Petra Popek Biškupec, Zdravko Lešić
Visoka škola za poslovanje i upravljanje "Baltazar Adam Krčelić"
Poslovna ekonomija i financije, Croatia
E-mail: pbiskupec@vspu.hr

IMPACT OF BAD LOANS ON THE CAPITAL ADEQUACY OF BANKS IN CROATIA

JEL classification: G01, G21

Abstract
Despite of the economic and financial crisis, which was caused by the banking crisis, the condition of banks in Croatia is very good. According to the indicators, the banking system in Croatia is among the most stable in Europe. If the indicators of stability and liquidity of the Croatian banks are very good, the question is why there are economic problems of the real sector in such system. Analysis of bank balance sheet, the quality of their assets and claims, leads to other findings that speak of the apparent stability of the financial system. The problem is that the part of the assets of Croatian banks is contaminated and refers to the bad loans. Bank stability that results from the capital adequacy ratio is statistically very good, but high capital adequacy ratio of Croatian banks actually has no real cover. The research results confirm that high capital adequacy ratio is unrealistic and that refers to inadequate valorisation of assets of the commercial banks.

Keywords: capital adequacy, bank loans, financial stability

1.   INTRODUCTION

Financial stability and high capital ratio have induced analytical research of relationship between financial and real system in which banks operate. Due to the excellent indicators of stability and liquidity of the Croatian banks, there is a question of economic and financial problems of the real sector in such system. High capital ratio shows that banks have enough funds and can follow the requirements of the real sector in the way that they encourage the production and thus contribute to a faster recovery of the entire Croatian economy. Croatian banks' capital adequacy is the largest in Europe and is over 20% (Banks bulletin no.25, pp. 40). In general, "banks in relatively more developed economies enjoy significantly more stable funding" (Chalermchatvichien et al, 2011, 6). But, further analysis of the balance sheet of banks, the quality of their assets, leads to other findings that speak of the apparent stability of the financial system. The capital adequacy ratio is calculated as the ratio of total claims and own funds. When these items are placed in the ratio, calculation is really like that, but the problem is that the part of the assets of Croatian banks is contaminated and refers to bad loans. Such placements should be thrown out of the assets and according to that amount, banks should decrease own funds. In this case, the capital adequacy ratio of Croatian banks is not 20% but would be decreased to about 5-6%. The second problem is that the calculation of capital adequacy is made according to the Basel II accord, and Basel II doesn't include currency-induced credit risk. Due to the Basel II methodology, assets of Croatian banks that are influenced by currency-induced risks are treated as less risked then they are in reality (Banks bulletin no.25). The aim of this paper is to analyze the stability of the financial system in Croatia and to show that it is not stable as it seems. Bank stability that results from the capital adequacy ratio is statistically very good, but a high capital adequacy ratio of Croatian banks actually has no real cover. The research results will confirm that the unrealistic view of capital adequacy results from inadequate valorisation of commercial banks assets and changes in the methodology of calculating capital adequacy, which was adapted to Basel II accord.

