A Multivariate Analysis of Determinants of Banking Profitability in Romania

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Abstract. *This study proposes to identify the factors that had an influence on the evolution of the return ratios of the banks and their impact on the banking performances by applying a multivariate regression model on the example of three most representative banks in Romania during 2010-2017 period. Thus, the return ratios (ROA and ROE), are considered dependent variables, while the capital adequacy ratio (CAR), the nonperforming loans (NPL) ratio, the net interest margin (NIM), the credits/deposits (CD) report, the debts/equity (DE) report, the demand deposits ratio (DDR) and the time deposits ratio (TDR) are the independent variables. The conclusions of the study are that the credits/deposits report, the debts/equity report and the nonperforming loans ratio have a significant influence, but negative effects on the return on assets, while the capital adequacy ratio, the interest margin and the time deposits ratio do not have a considerable effect on the return.*

Key words: net profit rate, return on assets, return on equity, nonperforming loans, multivariate regression, panel data.

Classification JEL: G2.

1. Introduction

In the specialty literature one pays a great importance to the analysis of the performances in the financial-banking because it works as a catalyst for the economic growth sustained by providing the financial mediation. In the conditions of a harsh competition, the deregulation, the globalization continual innovation for the supply of financial services acceptable to the clients, the interest of all the parties involved and interested in the detailed critical evaluation of banks has increased, including from the performances point of view. More studies (McKinnon, 1973; Levine, 1997) have proven that the efficiency of a financial system reduces the information and transaction costs, plays an important part in establishing the saving rate, the investments decisions, the technological innovations and therefore the economic growth rate.

The performance of a bank can be defined as being the measurable stability level of its activity, characterized by reduced levels of the risks of any kind.

In the evaluation of the performance of a company one usually uses the financial rates, because it offer a simple description on the financial performance of the company as compared to the previous times and it helps on the improvement of the management performance. Thanks to the rates analysis one can establish the financial position of the bank in comparison to other banks.

When we speak of measuring the performances and especially on comparing certain banks of different sizes from the performances point of view, a series of drawbacks are encountered in the use of the net income and the net profit, that is why one appeals to a series of other indicators which measure the performance, such as: ROA, ROE and the net interest margin.

2. Literature Review

We will make a brief survey of some of the literature works that approached the problematic of the banking performances.

We have identified two ways used in the specialty literature for measuring the banking performances, the accounting one which uses the financial indicators and the econometric one. The traditional accounting method uses the financial rates to evaluate the banking performance, but the limits of this method cumulated to the progresses of science led to alternative methods.

Hempel and Simonson (1998) made a study regarding the financial performance of banks and the managerial efficiency in Taiwan. The study consisted in the idea that the greater the ROA, the greater the financial performance or the profitability of banks.

Ahmad and Hassan (2007) had analyzed the quality of the assets, the capital rates, the operational rates for seven years, from 1994 until 2001 for the Islamic banks.

Jha and Sarangi (2011) analyzed the performances of seven banks using eleven indicators (operational, financial and efficiency) to make a classification of the banks in India.

Great part of the present specialty literature which analyzes the banking performance considers that the objective of the financial organization is the one of making a certain proportion between gain and risk, in other words making a level of profitability and minimal reduction of taken risks (Hempel G. Coleman, 1986).

Spathis and Doumpos (2002) in their study used a methodology with more criteria in order to classify the Greek banks depending on the profit and the operation factors among the small and great banks.

Faisal Abbas, M. Tahir (2014) used the measurement of the financial performances to analyze the rapid economic growth from the banking sector. The obtained results showed that the banks with greater total assets, and greater equities don't necessarily have a greater performance.

In an article that analyzes the performance of the investment banks in Pakistan during 2006-2009 one stated that the performance of the banks considered based on the efficiency rate is different from the one determined based on the liquidity coefficient, on the lever effect rate (Ali Raza, Muhammad Farhan, 2011).

Avkiran (1995) considers that the financial performance of the commercial banks is measured by means of a combination of analysis of the financial indicators, comparative evaluation, of measuring the performance comparatively to the budget, or a combination of theses methodologies.

