclusion that inefficiency was a primary problem that exposed banks to more risk.

Bank size, profitability and liquidity were the main factors that Yu (2000) made analysis for the bank capital ratio in Taiwanese banks. His findings were that larger banks had much lower capital ratios than smaller ones, with conclusion that with the usage of internal capital as a main source, profitability and CAR have positive relationship. In addition, for smaller banks the author has found a positive relationship between liquidity and equity to asset ratio and a negative for larger ones, while Aggarwal and Jacques (2001) in their

report for the US banks, noticed that banks were able to increase their capital ratio without increasing their credit risk. This was possible with a fast measurement response which immediately affected the capital ratio especially in the more undercapitalized banks.

More detailed research was made by Barrios and Blanco (2003), by using two regression models were researching if the capital adequacy is more affected by the market conditions, or by the capital adequacy rules. Different variables such as liquidity, size, ROA and credit risk were used. The findings suggested that the capital adequacy was more influenced by market factors rather than imposed regulations.

Another research made by Bertrand (2000) was focused on Swiss banks reaction to the Basel rules. He developed a model using total assets, ROA, loans portfolio lose rate and CAR ratio as variables. Positive and statistical significant relationship was found between ROA and CAR, implying that regulatory pressure influenced the Swiss banks to increase their capital and be in line with the rules of CB. Moreover, an example from Scandinavia, made by Nilsson, Nordström and Bredmar (2014), examined the Swedish banks prior and after the financial crisis. Their findings suggested significant changes in their capital structure, forcing the banks to have above required ratios after the crisis.

Also, Irawan & Anggono (2015) in their study of Indonesian banks, resulted that the CAR ratio was mostly influenced by ROA and non- performing loans (NPL), while ROE, NIM, deposits and credits had a negative one. The study was made for time period 2005−2014. Similarly, Jasevičienė & Jurkšaitytė (2004) were using: ROA, loans over total assets, assets growth, bank management pressure and bank size as variables for commercial banks in Lithuania. She used panel data from 2008−2013 and a multiple regression analysis, with result that ROA has a negative impact and it was statistically significant.

Another study using 41 observations in its data, from Iranian banks in time period 2006−2012, was made by Bateni, Vakilifard & Asgha (2014). They used CAR as depended variable and deposit asset ratio, risk asset ratio, equity ratio, ROA, ROE, bank size and loan to asset ratio as independent variables. From the regression analysis, 71.15 % of the variation of the dependent variable was explained. The variables: risk asset ratio (hereinafter: RAR) deposit asset ratio (hereinafter: DAR) and bank size had negative relation to CAR, while equity ratio (hereinafter: EQR), ROA and LAR have statistically significant and positive relationship.

The importance of capital requirement, especially in the last decade progresses rapidly. The effects of capital requirements on the Turkish banking system was main research topic to Atici and Gursoy (2013) using similar variables as Bateni, Vakilifard & Asgha (2014). Findings employ that the usage of capital buffering approach by the Turkish banks, represented a strong management tool for controlling the unexpected risks that were related to capital. In addition, the capital buffer was most influenced by loan growth, profitability, NPL and loan to asset ratio.

4 EMPIRICAL ANALYSIS

4.1 Conceptual Framework

As already appointed, besides getting better understanding of the Slovenian banking system, importunacy of capital requirements and risk management processes, this thesis primary goal and objective is to determine the factors that influence the CAR in the commercial banks in Slovenia. For this purpose, factors are divided in two main groups. The first one consists of bank specific factors: CAR, size of the banks, NPL, ROE, ROA, DAR, DAR and NM. The second group consist of macroeconomic factors: public debt as % of GDP, unemployment, inflation and GDP. This conceptual framework is summarized in Figure 15.

Figure 15: Conceptual Framework

Source: Own work.

4.2 Scope of Sample Data and Data Analysis

Predominantly this chapter should be able to answer the last question. That being said, most adequate research design is by applying panel data methodology. This sort of data should give us more precise, dependent and reliable result in contrast to time series or cross-cultural data. The data is collected for 9 Slovenian commercial banks and purposely the time period chosen for analysis was from 2008 to 2015. This exact period was when the global financial crisis had started, with CAR and the capital requirement mostly responsible for the upcoming events, since the banks were mainly undercapitalized. This should give us a more faithful representation, because of the dynamic movement of the variables during that period and afterwards.

Important aspect for the data collection is that secondary data (or data collected from other sources) has been used. Namely, partial data was extracted from pre-selected financial statements of the individual commercial Slovenian banks, Fitch connect mostly for the bank specific factors and for some of the macroeconomic ones, from the World Bank and CB of Slovenia. For the results, data was processed through IBM SPSS Statistics 22 software for statistical analysis.

4.3 Description of Variables

The main focus of my thesis is the analysis of CAR, which represents the dependent variable. As a dependent variable, it is essential to use variables that would give us a more precise picture of the difference in variables that might have positive or negative relationship towards it. Because of that, the variables are divided in two subgroups, with each one having different characteristics as a whole. The bank specific variables group consists of: Size of the Banks, NLP, ROE and ROA (for profitability), DAR, DAR and NM, while a representation for the macroeconomic group are: GDP, public debt as % of GDP, unemployment and inflation rate.