2. THE DEFINITION OF CAPITAL ADEQUACY IN CROATIAN BANKS

Capital adequacy has the most important role in "long-term financing and solvency position" of banking system (Barrios, Blanco, 2003, pp.1935). For the last few years, before the crisis escalated, it was not so important that the amount of capital in commercial banks had small share in banks' resources. Capital serves to keep the bank from business failure and to increase the profit to the owners (Mishkin, 2007). If the claims and liabilities were managed so that the liquidity standards were satisfied, there was no threat of losses or bank bankruptcies. But after huge shocks in financial and banking sectors have occurred and made impact to the economy in the whole world, the big issue of capital adequacy has came out as the most important question for the bank managers and low regulators. According to the Basel II accord, minimum coefficient of capital adequacy is 8% (Jakovčević, 2003). Figure 1 presents the structure of liabilities of Croatian banks.
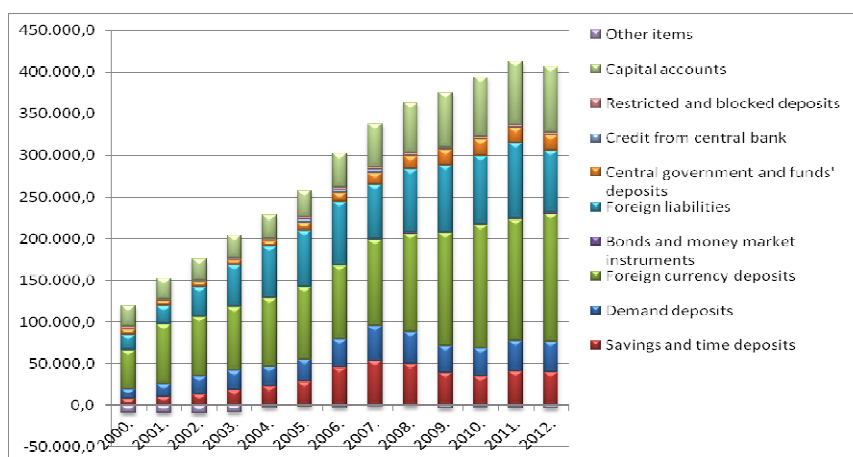

Figure 1: The liabilities of Croatian banks

Source: author according to the Bulletin – Statistical survey, D1: Credit institutions' accounts, Croatian National Bank, no.19, March 2013.

According to the Figure 1 it could be noticed that the level of capital in Croatian banks is very high. The capital adequacy in 2012 amounted 20,17% (Banks bulletin 25, pp. 40) and it was among the highest in Europe what could be seen in the Figure 2.
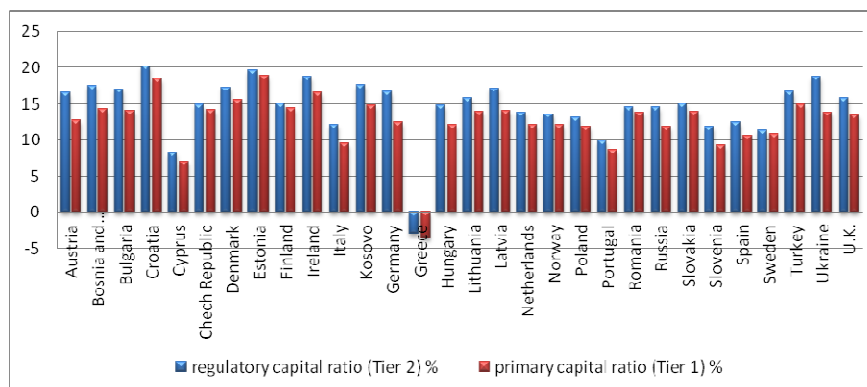

Figure 2: Capital adequacy ratio among some countries

Notes: The data for Figure 2 refer to periods 2011/Q4, 2012/Q1 and 2012/Q2. Different countries have difference of a few months in their report release.

Source: author according to the HUB Analize (2012). Povratak negativnih trendova uz iznimno visoku kapitalizaciju, 39/40, pp.3

Banks in Croatia have the best capital adequacy ratio, both Tier 1 and Tier 2. Tier 1 capital "consist of the sum of the following elements: common shares issued by the bank that meet criteria for classification as common shares for regulatory purposes, stock surplus resulting from the issue of instruments included Common Equity Tier 1, retained earnings, accumulated other comprehensive income and other disclosed reserves, common shares issued by consolidated subsidiaries of the bank and held by third parties that meet criteria for inclusion in Common Equity Tier 1 capital, and regulatory adjustments applied in the calculation of Common Equity Tier 1" (Basel Committee on Banking Supervision, 2010, 13). Tier 2 capital "consists of the sum of following elements: instruments issued by the bank that meet the criteria for inclusion in Tier 2, stock surplus, instruments issued by consolidated subsidiaries of the bank and held by third parties,

