INFLUENCE OF THE MACRO VARIABLES ON THE CREDIT RISK RATE AND TRANSPOSAL INTO BANKING CAPITAL AND JOB CUTS

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Abstract
Given the macro-economic evolution of the past 6-7 years and their impact in the credit portfolios of the financial institutions, an increased interest is shown regarding risk management and early warning systems. As we observed, the risk management represents an important item in the organization of the credit institutions and an increased supervision is made over the quality of the credit portfolios instead of the volumes.

The research paper offers a perspective for the quantification of credit risk over the Romanian banking system illustrated by the VAR model analysis and review. By analysing the results of the VAR model, it was observed that the most powerful influence is made by the exchange rate, but also an influence was detected from the interest rate and GDP.
The model presented has the scope to define the interactions between the quality of the credit portfolios and the macroeconomic environment from Romania. Having in view the complexity of the data aggregation and their availability, there were used 62 quarterly observations, the sample period being January 2001 - June 2016.

The influence of the credit risk in the banking capital and into the available jobs was quantified through a qualitative analysis performed at global level but also on the Romanian banking system.

Key words: *credit, risk, interest, capital, jobs.*
JEL classification: E44 - Financial Markets and the Macroeconomy

Summary
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Introduction

Given the macro-economic evolution of the past 6-7 years and their impact in the credit portfolios of the financial institutions, an increased interest is shown regarding risk management and early warning systems. The risk management will represent an important subject for the credit institutions and an increased supervision will be made over the quality of the credit portfolios instead of the volumes. In the 2005-08 years, the financial institutions assumed an aggressive growth policy of the market share, based on enabling an easily credit analysis system and products that encouraged the speculative transactions. Such examples can be underlined in the Romanian banking system, but not only.

The research aims to define a framework to uncover some macroeconomic influences over the credit risk rate/NPL. The paper addresses two main issues: the determinants of the credit risk rate and the influence of the economic environment performance.

To understand the impact of credit risk on the financial institutions capital, the paper analyses the macro-economic conditions through the following variables: gross domestic product, unemployment rate, net income, interest and exchange rate EUR/RON. The working methodology is based on statistical analysis and the interpretation of results. The variables considered were analysed using the VAR model, 62 observations from the period January 2001 - June 2016 being tested.

The approach on the Romanian market was used in this research because the economy is not in the Eurozone area, is an emergent economy depending on the external investments and the local market showed a good increase of loan volumes in the economic growth periods.

The empirical analysis aims to explain the influence to which the independent variables have on credit risk rate (dependent variable). Also, the research paper foresees obtaining a functional form for determining the future values that can be recorded for the credit risk rate. Credit risk rate was preferred instead of NPL rate (Non-Performing Loans) because the latter is calculated only starting with September 2009, and the computation method was changed over time.

1. Literature review

Methodological solutions were used for measuring the impact of macro-economic conditions over the reimbursement capacity of the debtors, which rely in multiplying the set of explanatory variables for the scoring model with aggregated indicators (Philip Bunn & Victoria Redwood (2003), *Company accounts based modelling of business failures and the implications for financial stability*, Bank of England working papers 210, Bank of

England). Also, the connection functions can be used for modelling the dynamics of some balance sheet items of the debtor through equations, including macro-economic variables (Philip Bunn & Victoria Redwood (2003), *Company's accounts based modelling of business failures and the implications for financial stability*, Bank of England working papers 210, Bank of England).

Regarding credit risk scorecards, the methodological solutions should be developed using multiple regressions with macroeconomic factors. In this context, the dependent variable is the NPL rate or the credit risk rate (Pain, D., 2003, The Provisioning Experience of the Major UK Banks: a Small Panel Investigation, Bank of England Working Paper; Hoggarth G., Whitley J. (2003), Assessing the strength of UK banks through macroeconomic stress tests, Financial Stability Review, Bank of England), the common econometric techniques used being the regressions and VAR models (Jorda O. (2005), *Estimation and inference of impulse responses by local projections*, American Economic Review 95(1); Saurina, J. G. Jiménez Zambrano (2006), *Credit cycles, credit risk, and prudential regulation*, International Journal of Central Banking, June pp. 65-98).