Bakar and Tahir (2009) use in their work multiple linear regressions to estimate the banking performances. Thus, ROA was used as variable dependent on the performance of the bank and seven variables, namely the liquidity, the credit risk, the cost-incomes report, the size and the concentration rate were used as independent variables. They reached the conclusion that the multiple linear regression can be useful for the study of the linear connection between the dependent variable and the independent variables.

Alam and colab. (2011) concluded that the classification of the banks differ as the financial rates change.

Gopinathan (2009) showed that the analysis of the financial indicators is useful to the investors because based upon it they could choose the best investment options, because this analysis measures different aspects of the performance of a company or of an institution.

3. Methodology and Data

This study proposes to identify the factors that had an influence on the evolution of the return ratios of the banks and their impact on the banking performances by applying a multivariate regression model. Thus, the return ratios (ROA and ROE), are considered dependent variables, while the capital adequacy ratio (CAR), the nonperforming loans (NPL) ratio, the net interest margin (NIM), the credits/deposits (CD) report, the debts/equity (DE) report, the demand deposits ratio (DDR) and the time deposits ratio (TDR) are the independent variables.

The empiric model used will be estimated in order to point out the theoretical predictions within the two equations below:

$$ROA = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \alpha_5 X_5 + \alpha_6 X_6 + \alpha_7 X_7 + \varepsilon \quad (1)$$

$$ROE = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \alpha_5 X_5 + \alpha_6 X_6 + \alpha_7 X_7 + \varepsilon \quad (2)$$

Where: X_1 = the capital adequacy ratio (CAR), X_2 = the nonperforming loans (NPL) ratio, X_3 = the net interest margin (NIM), X_4 = the credits/deposits (CD) report, X_5 = the debts/equity (DE) report, X_6 = the demand deposits ratio (DDR) and X_7 = the time deposits ratio (TDR), α_0 = constant, α_i= variables coefficient and ε = the residual value of regression.

Returning to our sample, we shall use the quarterly data from 3 commercial banks from Romania during 2010 - 2017. The information specific to the banks are collected or calculated thanks to the data from their financial reports. The final sample contains 96 observations and it contains 3 representative commercial banks in Romania.

4. Results and discussions

Therefore, for the study of the correlation we shall estimate a panel data model in Eviews. The model with panel data consist of the estimation by regression equations in which one uses series that are both time series and also cross-section data.

The estimation of the coefficients was made based on the data from Table 1 – for the first equation and on the data from Table 2 for the second equation.

By applying the method of the least squares for the analyzed variables, the independent variables which are statistically significant are similar in the two cases.

Thus, in case *ROA is the dependent variable*, we can observe that for the CAR variable, P-value has the value 0.88 > 0.05, which means that this variable is not strongly significant and therefore the relation between ROA and CAR is not very strong. One observes the existence of a positive correlation of this variable with the dependent variable, so that on a growth by one unit of the capital adequacy ratio, a growth of ROA by 0.01 will take place.

For the CD and NIM variables the P-value is 0.12 respectively 0.13 > 0.05, which means that these variables are not significant and indicate us the fact that a growth by one unit of the CD or NIM indicator level determines the decrease by 2.16 and by 0.31 respectively of the dependant variable.

The value of the probability associated to the DE and NPL variables is 0.00 respectively 0.00<0.05, which means that these variables are significant from the statistic point of view, and the coefficients associated to them show us that on a growth by one unit of the independent variable, we will register a decrease of ROA by 1.53, 0.21 respectively.

For the TDR and DDR variables the P-value is 0.01 respectively 0.01<0.05 which means that these variables are significant and a modification of these variables by one unit generates a growth of ROA by 12.16, 0.18 units respectively.

The determination coefficient R-squared is 0.91, which shows us the fact that 91% of the ROA variation is explained by the evolution of the variables included in the regression. The adjusted value of the determination coefficient is 0.90, approximately equal to the determination coefficient and it explains the fact that the sample is representative for a depiction of reality as concise as possible.

Durbin Watson statistic (DW) is a statistic test that tests the serial correlation of the errors. If the errors are not correlated, then the value of DW will be around 2. In the example below this indicator has the value 2.02, and therefore, there is no serial correlation of the errors between the independent variables and the ROA.