certain loan loss provisions, regulatory adjustments applied in the calculation of Tier 2 Capital" (Basel Committee on Banking Supervision, 2010, 17). Very good capital indicators are result of strict policy of Croatian National Bank, but also these figures result from changes in methodology that were applied in year 2010 (Banks Bulletin no.25).
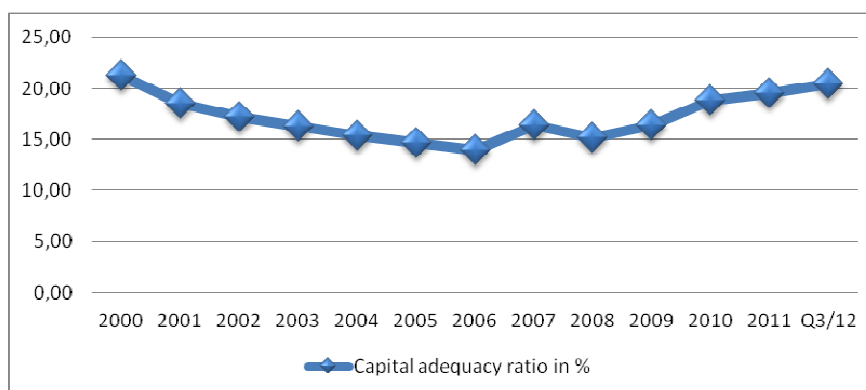

Figure 3: Capital adequacy ratio in Croatian banks

Source: author according to the Regular publications – 1st quarter 2013, Croatian National Bank,
http://www.hnb.hr/publikac/epublikac.htm

Figure 3 shows that the capital adequacy ratio has been kept on high level for very long period. Strict monetary policy on one hand and recent changes in methodology of calculation on the other hand, have contributed that the capital adequacy of Croatian banks is on very high level. Concerning the different methods of calculation, Kretzschmar, McNeil and Kirchner (2010) provided review of integrated models of capital adequacy and showed that both modular and fully-integrated approaches, can give different risk capital figure, although both methods are permissible under Basel II. Croatian national bank asks for minimum of 12% capital adequacy ratio, although there is applied Basel II methodology that requires 8% capital adequacy ratio. As already banks must kept capital adequacy on higher level, changes in methodology in 2010 and decrease in the average credit risk weighting, have increased

capital adequacy ratio of Croatian banks (Banks bulletin no.25,). Statistical increase of capital adequacy ratio can affect less risk averse banks and encourage them to more risk credit activity (Gehrig, 1995) and in reality statistically changed capital ratio has no real cover.

3. THE STRUCTURE OF ASSETS IN CROATIAN BANKS

The measurement of capital adequacy is an issue of monetary strategies and policies of financial sectors. It depends of monetary and administrative decisions of regulators and bank management. Capital adequacy ratio is directly connected to the quality of assets. On the other side, the structure of bank assets depends of the awareness of bank management of risk and according to that assigning a corresponding weight to the bank assets. The problem with risk awareness result from "conflicts of interest between debt holders and equity holders, and moral hazard arising from the combination of limited liability and government guarantees", in the way that "financial institutions have a natural tendency to accumulate assets that are to risky and to hold too little capital" (Cecchetti, Kohler, 2012, 2). Observing assets of Croatian Banks, it could be easily mislead to wrong conclusion. The majority of claims are in sector of householding mostly financing buying houses and apartments. These loans are covered by collateral, and for banks there is very low credit risk. From that point of view, banks do not accumulate risky assets and they have enough capital to ensure solvent business. To understand the real situation and structure of banks' assets, it should observe the structure of portfolio.

3.1. The problem of diversification in banks' portfolio

Since 2003, banks in Croatia have changed their business strategies, and in 2003 households financing outgrew enterprises financing, what shows Figure 4. This was period of huge escalation in construction sector and housing.
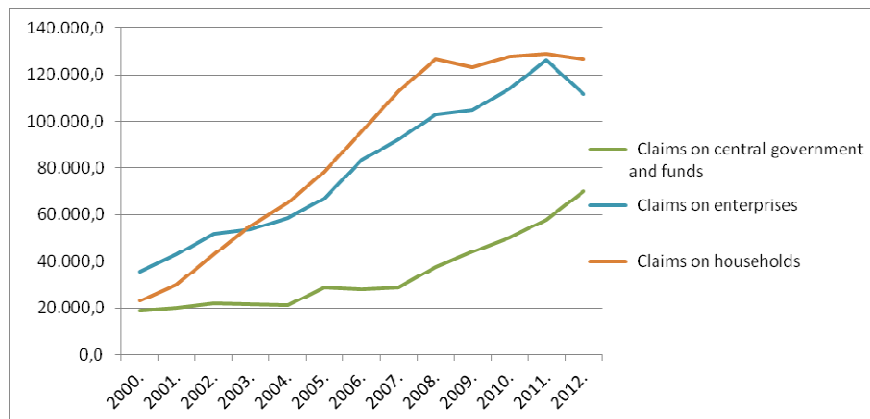
Figure 4: Structure of assets of Croatian banks according to
households, enterprises and central government