The GDP growth, the exchange rate appreciation, the interest income and the value of inter-bank loans are the variables that best explains the default rate in case of the African countries (Fofack H. (2005), *Nonperforming loans in sub-saharan Africa: causal analysis and macroeconomic implications*, World Bank Policy Research Working Paper No. 3769). A year later, Hu (2006) studied the relationship between the corporate governance and bad loans, and came to the result that there is an indirect correlation between them. The study performed by N. Klein, 2013 (*Non-Performing loans in CESEE: determinants and impact on macroeconomic performance*, International Monetary Fund Working Paper 13/72) analyses, during 1998-2011, the NPL in 16 countries located in Central and South Eastern Europe (CESS). His results showed that the level of bad loans can be determined both by macroeconomic conditions and those specific to the banking sector, although the latest were considered to have a relatively low explanatory power. While the default rate is impacted by macroeconomic conditions (GDP, unemployment and inflation growth), the analysis indicates that there are strong effects from the banking systems to the real economy, suggesting that the high rate of bad loans many central and eastern European countries are facing, have an indirect influence over the pace of the economic recovery.

The specific literature focused on explaining the influence of the macroeconomic performances on the credit risk and non-performing loans rate. A more detailed view of this topic was provided by the economists Dash and Kabra (Dash, Manoj K., and Gaurav Kabra, (2010), *The Determinants of Nonperforming Assets in Indian Commercial Banks: An Econometric Study*, Middle Eastern Finance and Economics, Vol. 7.)

Analysing the NPL divided by different types of loans (consumer, mortgages, corporate) for the 9th largest Greek banks, the study made by Louzis, Vouldis and Metaxas (Dimitrios P. Louzis & Aggelos T. Vouldis & Vasilios L. Metaxas (2010), *Macroeconomic and bank-specific determinants of non-performing loans in Greece: a comparative study of mortgage, business and consumer loan portfolios*, Working Papers 118, Bank of Greece) revealed that the indicator is explained by the management quality and macroeconomic fundamentals. Also, some other conclusions were related to the positive correlation between the NPL and the real lending rates, the un-efficient management and the higher proportion between operating expenses and incomes. The same results were also obtained by Espinosa and Prasad (Espinoza, R., and A. Prasad, (2010), *Nonperforming Loans in the GCC Banking Systems and their Macroeconomic Effects,* IMF Working Paper 10/224, Washington: International Monetary Fund) in a working paper referring to nonperforming loans and their macroeconomic effects. The literature that pertains best with the analysis from the paper is focused on explaining and predicting the credit risk rate at a macro level using the aggregate credit risk values. These values can refer to the total outstanding loans from the economy or only to specific types.

Michael Boss (Boss, Michael, *A Macroeconomic Credit Risk Model for Stress Testing the Austrian Credit Portfolio*, Financial Stability Report 4. OeNB.; Boss M., Fenz G., Pann J., Puhr C., Schneider M. And Ubl E. (2009), Modelling Credit Risk through the Austrian Business Cycle: An Update of the OeNB Model, Financial Stability Report 17, OeNB.) applies the methodological solution described above to model the sectorial dependencies of the credit risk rate in the Austrian economy, for exposures belonging to non-financial companies and also f to private individuals.

Previously, Arpa (2001) applied the regression model on the Austrian banking sector, showing that the total credit risk varies depending on the real GDP growth, the consumer price inflation and the real interest rates. Using a regression model, Shu (2002) conducted a study on the NPL in Hong Kong, stressing that an increased default rate can be explained by an increase in the nominal interest rates and in the number of bankruptcies, while a decreased interest rate is driven by the increased consumers price inflation, the economic growth and inflation generated from the real estate market prices. Considering Finland, Virolainen (Virolainen, K. (2004), *Macro Stress Testing with a Macroeconomic Credit Risk Model for Finland*, Bank of Finland, Discussion Papers, No.18) applies the dynamics models for credit risk by utilizing some macro-economic variables like: economic growth rate, interest rate for a tenor above 1 year, corporate indebtedness. Unlike the other research papers, the sensibility analyses performed for the credit portfolios granted to companies is divided in six types of activities.

Roberta Fiori and Simonetta Iannotti (Fiori, R., A. Foglia and S. Iannotti, (2007), E*stimating Macroeconomic Credit Risk and Sectoral Default Rate Correlations for the Italian Economy*, Working Paper, Bank of Italy) target the analysis of the impact in which the economic image of Italy affects the evolution of credit risk rate triggered by exposures of non-financial companies divided, in eight categories, by types of activity sector. The methodology for analysis is based on the approach used by Wilson (Wilson, T.C., (1998), *Portfolio Credit Risk*, FRBNY Economic Policy Review, Vol. 4, No. 3) and the further developments projected by Virolainen (Virolainen, K. (2004), *Macro Stress Testing with a Macroeconomic Credit Risk Model for Finland*, Bank of Finland, Discussion Papers, No.18.), which propose the evaluation of the operational form between the empiric values of the default rates at sector level and the macroeconomic environment is made through the SUR method.

