Financial Investment Optimisation

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Abstract*. Our demarche aims to highlight the decisive factors of financial performance in the purpose of finding ways to optimise it, this leading to superior result-effort reports. The econometric pattern has been used in this extent, namely a multifactorial regression in which different variables as influence factors had to be deemed, taking into account dependent variables ROE and ROA, as indicators of financial profitability. The study has been applied to the major banks of Romania, using the BNR published data per quarter, as it has the highest frequency of available data of all data series.*

Keywords: financial investment, econometric pattern, financial performance, financial investment optimisation, financial risk.

JEL Classification: G15, C22, G11.

1. Introduction:

The activity of a business bank can be evaluated and its efficiency can be quantified just as a regular company performing any other activity. For every company, their activity is reflected in the accounting documents and in the financial situation: balance sheets, profit account, balances and other accounting documents. Yet, correctly measuring the financial efficiencies implies a series of specific aspects of this activity, just as analysing a company`s activity from a certain area implies.

On the strength of accounting and financial situations and the processing which can be made with their help, the financial performance can be qualified and in this regard, literature offers a series of indicators to aid the achievement of this demarche. Therefore, the ratio on which the financial performance can be determined is based on the intermediate balance of discharge.

- To analyse the **profitability** of a bank there can be used:
- ✓ The ratio of economic cost-effectiveness;

This indicator must be as high as possible, but for a proper comparison, it is used as a reference for companies in the same industry. Therefore, a comparison based on the calculated indicator for companies from different industries is inconclusive. E.g. The Petroleum Industry compared to the Food Industry.

- ✓ The ratio of financial cost-effectiveness;

This ratio must be as high as possible, and for a proper use, it is indicated to draw conclusions in comparison to the results of other companies in the economic field.

- ✓ The ratio of assets use;
- ✓ The leverage effect;
- ✓ The ratio of deposit incomes or the deposit net spread;

The current banking system in Romania is in its infancy, having an insignificant past in comparison to the developed capitalist countries (obviously due to the socialist economy centralised for over 40 years) and being in a permanent dynamic. To support this statement, recent events from the Romanian banking market can be brought up: the Bancpost and Volksbank acquisitions by Banca Transilvania, the Piraeus Bank acquisition by the American investment fund JC Flowers or the Banca Carpatica

acquisition by Patria Bank. Also, the adjustment from the international and national legislation have significantly and continuously contributed to the way in which the local banking network has evolved, often requiring recapitalisations or reinforcements in less favourable economic situations or as a consequence of the increasing demands of capital coming from the national Bank of Romania.

The performance management of the banking system must be connected with the risk management, and the recent financial and economic crisis have fully emphasised the importance of this correlation for the Romanian banking system. In this regard, there can be mentioned that the period prior the economic crisis has been associated with high profits for the banking system, followed by a series of years when non-performing credits have increased, leading to significant damage to the banking system. Thus, for many banks, the damage was higher than the prior profits. Therefore, whether it is about the credit risk, the liquidity risk or other market risks (exchange rate risk, interest rate risk), it is unanimously accepted that the financial performance must be tightly connected with an efficient risk management associated with this activity.

2. Methodology and data series

According to those presented above, we will be moving on with this demarche and analyse the banking performance in the light of the risk management indicators, using the known econometric device. An attempt will be made to emphasize how performance is influenced by a series of variables that offer information about the credit risk, the liquidity risk or the market risk of the Romanian banking system. Using a multifactorial regression pattern, there will be an attempt to capture the manner in which the managing of liquidity risk was influenced by specific variables of the banking market for the three big banks of the Romanian banking system: Banca Comerciala Romana, Banca Transilvania, Banca Romana de Dezvoltare.

In the idea of an easy following of the study about a pattern that quantifies the banking risk and the influence factors for these variables, a brief summary will be presented, aiming to introduce the purpose, the estimation method, the awaited results and the ones obtained by applying the econometric pattern. Thus, the first step in the undertaking of the technical demarche is made.

The aim of the econometric pattern: the line-up of the influence factors and of their intensity over the measured performance through ROE for different banks of the Romanian banking system. We will now focus on those variants that measure various risks from the banking system: the liquidity risk, the credit risk, the deposit risk. Explaining the influence factors over the report between liquid assets and total banking assets will also try to be explained.