*Source: author according to the Regular publications – 1st quarter
2013,   Croatian   National   Bank,
http://www.hnb.hr/publikac/epublikac.htm*

Figure 4 shows the range of huge credit expansion to
households, what has been connected to houses and apartments
construction. In first step banks had been financing constructors for
building and in second step households for buying apartments and
houses. In that way, banks could have earned from both sides, but
also have exposed themselves to the bigger risk, because they have
tied their liquidity in long-term only in one sector. Later, in few
years, after the crisis escalated, the sector of construction and sale
of apartments rapidly failed and banks in Croatia could suffer big
losses if the market wouldn't recover quickly.

Although the monetary policy had been very strict
according to the percentage of capital adequacy ratio, it couldn't
affect the business strategy of banks management. The main reason
for doubting in the efficiency of capital adequacy requirement is its
static effects (Blum, 1999). Blum (1999) in his paper shows that
regulators are interested only in reducing insolvency risk of banks
and in the future that can cause reduction of bank's profit and
increase the possibility of insolvency of the bank.

According to the increase of credit risk, over the years, there was increase of partly and fully irrecoverable loans. Figure 5 shows the trend of increase of claims in group B and group C, the most risky groups, and decrease claims in group A, the non-risk group.
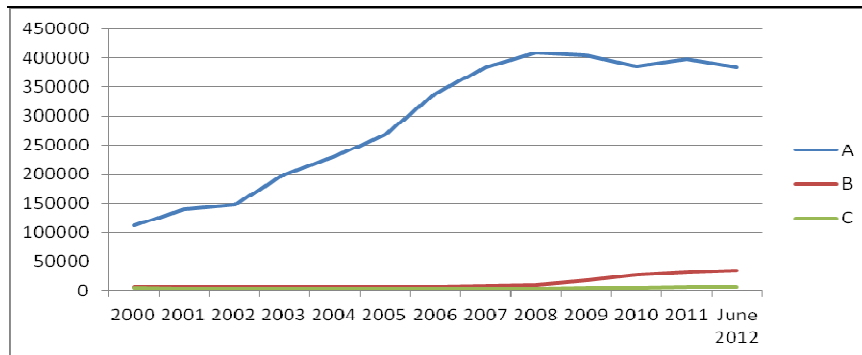

Figure 5: Classification of claims according to the risk groups

Source: Author according to the Bank bulletin, several numbers, available at http://www.hnb.hr/publikac/hpublikac.htm, [accsesed 24.04.2013.]

3.2. The impact of currency induced risk on assets and claims in Croatian banks

Besides the problem of bad diversification of banks assets, the problem that reflects to the capital adequacy is the currency induced credit risk. As already mentioned, Basel II doesn't include currency risk. The problem in Croatian banks is that the most of household's loans were placed with foreign currency clause. Theoretically, that puts the claims and assets of Croatian banks on higher risk level then it was calculated according to the Basel II methodology. But, although the HRK is the lawful currency, the most of deposits are in EUR. As the volume and characteristics of

deposits, capital and other resources determine the volume and characteristics of banks' assets (Lovrinović, Ivanov, 2009), according to the bank's policy, it is normal that the loans are issued in the foreign currency EUR also.