Regarding the classification of loans in non-performing classes, IMF (International Monetary Fund) recommends that both the loans and other assets to be classified as non-performing when the instalments registers overdue for more than 90 days. Moreover, non-performing loans will include also the loans with a debt service less than 90 days when a clear indication for default exists, e.g.: bankruptcy, insolvency (European Banking Coordination "Vienna" Initiative - Working Group on NPLs in Central, Eastern and Southeastern Europe (2012), A Concerted Approach, IMF). Furthermore, Moody's (Moodys, (1997), Investors Service "Moody's Approach to Analysing and Rating Emerging Market Banking Systems: Argentina as a Case Study") rating agency considers a loan as non-performing if it is framed in one of the following situation: for consumer loans granted to individuals if the overdue term is greater than 60 days; for commercial loans and leasing if the overdue amount is greater than 90 days; any loan to which there is a clear indication of default.

In the international practice, based on the Bank for International Settlements' requirements, there are several approaches, synthesized in the table below, considering the applied criteria:

Table no.1 – Criteria used for determining the NPL loans in Europe

Criteria	Countries and allocation
Number of overdue days	>90 days: 12 countries (Romania, Bulgaria, Cyprus, Greece, FYR Macedonia, Serbia, Hungary, Poland, Czech Republic, Ukraine, Latvia, Austria) >60 days: 2 countries (Estonia, Lithuania) >30 days: 1 country (Russia: >30 days for companies and >60 days for individuals)
Legal proceedings	All 15 countries mentioned
Financial performance	
Contamination at debtor level	Yes: 10 countries (Romania, Bulgaria, Serbia, Hungary, Czech Republic, Russia, Estonia, Latvia, Cyprus No: 4 countries (Greece, Poland, Lithuania, Austria) N/A: 1 country: FYR Macedonia

Source: Popa, R. (2010), Non-performing loans - methodology and comparisons, presentation within the National Bank of Romania

In addition, the chart no.1 blow highlights the evolution of nonperforming loans during 2007-2014, within the countries previously analyzed. On the vertical axis is shown the percentage level of bad loans while the horizontal axis contains the time frame.
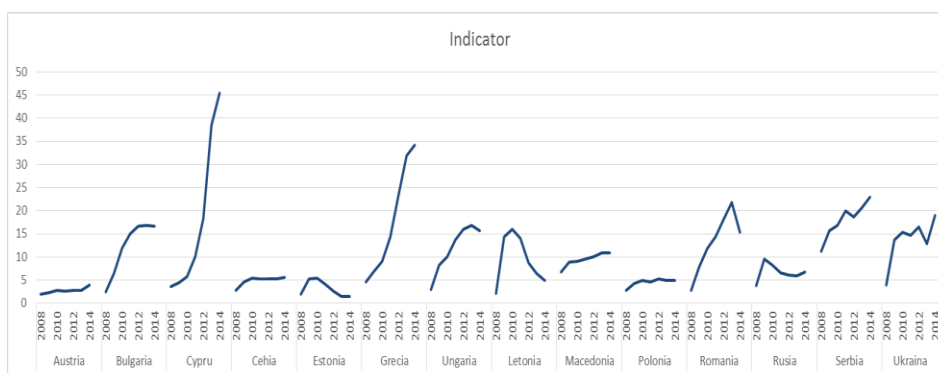

Chart no.1 – The NPL ratio in Europe during 2007-2014
Source: Authors performance using World Bank data.

IFRS, IAS 39 - Financial Instruments: Recognition and Measurement outlines the requirements for the recognition and measurement of the financial assets, financial liabilities, and some contracts to buy or sell non-financial items. Financial instruments are initially recognised when an entity becomes a part to the contractual provisions of the instrument, and are classified into various categories depending upon the type of instrument, which then determines the subsequent measurement of the instrument (typically amortised cost or fair value). Special rules apply to embedded derivatives and hedging instruments. A financial asset or a group of financial assets is considered as impaired if: there are evidences of depreciation because of an event that occurred after the initial recognition of the asset; the event that generates loss has an impact over the future cash flows estimated for the financial asset that can be estimated reliably. The following examples represent events that generate losses: financial difficulties of the debtor; breach of contract (overdue in paying the principal/interest); impending insolvency/bankruptcy.