4.3.1 Dependent Variable

The dependent variable is represented by the ratio of CAR that commercial banks have accumulated over time. This ratio as it is developed through the capital of the banks is crucial for stronger and more reliable protection against financial misbalances, especially in periods like the resent global financial crisis, where the banks were in a great manner undercapitalized and vulnerable to the upcoming events. From the literature review (see chapter 3) we can see that even though the studies analyses are from different counties and using different data, the results suggests that mainly similar factors influence the CAR, especially the profitability and loan ratios. This suggests us that form one side as the banks accumulate more capital, they are more prone towards investing in riskier activities and form other, and regardless of the accumulated capital requirements banks increased their investments in riskier assets with many of them not using proper guidelines from the Basel Committee on Banking Supervision. The appropriate formula for CAR is:

$$CAR = \frac{\text{Primary Capital (Tier 1)+ Sublmintary Capital (Tier 2)}}{\text{Risk Weighted Assets}} \qquad (3)$$

4.3.2 Explanatory Variables

4.3.2.1 Size of the bank

Larger banks have a tendency to hold more capital. They are engaging in more risky projects, but they are as well supposed to have better risk diversification. Regardless, some of them have a tendency to hold less adequate capital, since throughout many historical events can be seen that some are too big to fail. As an important factor size and growth have capitalization function, which can vary depending of the structure and condition that banks are implementing, affecting the overall performance. For the data, it is important to mention that natural logarithm for a distribution is being used. The reason is because the values of the data can differ from a larger scale, depending on the time period, this is additionally known as scale effect, where the significance of the results can be greatly impacted by the values. The usage of natural logarithm, evens the distribution and normalize the data. The size is represented as total assets.

4.3.2.2 Non-performing loans

The NPL can be identified as loans that borrowers are unable to repay. Mostly increased is the credit risk of the banks, with significant impact of the balance sheet. The uncontrolled expansions of loans that caused the real estate bubble in the United States and speeded towards Europe, was primarily ignited by NPL. Because the NPL is being interpreted differently in different countries, especially with the reporting of the loans that are past due, the BCBS has made clear distinction what should represent. All the loans that are past due 90 days, should be interpreted as non-performing. The correct formula is:

$$NPLR = \frac{Non{-}performin\ loans}{Total\ Loans} \tag{4}$$

4.3.2.3 Return on Equity and Return on Assets

The primary differentiator between ROE and ROA is financial leverage or debt. These two variables represent the performance indicators. Since banks mainly rely on the retained earnings, profitability is likely to have positive relationship to CAR and the asset risk is anticipated to be enlarged for higher returns. In other words, we can describe ROA as how efficient are the banks in generating their profits relative to their assets, while ROE profits are relative to the shareholder investments, with higher the rate, higher the successfulness of the investments. In a research made by Gropp and Heider (2007), a positive link was found between the revenues and the asset capital. The formula for the two variables is designed as:

$$ROE = \frac{Net\ income}{Shareholder\ equity} \tag{5}$$

$$ROA = \frac{Net\ income}{Total\ assets} \tag{6}$$

4.3.2.4 Deposit to Asset Ratio

Deposits represent an important asset to the banks, which gives them secure inflow of capital. Comparing to some other instruments, they are relatively cheap and controllable, but dependable by the depositors since lower DAR means lower capital ratio. That's why for safer deposits, Kleff and Weber (2003) idea is banks to maintain higher capital, or with other words, having unexpected circumstances of asset decline in future, deposits supposed to be more secured and less influenced by keeping the current value of assets higher to the value of deposits. Even applying basic capital standards to maintain minimum capital requirements, this should keep the deposits at satisfying level and by using different strategies to diversify and enlarge their products, should improve financial sustainability of the financial institution. The ratio of DAR is represented as:

$$DAR = \frac{Total\ Deposits}{Total\ assets} \quad (7)$$

4.3.2.5 Loan to Deposit Ratio

Liquidity is a major factor when it comes to banks preparedness of unexpected events that can seriously impact and distort day to day operations. The LDR ratio is used and should give us access to banks liquidity by comparing its loans to deposits, accounting for the same time period. This indicator is expressed as a percentage and it's expected to have positive relationship to capital adequacy since higher LDR increases the liquidity risk that by default should be compensated by adequate capital. Higher the ratio, higher the risk of insolvency and secure day to day operations, signaling that the banks liquidity might be too low to cover any unexpected financial requirements. In contrary, low LDR ratio as well may indicate that banks might not use their full earning potential. The appropriate formula for LDR is:

$$LDR = \frac{Total\ Loans}{Total\ Deposits} \quad (8)$$

4.3.2.1 Net Interest Margin

One way of describing the purpose of NIM, is a measurement of banks' net interest rate of return or the successfulness of banks investments in funds relative to their expenses. Generating above average revenues, should generate adequate income that banks can use and secure themselves against any risk exposures (Angbazo, 1997). This adequate income that is generated though retained should give a positive signal that should provide access to other markets. From other perspective, the high revenues may influence the banks management to reduce its capital since the lower risk of default and the potential negative impact that this ratio can have (Yu, 2000). The ratio is presented in the next form:

$$NIM = \frac{\text{Net interest Income}}{\text{Average Earning Assets}} \quad (9)$$