As it could be noticed from Figure 6 most of deposits are in foreign currency, specifically in EUR.
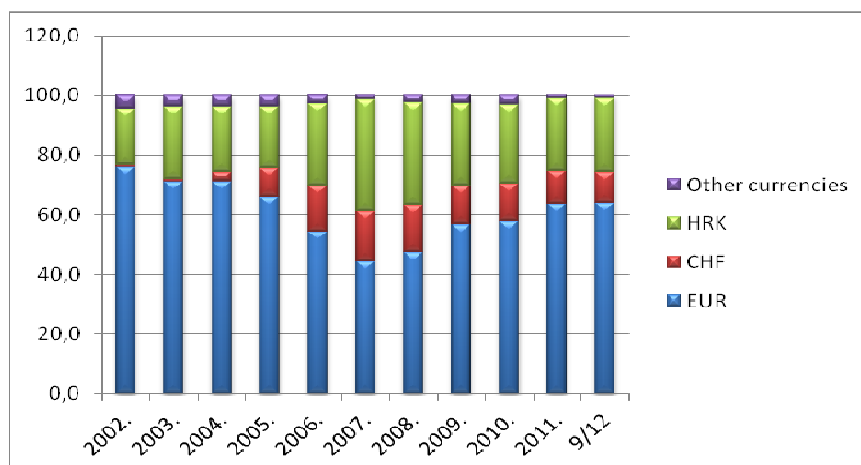

Figure 6: Currency structure of deposits in Croatian banks

Notes: Loans in foreign currency include loans denominated in that currency and loans indexed to that currency.

Source: Author according to the Croatian national bank, Regular publications – 1st quarter 2013, Currency structure of banks' credits to private sector http://www.hnb.hr/publikac/epublikac.htm, [accessed 04.05.2013.]

Figure 7 shows currency structure of banks claims which shows that almost 160.000 mil HRK are placed as loans indexed to foreign currency.
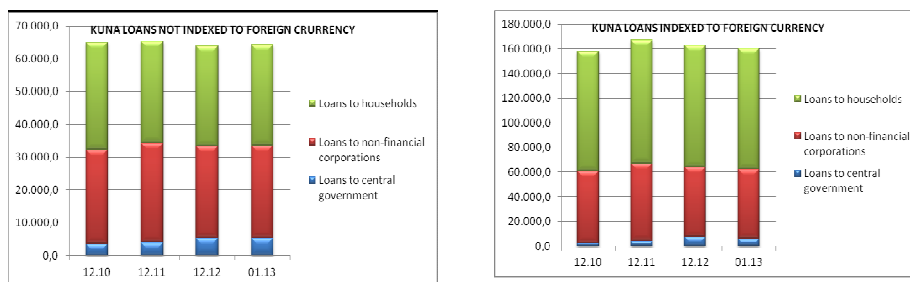
Figure 7: Kuna loans indexed and not indexed in foreign currency

Source: Author according to the Bulletin – Statistical survey, D5a: Distribution of credit institutions' Kuna loans by domestic institutional sectors, no.191, http://www.hnb.hr/publikac/epublikac.htm [accessed 04.05.2013.]
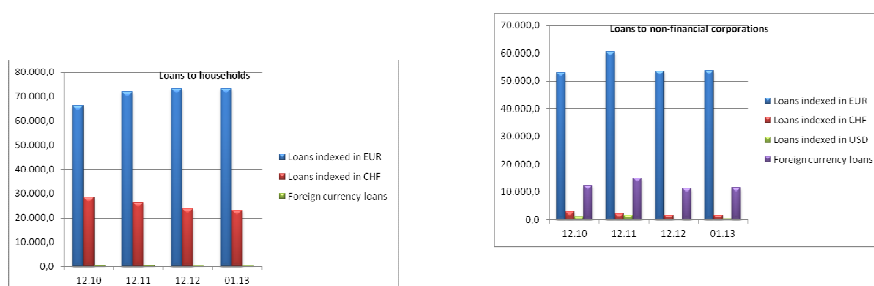

Figure 8: Distribution of credit by currency composition

Source: Author according to the Bulletin – Statistical survey, Table D5c: Distribution of credit institutions' loans to households by purpose and currency composition and Table D5d: Distribution of credit institutions' loans to non-financial corporations by purpose and currency composition, no.191, http://www.hnb.hr/publikac/epublikac.htm, [accessed 04.05.2013.]