For regularly testing the assets quality, the European Banking Authority (EBA) and the European Central Bank (ECB) organizes various assessment exercises, one of the most complex exercises being known as AQR - Asset Quality Review. This exercise made in 2014 targeted over 120 banks in 18 countries, verifying not only the parent banks, but also whether their subsidiaries, located or not within the Euro zone. According to the data presented, almost 1.250 loan files have been revised, which equals to some total risk-weighted assets of 3.72 trillion (about 58% of the total risk exposure of the banks analysed).

To quantify the credit risk, the National Bank of Romania used credit risk rate and later it introduced the non-performing loans ratio which was modified through the years, nowadays having the definition adopted by the European Banking Authority. The first indicator is defined as the ratio between the gross exposure of the non-banking loans classified as loss or doubtful and the total amount of loans classified, non-banking loans, excluding off balance sheet items. The second indicator, NPL rate, is defined as the ratio between gross exposure related to the non-banking loans classified in "loss 2" (pierdere 2) with a debt service over 90 days and/or to which the legal proceedings were started and the amount of loans classified, non-banking loans, excluding off balance sheet items. The difference between the two indicators is that credit risk rate comprises also the doubtful and loss 1 classified loans as against NPL rate which considers only loans classified in loss 2 and/or with legal proceedings.

Two Romanian authors - Moinescu B. and Codîrlaşu A. *("Lending, economic growth and nonperforming loans: empirical evidences from the new EU member states"*, Working Paper, Project "PN-II-ID-PCE-2011-3-1054 - Uncertainty, Complexity and Financial Stability", 2013) have deepened the research on NPLs with reference to the macroeconomic imbalance expressed by the variations in the private sector lending. The effects generated by analysing the items which supported the mechanism for leading increasing (economic growth, variations of NPL rate) were followed to highlight the shocks impact on the banking system loan portfolios. The research was performed on ten EU countries, their values being analysed using annual data regressions, covering a period of 12 years (2000-2011).

2. Data's used in analysis

The following variables were used in the empirical analysis: credit risk rate (as dependent variable); GDP in market prices (computed quarterly but with seasonally adjusted data, using the average prices for 2000 year); average quarterly exchange rate EUR/RON, hereinafter named as "exchange rate"; average gross income; average RON lending interest rate used by a credit institution, hereinafter named as interest rate and the unemployment rate. The observation period for analysis is January 2001 – June 2016, following 62 quarterly observations.

The following methodological research supports the arguments for choosing the variables above:

- the GDP was considered relevant because, according to economic theory, the evolution of credit risk depends on the economic cycles and, in this case, on GDP evolution.
- the exchange rate EUR/RON was included because 45%-65% of the loans granted in the period under review were denominated in EUR and due to the unfavourable evolution of the national currency against EUR after the global financial crisis.
- the income is the primary source of repayment of most loans. The data used in the statistical model take into consideration the incomes reported by companies with more than 3 employees, avoiding thus the extremes of the data series.
- the interest rate is an important element in the cost of credit, thus an increased interest rate may affect a borrower's ability to repay.

- the unemployment rate indicates the population employment level and, together with the income, influence the repayment capacity of a borrower.

Being one of the oldest banking prudence indicators calculated by the National Bank of Romania (NBR), the credit risk rate was preferred for analysis, covering a period that includes a full economic cycle. In addition, it can be considered as an early warning indicator given that its increasing rate leads to the necessity of additional provisioning.

As the credit risk rate was computed by NBR until the end of May 2014, the option for following month until June 2016 was to use the non-performing loans (NPL) indicator or to forecast the first one; regarding NPL, there is a difference of its computation through the years and, secondly, it covers a reduced period and is irrelevant from a complete economic cycle point of view. The NPL indicator was computed by NBR since September 2009 and starting with September 2015, the National Bank reports it as defined by the European Banking Authority, having a different algorithm compared to other approaches.