4.3.2.1 Gross Domestic Product

In determining the adequate capital needed, macroeconomic factors play important role, as this factor can seriously influence the risk management processes. According to Adegbite (2010), macroeconomic factors are crucial for economic stability and prosperity, taking care of stable external debt, prices and deficit. Additionally, in order to determine the capital needed according to Williams (2011), economic growth, unemployment rate (UNEM) and inflation should be considered. GDP can be described as: all the products and

services produced within a country, for a specific time period. This can vary from the difference between the exports and imports that county makes, all the investments and consumption. Many studies that have implemented GDP, shown negative relationship with CAR. In study made by Francis and Osborne (2010), GDP is insignificant and negatively correlated to CAR. We can assume a hypothetical situation that, in periods of high economic growth, banks tend to lower their capital required, while in expansion they are encouraged to maintain a higher one.

4.3.2.2 Inflation Rate

General definition of inflation rate, presents the increasing price level of goods and services in the country's economy over a time period. Williams (2011) in his research about Nigerian banking system for time period of 28 years, has concluded that inflation has a negative relationship with banks' capital, since inflation can have significant impact, distorting the economic development of the country. In order to have positive cost of living for the population, governments need to find solution and constantly adapt the prices of goods and services, which can be very difficult especially for the developing counties which tend to be more influenced by the changes in the global economy.

4.3.2.3 Unemployment rate

Moreover, the unemployment as a representative of economic performance, can be described as the percentage of the population that is currently unemployed, but is active in seeking new job opportunities. Eventually, as economic growth starts to diminish causes inflation to diminish as well, leading to downwards sloping of the interest rates and increases the unemployment. We should expect negative relationship to CAR.

4.3.2.4 Public debt as % of GDP

Governments' activity has always been important factor that directly influence the economy and banking system in a country. The connection between financial sector and fiscal policies that government propose must ensure market stability in order to avoid deterioration in the banking sector and consequently government intervention as was the case in the Slovenian banks, with BAMC intervention. These interventions directly influence the public debt, GDP growth and have severe impact on the public finances which means that new capital requirements can be imposed. Consequently because of the banks' liquidity is at risk, it's credit ratings and operations, a positive relation is anticipated between public debt as % of GDP and CAR.

4.4 Model Specification

The ordinary multiple linear regression incorporates parameters that are easily interpreted and is widely and frequently used by researches, data analysts or anyone working with different sorts of data. With multiple linear regression we can have more than one factors, with which we can predict the value of Y. These factors may act as separate variables,

origin from it or be powered by the same one (Verzani, 2004). Since one of my research focuses on the relationship between CAR and its variables, the model is appropriate and beneficial.

During my research, collection of data for the Slovenian commercial banks and going though the regression analysis I was faced with multicollinearity and outliers problem. Manly, this occurred because of the sample size of the data, the smaller number of banks incorporated with availability of the data for the statistical analysis from several banks. Since precise and more accurate depiction of the regression results is crucial for better understanding of the topic and further research, I have decided to implement fewer variables which would have a better overall fit in the regression analysis.

To determine the influence of the explanatory variables on the dependent variable CAR and according to my theoretical and empirical review, the following equation was created and addresses the relationship between the independent variables and CAR:

$$CAR_{i,t} = \alpha_i + \beta_1 Size_{i,t} + \beta_2 NPL_{i,t} + \beta_3 ROA_{i,t} + \beta_4 INF_{i,t} + \beta_5 GDP_{i,t} + \varepsilon_{i,t} \quad (10)$$

More specific for the equation components:

- α_i is the each bank's individual time-invariant intercept
- $\beta 1 - \beta 5$ are the parameters or beta coefficients that depending on their sign (+/-) should determine their relation to the dependent variable CAR.
- (*t*) is the time period.
- $\varepsilon_{i,t}$ is the error term.

4.5 Results and Discussion

Table 5 includes descriptive statistics of the data used in the regression. For these purpose, statistical data was extracted from 9 commercial banks, from 2008 to 2015, giving us variables that consist of 72 observations. The descriptive statistics shows minimum, maximum, mean, median and standard deviation. The results show that the dependent variable CAR, has a mean of 13.03, which is above the threshold imposed by the supervisors, meaning that the commercial banks in Slovenia held on average above the required minimum during the 2008 to 2015 period, noticing that this average was achieved by the rapid increase of the CAR ratio from 2014 onwards. The lowest CAR is 0.43, detected at one bank only, while the highest is 29.12. Changes can be noticed, that mostly occurred during the global crisis in the NPL ratio and ROA, which has a negative mean.

Skewness, which gives us a measure of the relative size of the two tails, is positive for Size, NPL and inflation, while ROA and GDP have a negative one. Kurtosis value, similar

to skewness gives us the normality of data distribution, but incorporates in its measure the combined sizes of the two tails. Normal distribution can be as well confirmed by the histogram in Appendix 2, which is bell shaped, indicating a normal distribution. The second table in Appendix 2 is normal probability plot (P-P plot of regression residuals). Since the residuals are fairly close to the line and we don't have great deviation from it, we can again conclude a fair normal distribution and relation between the residuals.