Comparison of Figure 7 and Figure 8 shows that, both deposits and claims are in the same currency; in EUR. That means that for banks, there is very low level of currency induced credit risk because liabilities and claims are mostly in same currency. But on the other side, the households, that are mostly users of loans, receive their income in domestic currency HRK and this puts them in very high level of risk of currency changes.

4.   THE ANALYSIS CAPITAL ADEQUACY OF CROATIAN BANKS

The analysis is made by using data provided by Croatian National Bank. The research is based on financial reports that provide Croatian National Bank, published in 2012 and 2013 year. The analysis refers on throwing out the bad assets of Croatian banks and calculating the real amount of capital adequacy ratio (CAR') according to the data gathered from Banks bulletin number 25.

The risk analysis is made using Value-at-Risk (VaR) methodology and correlation matrix among borrowers. The data for VaR analysis are gathered form Croatian National Bank, Bulletin-Statistical Survey; Table D5: Distribution of credit institutions' loans by domestic institutional sectors.

4.1.   The analysis of hypothetic scenario: capital adequacy with real valorisation of banks' assets

The own funds (OF) of Croatian banks amount 55.757,5 mil HRK what represents capital adequacy ratio (CAR) of 20,17%. Statutory capital adequacy ratio in Croatia is 12%. Capital requirements (CR) for capital adequacy ratio of 12% are 33.174,5 mil HRK, what means that the achieved capital adequacy is 22.583,0 mil kn (8,17%) more than regulator requires.

CAR   =   f   (OF)   (1)

CAR = f (55.757,5 mil) = 20,17%

But, the problem is that the bad loans (BL), grouped in B and C category of partly irrecoverable and fully irrecoverable loans have been increasing constantly, what was presented earlier in Figure 5. In June 2012 the partly and fully irrecoverable loans reached level of 41.771,3 mil HRK. Analyzing the report of profits and losses of Croatian banks it could be seen that for potential risk of losses (PL) was set aside only 1.775,5 mil HRK, what means that there are 39.995,8 mil HRK of bad loans left uncovered (UBL).

UBL   =   BL   –   PL   (2)

BL = 41.771,3 mil HRK

PL = 1.775,5 mil HRK

UBL = 41.771,3 mil HRK – 1.775,5 mil HRK = 39.995,8 mil HRK

If the banks would cover the potential losses of risky assets by their capital, then they should decrease the own funds by 39.995,8 mil HRK. This leads to different situation of capital adequacy ratio. The own funds would be decreased and it would amount 15.761,7 mil HRK.

OF' = OF – UBL (3)

OF' = 55.757,5 mil HRK – 39.995,8 mil HRK = 15.761,7 mil HRK

If inversed calculation is applied, then it is easy to calculate the new capital adequacy ratio.

CAR (CR=33.174,5 mil) = 12% (4)

1 p.p.= 33.174,5 mil HRK / 12% = 2.764,5 mil HRK

CAR' = OF' / 2.764,5 mil HRK= 15.761,7 mil HRK / 2.764,5 mil HRK (5)

CAR' = 5,7%

According to the data, the demanded regulatory rate of 12% refers to 33.174,5 mil HRK of capital requirements. That means the one percentage point refers to 2.764.5 mil HRK. When 15.761,7 mil HRK of new own funds are divided by 2.764,5 mil, the new capital adequacy ratio amounts 5,7%.

The new capital adequacy ratio should not be considered as the worst prediction, but bank management and monetary regulator should be aware of a threat that exists in economy of Croatia. Undercapitalized bank system is a problem for whole economy because there are many examples of spill over effects that could happened if banks do not operate well (Roger, Vitek, 2012).

4.2. Risk analysis using Value-at-Risk methodology and correlation matrix

One of the basic issue in banks is efficient risk management. Diversification of portfolio is the most common way of reduction level of risk. Value-at-Risk (VaR) methodology calculates the worst expected loss over a given period. In this paper, the portfolio refers to loans to central government, loans to local government, loans to non-financial corporations and loans to households over period from January 2000 to April 2013 on monthly basis. The loans are separated on the ones in Kuna (kn) and in foreign currency (f/c).