Pentru a putea continua studiul empiric cu date cât mai recente dar și cât mai apropiate de scopul cercetării, soluția aleasă a fost utilizarea unui model ARMA (model cu medie mobilă autoregresivă) de previziune a datelor. Prin intermediul acestei metode rata riscului de credit a fost completată cu un număr de 8 observații, acestea fiind o prognoză econometrică pentru perioadă neacoperită de datele Băncii Naționale. Modelul ARMA folosește istoricul seriei de date pentru a previziona valorile pe orizontul de timp necesar. În principal acest model ne arată cum va reacționa variabila la variațiile stocastice din trecut, fiind o estimare de trend.

For using more recent data and as close to the purpose of research, the option was to apply an ARMA model for data forecasting. Through this model, the credit risk rate has been supplemented with 8 observations as an statistical forecast to cover the period without the NBR computed indicator. ARMA model uses historical data series to forecast the values for a required timeframe, highlighting how the analyzed variable reacts to the stochastic variations, being a trend forecast.

As the trend observed by the ARMA model was increasing, the expected results were higher than those previously computed by the National Bank. To ensure the comparability and quality of the forecast data, we analyzed the trend of the non-performing credit indicator where we observed a steady decline starting with June 2014. The downward trend has been observed as a result of the National Bank's efforts to reduce bad loans by recommending commercial banks performing sales or recording off-balance sheet transactions. Thus, we considered appropriate to amend the results achieved by the econometric considering the economic reasoning, i.e to decrease by 10% the values obtained. This 10% was the quarterly average decreasing of the performing loans.

An important argument in choosing the study's variables is based on their representativeness: highlighting the financial market (interest and exchange rates), quantifies the real economy (GDP), tracing the labour market evolution (unemployment rate, net income), and showing the financial system health (credit risk rate). The real GDP, unemployment rate, inflation and financial variables are the most important study variables of an economic cycle (Mishkin, 2013).

The quarterly values computed as average of monthly values were considered for aligning all variables reporting period: for example, GDP has the lowest measurement frequency, quarterly, and due to customs of econometric models (especially the VAR model) when studying macroeconomic aspects. The latter showed an increased significance within quarterly analysis while the VAR model applicability is higher on quarterly data. The observation period covers at least an entire economic cycle (a period of growth followed by a crisis and a subsequent recovery). The analysed period, January 2001 - June 2016, of this paper covers an entire economic cycle, from the settle and economic recovery in the early 2000s, following with the economic boom (2007-2008 period) and the crisis beginning by the end of 2008, pursuing with the recovery period after 2012 year.

The study's data were collected from the statistical reports of National Bank of Romania for credit risk rate, GDP, exchange, unemployment and interest rates; while the net income data were obtained from the National Institute of Statistics website.

All the statistical test and analysis performed are available within the author.

3. Aspects revealed through the statistical analysis

To check the economic assumptions that were presented above, a VAR model it was used. The advantage in using the VAR model is that is simple, it does not imply severe restrictions for the variables and it can be used in many other purposes (analyse, Impulse Response Functions, forecasting) (Svetlozar T. R., Fabozzi, F.J., Mittnik, S., (2007), *Financial econometrics: from basics to advanced modeling techniques*, Hoboken: John Wiley & Sons, The Frank J. Fabozzi series.). The weakness of this model is expressed by the fact that is not a theoretic model and, Choleski decomposition for the estimation of the parameters is not always well-matched with the economic theory.

To determine the number of lags to be used, an analysis has been performed, VAR Lag order selection criteria. A higher number of lags were chosen, three in this case, because an impairment of the macro indicators (decrease of GDP, raise of unemployment, increase of the exchange rate) it is not immediately reflected in the credit risk rate growth, a gap being observed. Also, a test for the possible co-integration relations between the selected variables was conducted. In this case a relative small co-integration relation was observed but the VAR model was preferred for use. The stability test performed shows that the VAR model applied over the equation satisfies the stability condition. Homoscedasticity was tested through White test which showed that the hypothesis is respected. The statistical analysis through VAR model uses two main functions: impulse-response and variance decomposition.

Impulse – response function is used in studying the evolution of the dependent variable after a shock is applied to the independent ones. On the other hand, variance decomposition illustrates how a variable can explain the evolution of another variable. The period under review was settled as 10 quarters and the residual was defined as one standard deviation because the variables have different units of measurement.