From kurtosis values we can conclude that data besides ROA, which value deviates from 3, the other variables values are fairly close to zero, indicating an approximate normal distribution.

Table 5: Descriptive Statistics

	N	Min	Max	Mean	Std. Devi	Skewness	Kurtosis
CAR	67	.43	29.12	13.0342	4.82648	.727	2.997
Size	69	5.94	9.88	7.9110	.89680	.312	-.240
NPL	65	1.41	57.27	16.4157	13.11736	1.337	1.249
ROA	68	-25.62	1.36	-1.2678	4.00306	-4.198	21.351
Inflation	72	-.51	5.65	1.7712	1.75293	1.026	.677
GDP	72	-7.79	3.30	-.1488	3.48033	-1.159	.369

Source: Own work.

Table 6 consists of the Pearson correlation matrix. The results should tell us the relationship or the correlation between the variables. Besides this, most importantly the dependent and independent variables are examined for multicollinearity. Multicollinearity problem arises when one of the independent variables is being highly correlated with one or many of the other variables, which undermines the significance of the independent variable. According to Cooper and Schindler (2003), multicollinearity can be a problem if the correlation coefficient is 0.8 or higher. Even though in the third table in Appendix 2 (scatterplot) a multicollinearity problem is noticeable by deviating some of the residuals from the group, it is in tolerable scale.

Regarding the relationship of CAR with the other independent variables, Size, NPL, ROA, and GDP have a significant positive relationship with the CAR, while inflation rate have a negative one. Regarding the multicollinearity problem, as already stated that the variables were appropriately chosen to avoid this problem, we can conclude that no multicollinearity among the variables exists.

Table 6: Pearson Correlation Matrix

	CAR	Size	NPL	ROA	Inflation	GDP
CAR	1.000					
Size	.134	1.000				
NPL	.397	.303	1.000			
ROA	.117	-.149	-.422	1.000		
Inflation	-.456	.001	-.293	-.001	1.000	
GDP	.248	-.028	.084	.092	.202	1.000

Source: Own work.

Next two tables show the results from the regression analysis. The multiple linear regression should give us more distinctive explanation and provide us with greater understanding of the relationship between variables, especially between the predictor (dependent) and the other explanatory (independent) variables. Table 7 is the summary statistics from the model.

Table 7: Model Summary

Model summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		Durbin-Watson
					R Square Change	F Change	
1	0.656[a]	0.430	0.380	3.44172	0.430	8.605	1.286

a. Predictors: (Constant), GDP, Size, ROA , Inflation, NPL

b. Dependent Variable: CAR

Source: Own work.

First three coefficients are R, R^2 and adjusted R^2. These coefficients of determination should give us goodness of fit, of the regression analysis and the correlation between them.

Besides coefficient of R 0.656 which is high enough and indicates a good level of prediction, the more accurate R^2 is 0.430, showing that, Size, NPL, ROA, inflation and GDP explain 43 % of the variation of CAR in the Slovenian banking system. Adjusted R^2 helps the model with the overestimation, since the sample size is not that large. To check the autocorrelation between two observations a Durbin-Watson test is used, testing for serial correlations between errors. This shows us coefficient of 1.286. The test values can vary between 0 and 4, with value of 2 meaning that the residuals are uncorrelated. Since a conservative rule of thumb is that Durbin-Watson statistics values above 3 and less than 1 should be cause for concern, we can conclude that there is positive serial correlation between residuals. The indicator of F-statistics is 8.605 with, confirms that regression is significant overall and rejects the null hypothesis that all coefficients are simultaneously zero.

Table 8: Effects of Individual Independents

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Correlations	
	B	Std. Error				Tolerance	VIF
(Constant)	10.801	4.239		2.548	.014		(Constant)
Size	.408	.546	.079	.747	.458	.893	1.120
NPL	.109	.041	.328	2.626	.011	.641	1.560
ROA	.388	.182	.241	2.129	.038	.779	1.284
Inflation	-1.054	.278	-.418	-3.788	.000	.823	1.216
GDP	.359	.133	.285	2.707	.009	.900	1.111

Source: Own work.

Final results come from table 8 which tells us the final collinearity, influence and coefficient interpretation. Beta coefficients is used for the relation between dependent and independent variables, combined with the significance level that should be 0.05 or below in order to be considered as statistically significant and the null hypothesis is rejected for each of the variables. The unstandardized coefficients show the change in the dependent variable with other independent variable, all other variables being constant, while the standardized beta coefficients tells us the strength and relationship between the dependent and independent variable.

A beta coefficient for Size has a negative significance level and do not have any impact on the dependent variable CAR. On the other hand NPL has significant and positive relationship with CAR (if NPL increases by 1 % point, CAR will increase by 0.109 %), ROA as a performance coefficients has positive significance level and relationship with CAR (if ROA increases by 1 % point, CAR will increase by 0.388 %).