The operated methodology: there will be operated with two patterns of applied multifactorial regression for all obtained data series of Romanian financial market, organised as a panel. BRD, Banca Transilvania and BCR will be used to provide data. Data for these credit institutions have been chosen as they are the three most important banks of Romania and the most transparent when it comes to making public the financial reports;

Data series: ROE, the report between credit and bank deposit, the report between the deposit from banks and from the total deposit and the report between the liquid assets and the total assets of a bank to measure the liquidity risk. In addition, a data series about the interest rate from the monetary policy will be used for the second pattern;

Data sources: The National Institute of Statistics from Romania, BNR, Eurostat (The European Institute of Statistics);

The operated software: Eviews 9.0;

Awaited results: I expect for the pattern to indicate a significant meaning correlation between ROE and the indicated variables: the report between credit and deposit, the report between the liquid assets and the total assets and the report between the deposit drawn in by banks and the total deposit. On the other hand, I expect to obtain an opposite correlation between the liquid assets, the total assets and the interest rate from the monetary policy, also in relation to the non-performing credit rate.

3. Obtained results

As expected, significant and of the same meaning correlation has been obtained between financial performance (ROE) and the three independent variables chosen for the first pattern: the report between credit and bank deposit, the report between the liquid assets and the total assets and the report between the deposit drawn in by banks and the total deposit. By doing so, according to the pattern, an increase of these reports leads to an increase of the banking performance measured by ROE. In other terms, the reducing of the liquidity risks measured with the help of these three indicators leads to an increase of the banking performance.

Estimating the suggested pattern, a direct correlation has been obtained between the report between the liquid assets, the total assets and the interest rate from the monetary policy, suggesting that an increase of the interest rate from the monetary policy leads to the increase of this report, namely an improvement of the bank`s liquidity position, so a decrease of the liquidity risk. On the other hand, an opposite correlation between the dependent variable (liquid assets/ total assets) and the non-performing credit rate has been obtained, which proves that, according to the pattern, an increase of the non-performing credits can be reflected in an increase of the liquidity risk, namely a decrease of the liquid assets from the balance sheet of the banks.

To pursue the prior aim, a series of variables will be chosen to consider the explanatory variables for the financial performance measured with ROE (return on equity). The variables have been chosen to show the administration of the liquidity risk of the banks, but also how the banks managed to correlate the drawn-in resources (form different categories of clients) with the operated ones, so that a credit range that ensures profit can be maintained and, at the same time, to eliminate the risk of a strongly negative liquidity gap. Moreover, it has somehow been taken into account the impact of the credit risk administration over the balance sheet of the bank by introducing the report between credit and deposit as an explanatory variable. Based on these ideas, we will pursue the development of an econometric pattern of multifactorial regression, relying on the data series for three banks as data panel pattern.

- **Defining the pattern**

Multifactorial regression pattern:

$$ROE_t = \alpha_0 + \alpha_1 credite/depo + \alpha_2 activelichid/totalactiv + \alpha_3 depobanci/totaldepo + \varepsilon_t$$

- **The data series**

Data from three banks have been used: Banca Transilvainia, BRD-GSG and BCR- Erste Bank. The operated data series are linked to the 2001-2007 period of time, annual remarks being given. Next, the graphics about their evolution for each of the three banks will be presented:

**Graphic no. 1. The evolution of ROE (%) during 2001-2017 for
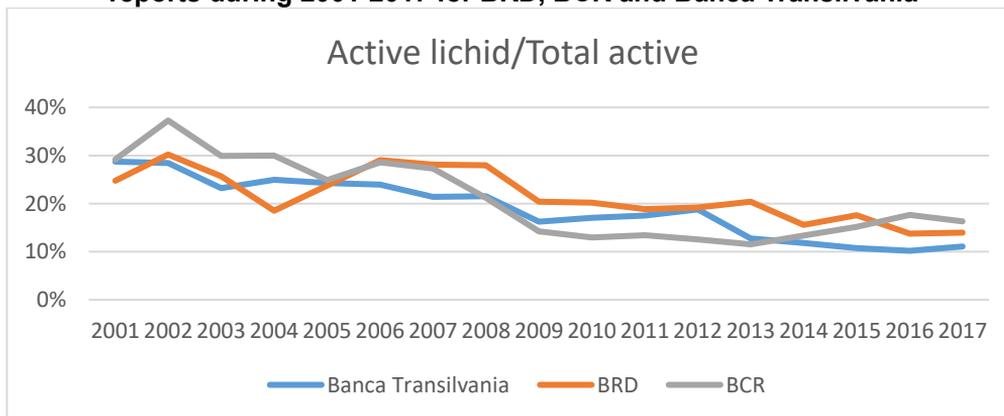BRD-GSG, BCR-Erste Bank and Banca Transilvania**
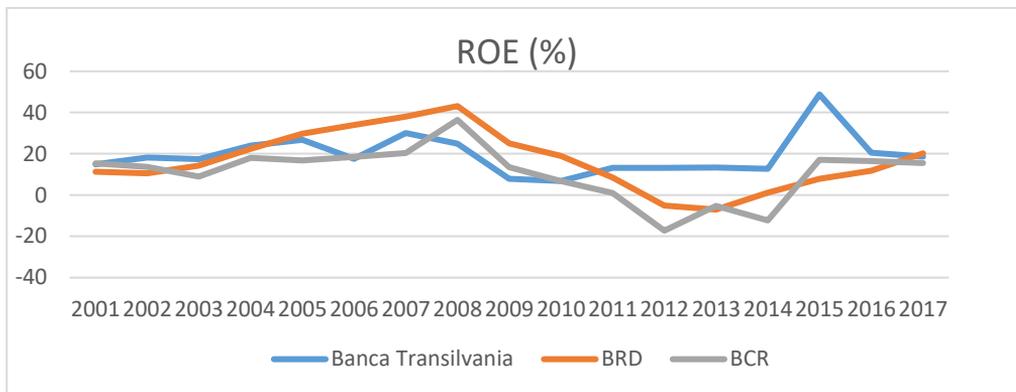
Source: personal processing based on the Boomberg data.

**Graphic no. 2. The evolution of the credit /deposit reports during 2001-2017
for BRD, BCR and Banca Transilvania**
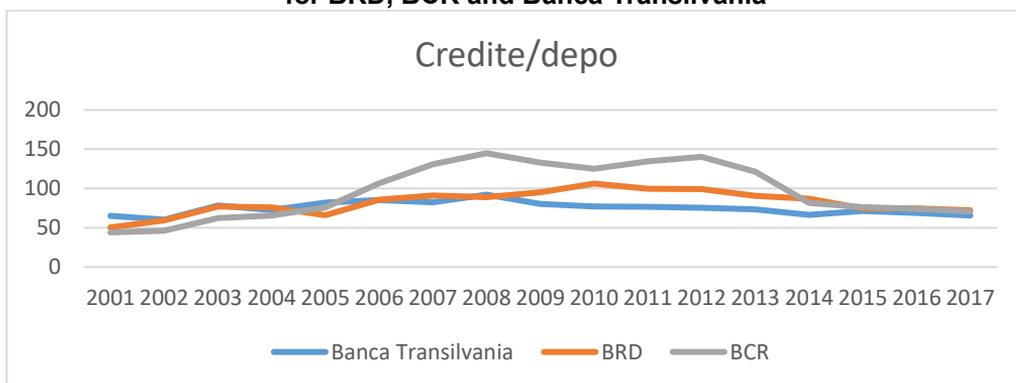
Source: personal processing based on the Boomberg data.

**Graphic no. 3. The evolution of the deposit from the liquid assets/total assets
reports during 2001-2017 for BRD, BCR and Banca Transilvania**

Source: personal processing based on the Boomberg data.

Graphic no. 4. The evolution of the bank deposits/ total deposits reports during 2001-2017 for BRD, BCR and Banca Transilvania
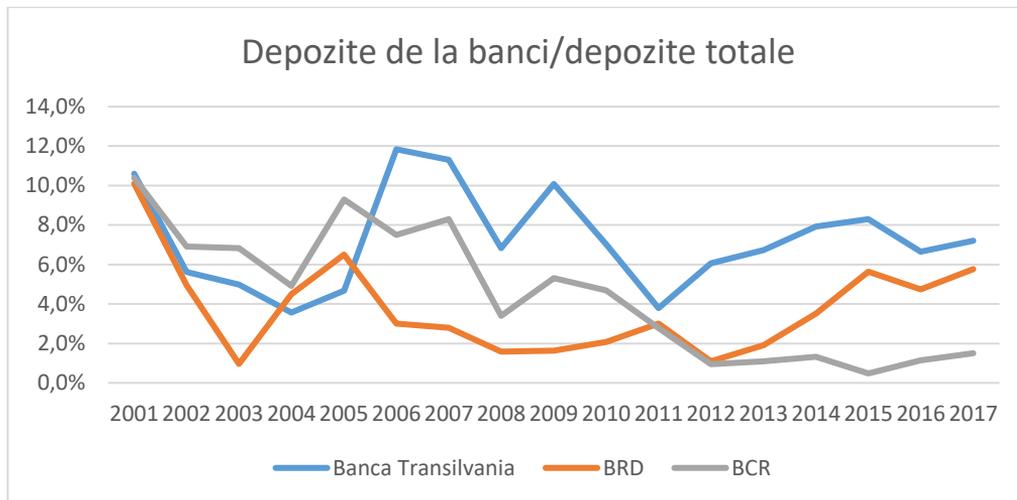
Source: personal processing based on the Boomberg data.