Impulse response functions illustrate that impairment of the macro-economic indicators determines the growth of the credit risk rate as represented in the graphics from the Annex, in compliance with the economic theory as follows:

- It was observed that a shock over the GDP determines a decrease of the credit risk rate in the first two quarters, a raise in the next five and a linear evolution for the last periods.
- The most important influence is revealed by the exchange rate, a depreciation of the national currency against the euro determines an increase of the credit risk rate in the first seven quarters and after that following a descendent trend. The result is representative considering the high amount of loans in euro which were granted by the Romanian banks.
- Another representative influence was observed in case of a shock applied to the interest rate which determines an increase of the credit risk rate starting with the third observation period. We take note that an increase in interest rate could be driven by the decision of the National Bank to increase the monetary interest rate in order to temper the inflation pressure. Other explanation could be also the high demand of money on the currency and short liquidity which automatically influence the interbank interest rates.
- An important influence was noted also in case of the incomes, a shock on the salaries having a considerable influence from the first observation period. It's wort

mentioning that in the period under the analysis, in June 2010 the salaries of the public administration employees (including state public services) encountered a 25% decrease of the salaries, situation which lasts until mid-2012.

- Last, the unemployment rate did not show a significant impact. A possible explanation could be the fact that unemployment calculation considers the un-employed people only in the registration period.

Considering the outcome of the statistical tests, the above mentioned macro-economic variables play an important role in the financial stability of the monetary and banking system as a severe deterioration of one of them influence the credit risk rate.

The statistical tests applied over the variance decomposition resulted in the following statements, as shown also in the annex:

- The foreign exchange rate EUR/RON explains at about 40% from the credit risk rate, a result confirmed also by the economic theory considering the high volume of the loans granted in foreign currency, especially in euro.
- Gros domestic product explains at about 20% of the credit risk rate. The result is satisfactory considering that in the financial crisis the Romanian economy decreased sharply, especially in 2009.
- The other variables considered in the study, interest rate, unemployment rate and income level, explains at about 10% of the credit risk rate evolution. The results are in line with the expectations and with the outcome of the impulse-response functions.

The current paper proposes both a statistical study as well as a qualitative one. The main outcome of the qualitative analysis is to show the influence of the credit risk rate into the capital which supports the activities of a Bank. Going further with the study, it was analysed what are influences in the number of employees from the banking system. Considering the scope of the study, the qualitative analysis was applied as a top-bottom approach starting with a global overview and finishing with the impact in Romania.

A loss coming from the default of a loan is indirectly transposed into a capital shortfall, through the provisions, write-off and derecognition. Over the last years, we observed continuous recapitalization actions in the banking environment made even through bail-out, bail-in, capital infusion from the shareholders or new stock selling. The rationale for the capital increases resides in the increase of the credit risk through the non-performing loans and loss recognition but also from the inefficient restructuring actions.

An indirect influence of the credit risk rate over the available capital it is observed, an inverse relation which shows that an increase of the non-performing loans implies a higher stock of credit risk provisions, thus reflecting in an expense in the balance sheet and a loss in the P&L account and the available capital.

A study published by Achrya, V. et all (2011), indicates that the banks encountered massive losses in the global financial crisis, between 2007 and 2009, but the necessary capital, due to the new legislation requirements, was raised considering the contribution of the government or the private investors. The following table presents the total loss from loans and off-balance sheet assets registered in the banking sector on each continent, quarterly measurement. As it can be seen, the biggest amounts were registered in American region, followed by Europe and less more by Asia.

Table no. 2. Loss from loans and off-balance sheet assets in the banking sector

Region / Period (bln USD)	Q3-07	Q4-07	Q1-08	Q2-08	Q3-08	Q4-08	Q1-09	Q2-09	Q3-09	Q4-09	Q1-10	Q2-10	Q3-10	Q4-10	Q1-11	Q2-11	Total loss
Global	37.4	141.2	132.9	114	158	240.9	86.8	89	47.1	67.3	39.3	32.1	23.8	21.5	14.4	16.1	1,261.8
Americas	24.5	70.3	63.2	65	111.5	129.3	51.1	44.2	34.9	32	28.1	19.1	14.8	12.3	6.4	5.6	712.3
Europe	12.1	61.5	60.8	46	41.8	107.9	32.7	44.4	12.4	35.2	11.2	12.7	8.4	8.4	7.4	9.9	512.8
Asia	0.8	9.4	8.9	3	4.7	3.7	3	0.4	-0.2	0.1	0	0.3	0.6	0.8	0.6	0.6	36.7

Source: author computation following Bloomber WDCI function[2] and Achrya, V. et all

(2011).