The other group of variables has high significance results, where Inflation has a negative relationship with CAR (if inflation increases by 1 % point, CAR will decrease by -1.054 %), while GDP has a positive one (if GDP increases by 1 % point, CAR will increase by 0.359 %). Collinearity statistics is another way of identifying multicollinearity. Variance interest factor (hereinafter: VIF), should indicate whether a predictor has strong linear relationship with other predictors. Basic rule of thumb is VIF to be below 10 and tolerance level above 0.1. Results suggest that all the variables have VIF below 10 and tolerance level above 0.1, indicating no multicollinearity problem whatsoever.

CONLCUSION

The main objective of this paper is to investigate empirically the determinants of CAR in nine commercial Slovenian banks. This study used secondary data from different sources for sample banks. Time study period was eight years, from 2008 to 2015 and panel data regression is used in this study and analyses relationships between bank specific variables: Size of the Bank, NPL ratio, for the profitability ROA, and the macroeconomic variables: inflation rate and GDP. Among many, there are many variables and factors that can influence CAR (external and internal). Because of multicollinearity and outliers difficulties in the regression results, some of the variables were reduced and these factors were chosen for the final regression analysis to empirically investigate determinants of CAR as dependent variable in Slovenian commercial banks.

According to the research capital requirements play crucial role in maintaining financial stability in the banking sector, macroeconomic environment and ensure that entities can be confident in their banking system. The importance of CAR was mainly reveled when the global financial crisis has started, with banks struggling to maintain their capital requirements and failing to be consistent with their internal capital targets and control banks' overall risk profile. Slovenian banking system has been through serious changes, especially in the capital requirement segment. the regulators adjusted the risk-based rules by allowing a subset of banks to use internal valuation methods to determine the appropriate capital-asset ratio in light of the credit risk of their loans, but did not intend to strengthen them at the beginning leading to the financial crisis. Only after measures have been applied and regulatory pressure took place, banks started to behave more responsible.

This as well answers the first question that banks even though majority of them can be repulsive and insecure at the beginning, with time they adapt to the new requirements. In the case with Slovenian banking system, history has proven that after the establishments of BAMC, its influence and recapitulation processes, banks are more careful with the risks and investments, while they are accumulating sufficient regulatory capital step by step. These changes are easily noticeable since at the beginning of the global financial crisis CAR in Slovenia was 11.5 % and after all the restructuring, regulatory pressure and

adaptation, in 2016 CAR was 19.1 %. This can answer the second research question, that even though regulatory pressure was high during the restructure period, it induced Slovenian banks to increase their capital and with that ensure to maintain low risk profile.

Some recommendations based on my findings would be a proactive engagement of the risk management to the imposed recommendation by the government and Basel committee. One of the key segments that should be addressed to and contributed to the development of the crisis in Slovenian commercial banks was the rapid unbalanced growth and most importantly the excessive debt, that results confirmed this factor as significant as well. Additionally, since the results suggested that performance factors have significant influence as recommendation, more controlled measures and stressed tests to be applied on short periods in order to ensure low level of liquidity and solvency risk.

The study shows that under the multiple regression model, variables NPL, ROA, inflation and GDP have positive and significant relation to CAR, while size of the banks has a negative significance level and do not have any impact on CAR. This in addition answers the third research question and can be concluded that CAR is influenced by both macroeconomic and bank-specific variables, suggesting that in determining what factors mostly influence the capital requirements, both types of factors should be included in the analysis and research.

The general conclusion in this research suggests that, besides the Basel committee recommendations and regulations, one of the largest banks have failed to maintain their liquidity and capital requirements. This failure has left certain legacy for the next decade to come with a recommendation for higher capital requirements criteria, stressed tests to be mandatory and to be executed on shorter periods. More regulatory bodies imposed by the government can be established, that will control and enforce the recommendations, support new regulatory policies and cooperate closely to Basel committee on any future pillar upgrades establishing new capital buffers and suggest solutions to prevent financial distortions.

Finally, recommendations for future researches can be implementing even more factors, both macroeconomic and bank-specific, since research suggests that both can influence capital requirements. To use different statistical models and compare if the models suggest same influence level by variables, if possible larger sample of data to be used for more accurate results with larger set of variables, moreover to extend time period of analysis and to compare separately the major changes in the pre-crisis and post-crisis period. This can add substantial data to other researches in determining the variables of CAR. It can give broader picture to the regulatory policy makers and regulatory bodies on what categories of risks to focus for better financial stability and raise awareness, which will enhance banks competitiveness.

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APPENDICES

Appendix 1: Povzetek (Summary in Slovene language)

Regulacija finančnih trgov je postala ena izmed najpomembnejših in obravnavanih tem v zadnjih letih. Glavni namen regulacije bank je stabilizirati bančni sektor in zagotoviti, da bodo banke hranile dovolj kapitala za tveganja, ki jih sprejemajo, s čimer bodo ustvarile stabilno gospodarsko okolje, v katerem bodo podjetja imela večje zaupanje v bančni sistem. Ključna zahteva za vsako banko ali finančno institucijo je ustrezen in zadosten kapital, da se zagotovi ravnovesje med razpoložljivimi sredstvi in tveganji.