Based on these data, we will move on with the estimating of the multifactorial regression pattern. As independent variables for the pattern we will use:
- Credits / deposits;
- Liquid assets / total assets;
- Bank deposits / total deposits.

To calculate the liquid assets, variable which will be used as part of the pattern, the following balance sheet has been taken into consideration: currency, deposits from the central bank and deposits from other banks. These have been considered the liquid assets of a bank`s balance sheet. Next, the results of the estimation given using the **pooled regression** method will be presented:

Fig.no.1. The results obtained by using the Eviews software concerning the dependent variable: ROE

Dependent Variable: ROE
Method: Panel Least Squares
Date: 10/29/18   Time: 21:47
Sample: 2001 2017
Periods included: 17
Cross-sections included: 3
Total panel (balanced) observations: 51

Variable	Coefficient	Std. Error	t-Statistic
CREDIT _DEPO	0.098812	0.043331	2.280397
BANKDEPO_TOTDEPO	0.310269	0.116633	2.660212
LIQUIDACTIVES_TOTALA	0.537628	0.267415	2.010463
C	0.111561	0.097073	1.149240

R-squared	0.157431	Mean dependent var	
Adjusted R-squared	0.103650	S.D. dependent var	
S.E. of regression	0.121301	Akaike info criterion	

Sum squared resid	0.691554	Schwarz criterion
Log likelihood	37.30044	Hannan-Quinn criter.
F-statistic	3.927258	Durbin-Watson stat
Prob(F-statistic)	0.013307	

Source: personal processing based on the EVIEWS software

We can now notice the probabilities linked to the three independent variables considered lower than the 5% scale, suggesting that the parameters are considerably different from zero, statistically speaking. There can be also claimed that they can be economically interpreted. On the other hand, we notice that the probability of the pattern`s constant is higher than 5%, proving that the parameter is not significantly different from zero as the t-Student test, the one with the Eviews statistics.

It is important to follow the direction of the estimated correlations. This way, there is a positive correlation between the credit, the deposit and ROE (personal income profitability), which shows that a faster increase of the credits, comparing with the increase of the deposits, will draw in an increase of the financial profitability measured with ROE. Thus, giving credits of a good range leads to a profit increase and to a credit/ deposit increase. Moreover, positive correlations have been established between ROE and the other independent variables: the report between bank deposit and total deposit and the one between liquid assets and total assets. By doing so, an increase of these two reports leads to an increase of ROE, according to the estimated pattern based on BRD, BCR and Banca Transilvania data.

With the help of the econometric analysis prior given, an econometric pattern has been created to explain how the banking system administration of the various risks has influenced the performance measured by ROE. Thereby, there have been considered the credit risk, the liquidity risk, and also how the drawn in resources have influenced the performance. What needs to be reminded is how important for a bank is to efficiently administrate the actives and the correspondence steps, correlating the maturities and the liquidity. In this regard, we will now approach the quantitative analysis from the perspective of the liquidity risk and of the way it has been influenced by a variable series form the banking market. Therefore, the emphasis is on the manner in which the liquidity risk has been administrated, depending on the market risks and taking into account that all these eventually influence the financial performance.