A better view on the loss amounts, capital increase and the job cuts at the global level can be observed in the chart **no.2** inserted below. In about four years, almost 400 thousand jobs in the banking system were cut, in the same time a loss of 1.200 billion being registered for which a capital increase of about 1.000 billion was needed.
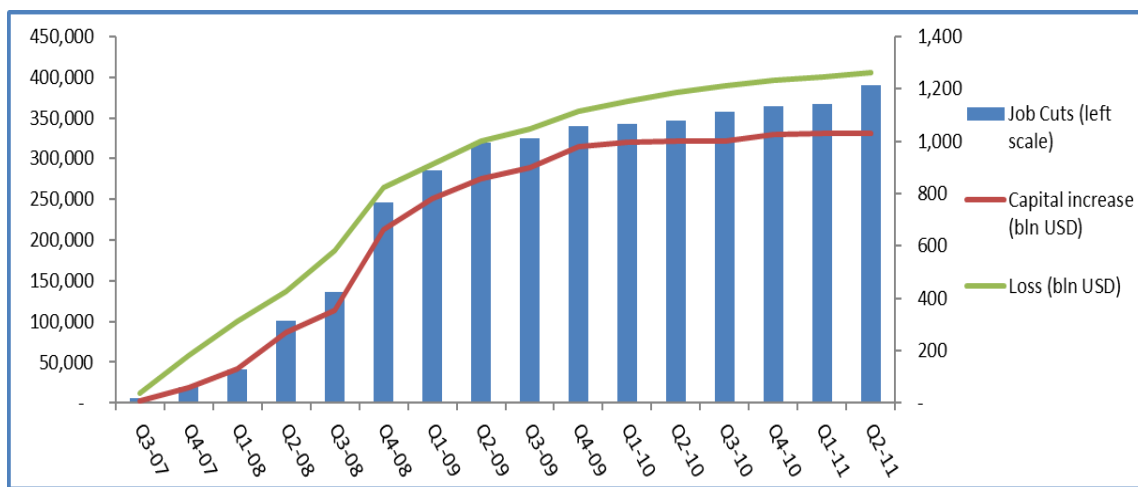

Chart no.2. Comparison between Capital increase, Losses and job cuts – global view
Source: author computation based on the information from Bloomberg, WDCI function

Informația disponibilă pentru mediul bancar românesc nu este atât de bine sintetizată, având în vedere că Banca Națională a României nu dezvăluie toți indicatorii prudențiali. Figura nr. 3 ilustrează o comparație între provizioanele pentru riscul de credit, atât prudențiale cât și IFRS, și salariul mediu net din sistemul bancar. Putem observa un trend ascendent în nivelul de provizionare, în timp ce salariul net nu a evidențiat o tendință clară, poate și prin prisma faptului că restructurarea sistemului bancar s-a făcut destul de greoi și pe o perioadă destul de lungă.

The information available for the Romanian banking environment is not so well synthesized, considering that the National Bank of Romania does not disclose all the prudential indicators. The first chart illustrates a comparison between the

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[2] WDCI function available in Bloomberg platform measures the loss from loans and off balance sheet assets as well the capital increases.

credit risk provisions, both prudential and IFRS, and the net average salary in the banking system. We can observe an uptrend in provisioning level, while the net salary didn't reflect a trend, also because the restructuring of the banking system has not always easy to be performed.
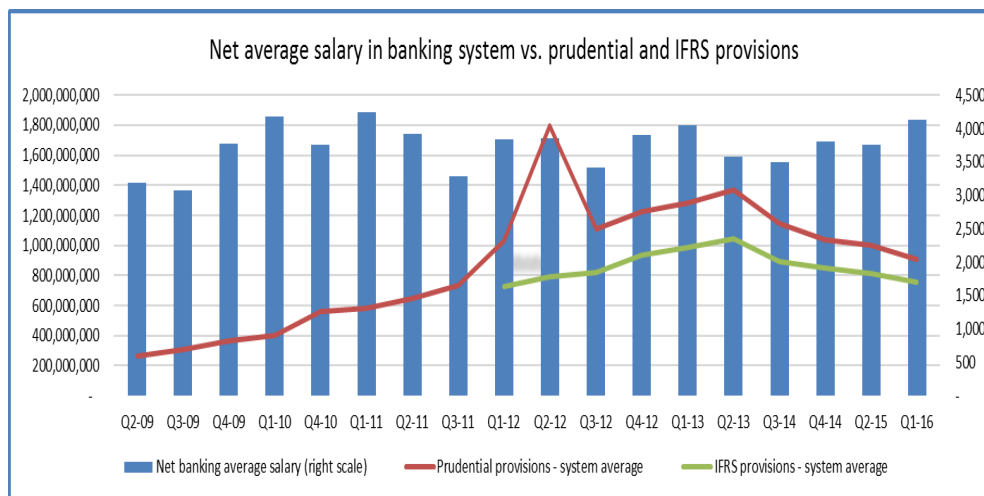