Kljub temu, da je Baselski odbor za bančni nadzor (BCBS) zasnoval kompleksna pravila o tem, kolikšen naj bi ta zadosten kapital bil, mnoge velike banke med finančno krizo leta 2008 ne le, da niso izpolnjevale teh standardov, ampak so nekatere celo prijavile stečaj in večino jih je morala dokapitalizirati država.

Tudi slovenski bančni sistem je bil del tega procesa, zlasti v času finančne krize, ko je bila večina domačih bank v bančnem sistemu zaradi velikega števila slabih bančnih posojil (NLP), slabega upravljanja s tveganji, okorelega nadzora in slabega izvajanja regulatornih politik v zelo slabem stanju. Vse to je privedlo do vprašanja kapitalske ustreznosti in likvidnosti.

Nekateri ključni segmenti, ki so prispevali k razvoju bančne krize v Sloveniji so bili: hitra in neuravnotežena rast pred krizo, nenadzorovani prekomerni dolgovi nefinančnih družb, model privatizacije (financiran z zadolževanjem) in kopičenje slabih posojil med krizo.

Glavni cilj magistrske naloge je, z analizo dejavnikov in ovir, ki v največji meri vplivajo na CAR v komercialnih bankah v Sloveniji, doseči boljše razumevanje slovenskega bančnega sistema, obvladovanja tveganj in kapitalskih zahtev v bančništvu.

Namen tega prispevka je empirično raziskati in prikazati glavne spremenljivke CAR v petih komercialnih slovenskih bankah. Pri raziskavi so za vzorčne banke uporabljeni sekundarni podatki iz različnih virov.Študija se je izvajala v obdobju 8-ih let, in sicer od leta 2008 do leta 2015. Uporabljena je panelna podatkovna regresija in analiza razmerij med bančno-specifičnimi spremenljivkami: velikost banke, NPL, donosnost ROA, ter makroekonomskimi spremenljivkami: rast BDP-ja, javni dolg kot delež BDP in inflacije. Na CAR vpliva veliko spremenljivk in dejavnikov, tako zunanjih kot tudi notranjih. Zaradi multikolinearnosti in težave v regresijskih rezultatih so bile za končno regresijsko analizo za empirično raziskovanje determinant CAR v slovenskih poslovnih bankah izbrane kot odvisne le zgoraj navedene spremenljivke.

Obstaja še veliko spremenljivk in dejavnikov, ki lahko vplivajo na CAR (zunanji in notranji). Zgoraj navedeni dejavniki so bili izbrani za naše odvisne spremenljivke za raziskovanje empiričnih dejavnikov CAR v slovenskih poslovnih bankah.

Kapitalske zahteve imajo ključno vlogo pri ohranjanju finančne stabilnosti v bančnem sektorju, makroekonomskem okolju in zagotavljajo zaupanje v bančni sistem. Slovenski

bančni sistem je šel skozi resne spremembe, zlasti v segmentu kapitalskih zahtev in šele po uvedbi določenih ukrepov in regulacijskem pritisku, so banke začele delovati bolj odgovorno.

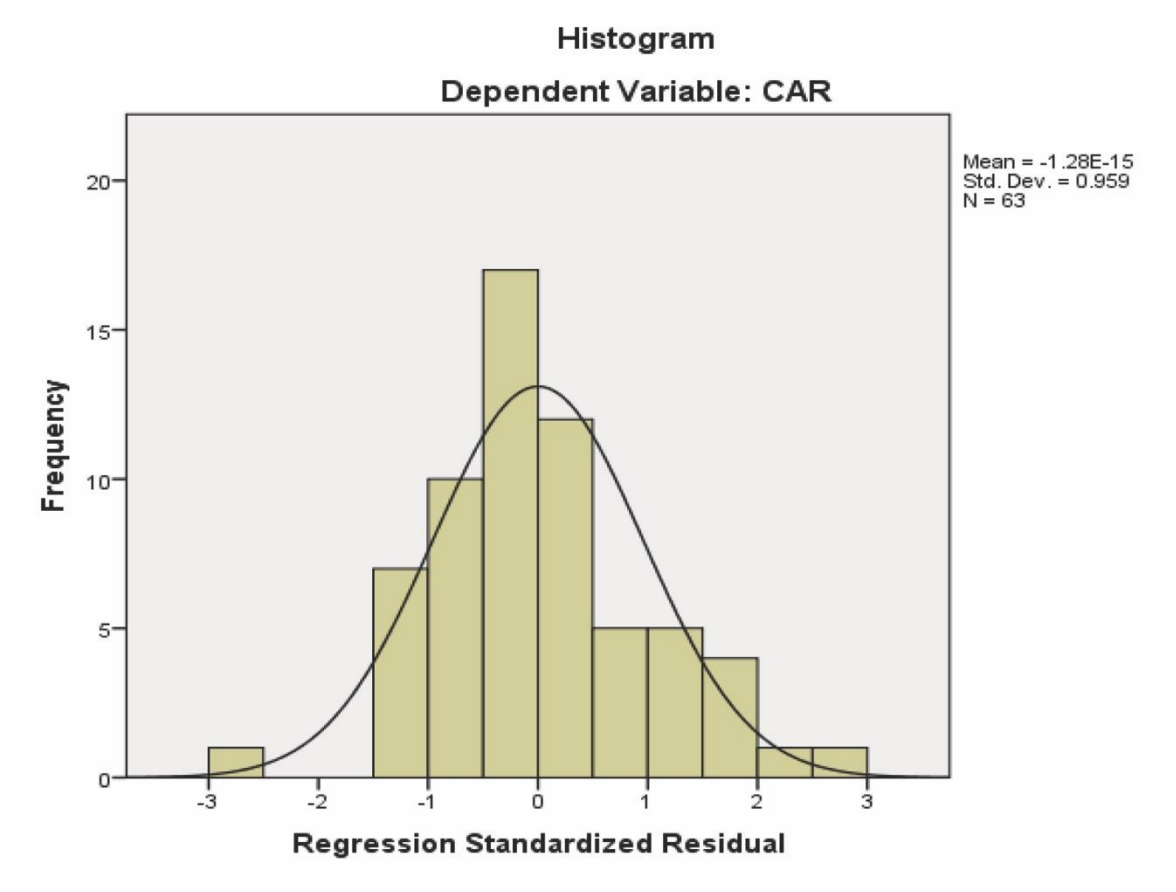
Čeprav so banke na začetku po večini odklonilne in negotove do novih zahtev, jih sčasoma sprejmejo. V primeru slovenskega bančnega sistema se je pokazalo, da so banke po vzpostavitvi BAMC-ja, njenega vpliva in rekapitulacijskih procesov postale bolj previdne s tveganji in naložbami, hkrati pa korak za korakom ustvarjajo akumulacijo zadostnega regulativnega kapitala.