The total portfolio value of a given assets amounts 279.157,20 million HRK. The specification of assets' volatility and individual VaRs are given in table 1.

Table 1

Volatility and individual VaR

	volatility (st dev)	position	VaR individual
central gov in kn	16,75%	11.634,6	3205,48
local gov in kn	5,20%	3.374,2	288,60
non-fin corp in kn	1,54%	85.758,4	2172,32
households in kn	1,32%	129.147,6	2804,06
central gov in f/c	14,28%	23.483,8	5515,99
local gov in f/c	21,94%	0,2	0,07
non-fin corp in f/c	3,59%	25.470,1	1504,02
households f/c	6,74%	288,3	31,96

Source: Author's calculation

Analytical VaR estimation for total portfolio provides monthly VaR of 7.223,00 million HRK with a confidence level of 95%. This calculation means that there is 5% chance for losses bigger than 7.223,00 million HRK in any given month of a defined holding period under normal market conditions.

Table 2

Correlation matrix among borrowers

CORRELATION	CENTRAL GOV in kn	LOCAL GOV in kn	NON-FIN CORPORATIONS in kn	HOUSEHOLDS in kn	CENTRAL GOV in f/c	LOCAL GOV in f/c	NON-FIN CORPORATIONS in f/c	HOUSEHOLDS in f/c
CENTRAL GOV in kn	1	0,168993281	-0,089855842	0,04481561	-0,260031627	0,105370256	0,010006387	-0,057180773
LOCAL GOV in kn	0,168993281	1	-0,132649577	0,046990855	-0,160615559	0,037169989	0,009015294	0,073663612
NON-FIN CORPORATIONS in kn	-0,089855842	-0,132649577	1	0,496711283	-0,060461854	-0,048202527	-0,08618732	-0,02631391
HOUSEHOLDS in kn	0,04481561	0,046990855	0,496711283	1	0,071243457	0,179107756	0,034244773	0,219521118
CENTRAL GOV in f/c	-0,260031627	-0,160615559	-0,060461854	0,071243457	1	-0,034116981	-0,013996854	0,046520405
LOCAL GOV in f/c	0,105370256	0,037169989	-0,048202527	0,179107756	-0,034116981	1	0,222118713	0,187552099
NON-FIN CORPORATIONS in f/c	0,010006387	0,009015294	-0,08618732	0,034244773	-0,013996854	0,222118713	1	0,278802792
HOUSEHOLDS in f/c	-0,057180773	0,073663612	-0,02631391	0,219521118	0,046520405	0,187552099	0,278802792	1

Source: Author's calculation

The correlation of loans between sectors is low which indicates that there is diversification benefit of portfolio. Although, there could be indication of possible lack of diversification among households and non-financial corporations, because in this case the matrix shows the correlation of 0,4967 which is the highest among all borrowers.

5. CONCLUSIONS

Relationship between financial and real system in Croatia is not compliant, because banks do not enjoy such stability as there is presented in their financial reports. High capital adequacy ratio doesn't mean that banks in Croatia have enough funds and that they will or can follow the needs of real sector.

The situation in Croatia is not result of regulatory requirements. High capital adequacy ratio in Croatian banks could be considered as a result of administrative and methodological changes and not as a real capital level. Capital adequacy ratio of 20,17% has no real cover, because the risky loans and assets of Croatian banks exceed 40.000 mil HRK, and reserves for potential losses are less than 2.000 mil HRK. The huge gap between high level of partly and fully irrecoverable loans on one side and low reserves for potential losses of other side speaks about apparent stability of bank system in Croatia. Although the correlation among borrowers speaks about good diversification, except among households and non-financial corporations, the analytical VaR estimates quite big possible losses on monthly basis. The worst scenario of capital adequacy ratio of 5,7% could be avoid if the regulator would determine that for risky

claims there should be formed bigger reserves or it would be necessary recapitalization of banks and it that way it would be achieved required capital adequacy ratio.

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