Chart no. 3. Net average salary in banking system vs. prudential and IFR provisions – Romania

Source: author computation based on the information reported by National Bank of Romania

The second chart shows a comparative study by considering the available capital, net profit and the number of employees in the banking sector. The maximum number of employees in the system was achieved at the end of the year 2008 – approximately 71 thousand people, while the figure decrease up to 55 thousand in 2016. Banks' capital increased from about 24 billion lei at the beginning of 2008 to a maximum of 44 billion lei at the end of 2013, when banks began to make write-offs and massive derecognition of bad loans. The profitability of the banking sector registered very low levels between 2009 and 2014, the maximum loss being achieved at the end of 2014 (4,8 billions Ron) – figures influenced by high amounts of non-performing loans derecognized by the first two banks in the system. (BCR and BRD). After 2015, the banking system went profitable, the capital amount being at a stable level of 39 billions Ron.
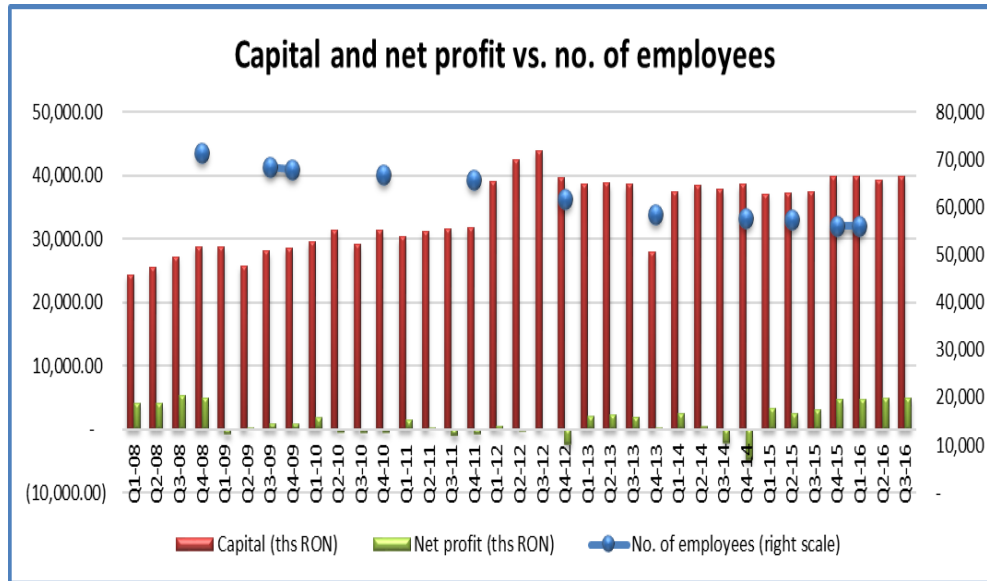
Chart no. 4. Comparison between Capital, net profit and available jobs – Romania

Source: author computation based on the information reported by National Bank of Romania

Conclusions

The recent global financial crisis offers a very good example of rising NPL and credit risk rate. A close examination determines the influence of the macroeconomic performances. The analysis performed examines the aggregate NPL and credit risk rates and macroeconomic data.

The VAR model presented is developed to define the interactions between the quality of the credit portfolios and the macroeconomic environment from Romania. As illustrated, the biggest influence on credit risk belongs to the exchange rate because of the big amounts of loans granted in foreign currency, especially euro. Interest rate and gross domestic product have also an influence over the credit risk, but lower than the one of exchange rate.

The qualitative study presents the impact of the financial crisis over the banking loan portfolios through the losses incurred, the capital increases and the job cuts. Through the analysis performed, both globally and Romanian banking system level, it was illustrated indirect influence of the credit risk in the available capital and the number of jobs from the banking system.

Findings revealed by the research paper have both practical applicability and economic policy implications. The results and econometric relations issued by this research can be used for stress testing and forecasting purposes by regulatory and supervisory institutions and by the banks.

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