A bank`s liquidity is one of the most controversial aspects of the specialised literature, hardly approached, given the fact that the bank always needs to find a compromise between liquidity and cost-effectiveness. This way, it is unanimously accepted that maintaining a higher level of the assets reduces the liquidity risk, but at the same time, it can significantly reduce the bank`s profitability by taking these resources to really low interest-rate or even to zero. This is the most important problem for every bank of the system and it needs a careful manage. We are talking about the goal of *maximizing the profit while maintaining the liquidity risk at a low or within the parameters level.*

In this respect, we will try to explain the variation of the report between liquid assets and total assets for the three banks we have data for from the local system. To accomplish this, we will estimate again a multifactorial regression pattern based on the panel-structured data. The general equation of the pattern to be estimated is presented below, as a two-variable pattern NPL (non-performing credit rate) and ratadobpol (monetary policy interest rate). These variables have been chosen by estimating various patterns, the results indicating that these two variables are the ones significantly influencing the report between the liquid assets and the total assets for three banks (BCR, BRD and Transilvania Bank), all important for the banking system in Romania. At

the same time, of the estimated patterns, the one of whose parameters were statistically significant has been chosen.

$$activelichid/totalactiv = \alpha_0 + \alpha_1 pol\_monetara + \alpha_2 NPL + \varepsilon_t$$

Fig. no. 2 Results obtained with the Eviews software about the dependent variable: ASSETS/ TOTAL ASSETS

Dependent Variable: ASSETSTOTALASSETS

Method: Panel Least Squares

Date: 10/29/18   Time: 23:01

Sample: 2008 2017

Periods included: 10

Cross-sections included: 3

Total panel (balanced) observations: 30

Variable	Coefficient	Std. Error	t-Statistic
NPL	-0.269916	0.093581	-2.884312
MONETARY_POL	0.632636	0.361918	1.748010
C	-0.008340	0.004794	-1.739465

R-squared	0.331851	Mean dependent var	
Adjusted R-squared	0.282358	S.D. dependent var	
S.E. of regression	0.023784	Akaike info criterion	
Sum squared resid	0.015273	Schwarz criterion	
Log likelihood	71.17506	Hannan-Quinn criter.	
F-statistic	6.705060	Durbin-Watson stat	
Prob(F-statistic)	0.004323		

Source: personal processing based on the EVIEWS software

As noticed, all estimated coefficients are statistically significant for a considerably 10% verge. Moreover, the related NPL coefficient is significant for a 1% verge. There has also been obtained an opposite connection between the operated liquidity ratio and the non-performing credit ratio. By doing so, an increase of the NPL leads to a decrease of the bank`s assets. On the other hand, an increase of the monetary policy rate leads to an increase of the liquidity indicator, banks preferring to keep higher amounts as assets, the latter being better paid when the interest-rate is higher. Hence, there are a series of relations in line with the economic, econometric and statistic theory and it validates our initial expectations.

Through this final part of the case report we have emphasised a series of expectation about how the administration of the liquidity risk has been done for the three major banks of the Romanian banking system: BRD, Banca Comerciala Romana and Banca Transilvania. The obtained results are connected to the initial expectations and

have provided essential information about the optimising and administration of risks influences financial performance.

Thus, we have an opposite relation between the non-performing credit rate (NPL) and the report between the liquid assets and the total assets, and a positive relation between the monetary policy rate and the liquidity indicator. Therefore, an increase of the non-performing credits leads to a decrease of the bank`s assets, and an increase of the monetary policy rate can stimulate the banks to have more assets, as they are now being properly paid.

Then again, we have a positive (direct) relation between the monetary policy rate and the report between the bank`s liquid assets and the total assets. Thus, an increase of the interest rate leads to an increase of the liquidity from the bank`s balance-sheet. The interest rate increase leads to a better paying of the short-term banking investment or of the estate titles, causing the banks to take higher risks and more liquid banking investments seeking for higher performance.

4. Conclusions

This paperwork`s purpose was to seek the analysing of the financial performance as compared to the manner in which risks have been managed for banks of the local banking system. By doing so, we are emphasising the way the risk- profit management for the most important banks of Romania`s banking system. Considering the existence of significant economic relationship, a series of microeconomic and macroeconomic variables have been deemed.

In other terms, the financial performance has been analysed in correlation with the accepted risks and has been proven as existent the direct relation between ROE and a series of factors that measure the liquidity risk (the financial performance) such as: the credit- deposit report, the report between the brawn-in deposit and the total deposit and the report between the liquid assets of a bank`s balance sheet and the total assets. This way, it is shown that the more credit the bank provides, compared to the bank deposit, the higher the performance; however, maintaining a considerable liquidity is necessary, aspect revised in the latest report between the liquid assets and the total assets. O better evolution of the latter leads to financial performance and, as a result, a mixture of the right managing decisions is needed to administer both the potential expenses generated by the liquidity risk and the bank`s need to give more credits which implies applying interest-rates and earning margins (the difference between the rate of the credits and the rate paid for the drawn-in resources).

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