Te spremembe je lahko zaznati, saj je v začetku svetovne finančne krize CAR v Sloveniji znašal 11,5% in šele po vseh prestrukturiranjih, regulacijskem pritisku in prilagoditvah je CAR leta 2016 znašal 19,1%. Podatki ponazarjajo, da kljub temu, da je bil regulacijski pritisk v obdobju prestrukturiranja visok, je slovenske banke dodatno spodbudil, da povečajo svoj kapital in s tem zagotovijo vzdrževanje profilov nizkega tveganja.

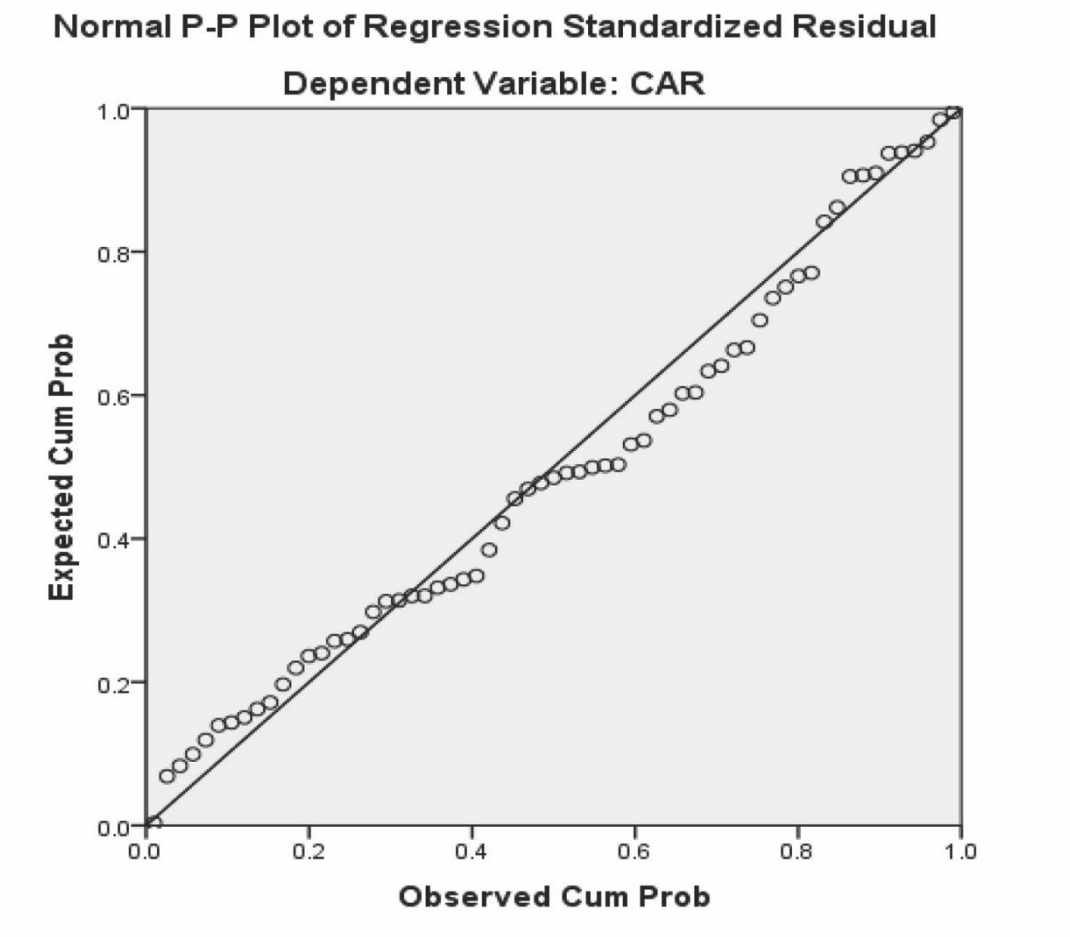
Iz raziskave je razvidno, da imajo regresijske spremenljivke NPL, ROA, javni dolg kot % BDP in inflacije pomembno povezavo s CAR in nanj pozitivno vplivajo, medtem ko velikost bank nima nobenega vpliva na CAR. S tem lahko pridemo tudi do ugotovitve, da na CAR vplivajo tako makroekonomske kot bančno-specifične spremenljivke. Tako je potrebno pri določanju, kateri faktor najbolj vpliva na kapitalske zahteve, vključiti v raziskave in analize obe vrsti dejavnikov.

Priporočilo, ki temelji na naših ugotovitvah, je proaktivno vključevanje obvladovanja tveganj glede na smernice vlade in baselskega odbora. Rezultati ponazarjajo, da imajo dejavniki uspešnosti največji vpliv. Z namenom, da se zagotovi nizka stopnja likvidnosti in tveganje plačilne sposobnosti je potrebno vpeljati več nadzorovalnih ukrepov stresnih testov. Vlada lahko ustanovi različne regulacijske organe, ki bodo kontrolirali in uveljavili priporočila. Podpre lahko nova regulacijska določila in predpise ter tesno sodeluje z baselskim odborom, s katerimi bi nadgradili stanje, vzpostavili nove kapitalske rezerve in poiskali rešitve za preprečevanje finančnih kriz ali poslabšanje finančnega stanja.

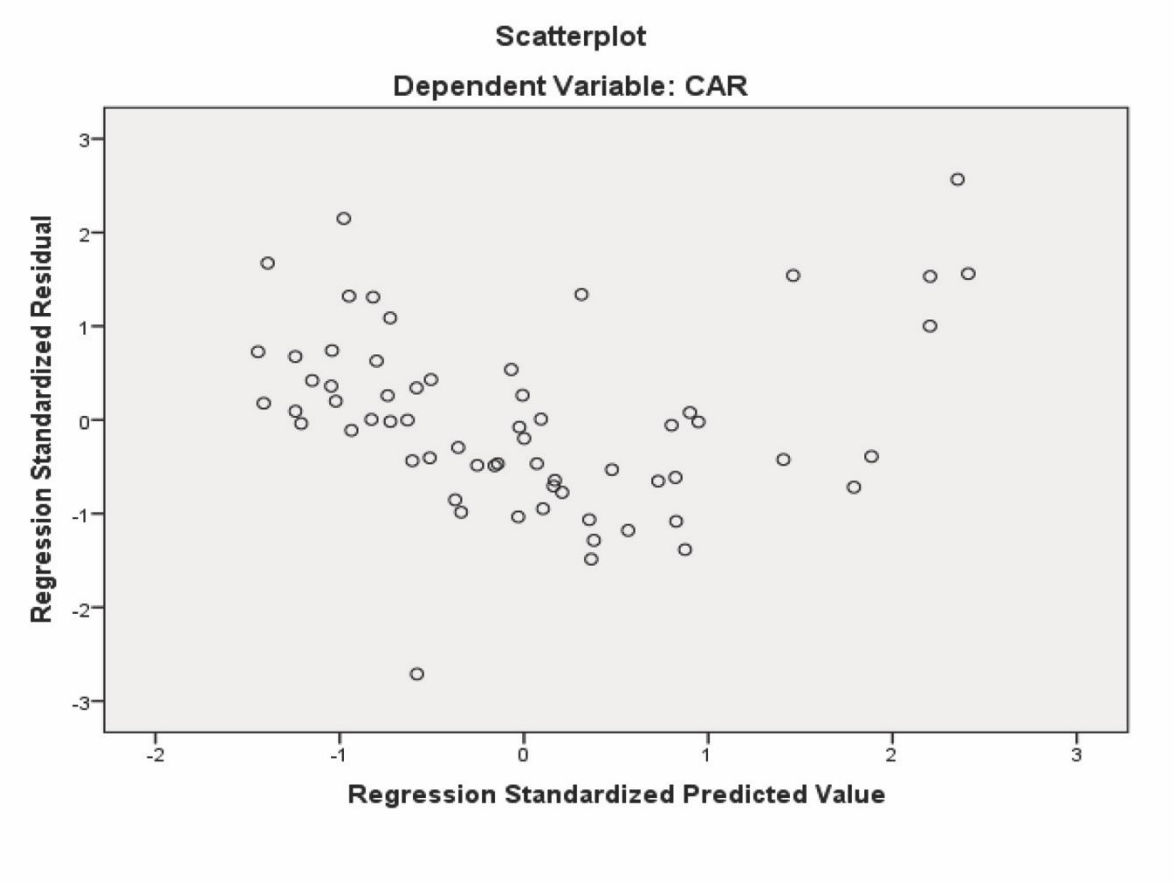
Appendix 2*:* Histogram, Normal P-P Plot of Regression Standardized Residual, Scatterplot



Source: Own work.



Source: Own work.



Source: Own work.