Table no. 1. The estimation of the regression equation with the dependent variable ROA

Dependent Variable: **ROA**
Method: Panel Least Squares
Date: 10/04/18 Time: 12:03
Sample (adjusted): 2010Q2 2017Q4
Periods included: 31
Cross-sections included: 3
Total panel (balanced) observations: 93
Convergence achieved after 11 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CAR	0.013945	0.094012	0.148327	0.8824
CD	-2.164392	1.395446	-1.551040	0.1247
DE	-1.533843	0.138142	-11.10336	0.0000
NIM	-0.310278	0.203134	-1.527458	0.1304
NPL	-0.211647	0.032655	-6.481251	0.0000
TDR	12.16349	4.887754	2.488564	0.0148
DDR	12.18849	4.896464	2.489243	0.0148
C	-1199.432	490.1524	-2.447060	0.0165
AR(1)	0.979120	0.029617	33.05967	0.0000
R-squared	**0.914566**	Mean dependent var		0.929785
Adjusted R-squared	**0.906430**	S.D. dependent var		1.663330
S.E. of regression	0.508800	Akaike info criterion		1.578241
Sum squared resid	21.74569	Schwarz criterion		1.823332
Log likelihood	-64.38823	Hannan-Quinn criter.		1.677202
F-statistic	112.4026	**Durbin-Watson stat**		**2.027777**
Prob(F-statistic)	0.000000			
Inverted AR Roots	.98			

Source: Own calculations in Eviews

The resulted regression equation is:

ROA = 0.0139445308762*CAR - 2.1643921121*CD - 1.5338426404*DE - 0.310278042003*NIM - 0.211646809592*NPL + 12.1634907683*TDR + 12.1884903921*DDR - 1199.43223391 + [AR(1)=0.979119721987]

In case *ROE is the dependent variable,* we can observe that for the CAR variable, the P-value has the value 0.38 > 0.05, which means that this variable is not stronlgy significant and thus the relation between ROE and CAR is not very strong. One states the existence of a negative correlation of this variable to the dependent variable, so that on a growth of the capital adequacy ratio by one unit a decrease of ROE by 0.94 units will take place.

For the CD and DE variables the P-value is 0.03 respectively 0.00 < 0.05, which means that these variables are significant and indicate us the fact that a growth of the CD or DE indicator level by one unit determines the decrease by 33.80 and 19.03 respectively of the dependent variable.

The value of the probability associated to the NIM and NPL variables is 0.01 respectively 0.00<0.05, which means that these variables are not statistically significant, and their coefficients show us that on a growth of the independent variable by one unit, we shall register a decrease of ROE by 5.60, 2.59 respectively.

For the TDR and DDR variables the P-value is 0.02 respectively 0.02<0.05 which means that these variables are significant and a modification of these variables by a unit generates a growth of ROE by 129.25, 129.46 units respectively.

The determination coefficient R-squared is 0.91, which shows the fact that 91% of the ROE variation is explained by the evolution of the independent variables included in the regression. The adjusted value of the determination coefficient is 0.90, approximately equal to the one of the determination coefficient and it explains the fact that the sample is representation of an as concise as possible depiction of reality.

Durbin Watson statistic (DW) is a statistic test which tests the serial correlation of errors. If the errors are correlated, then the value of DW will be around 2. In the example below this indicator has value 2.03, and therefore, there is no serial correlation of the errors between the independent variables and ROE.

Table no.2. The estimation of the regression equation with the dependent variable ROE

Dependent Variable: **ROE**
Method: Panel Least Squares
Date: 10/04/18 Time: 12:02
Sample (adjusted): 2010Q2 2017Q4
Periods included: 31
Cross-sections included: 3
Total panel (balanced) observations: 93
Convergence achieved after 10 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CAR	-0.946979	1.089441	-0.869234	0.3872
CD	-33.80199	16.10358	-2.099036	0.0388
DE	-19.03680	1.594950	-11.93567	0.0000
NIM	-5.600004	2.344039	-2.389040	0.0191
NPL	-2.599690	0.375906	-6.915803	0.0000
TDR	129.2538	56.33634	2.294324	0.0243
DDR	129.4640	56.43686	2.293961	0.0243

C	-12692.62	5652.398	-2.245528	0.0274
AR(1)	0.986126	0.024284	40.60752	0.0000

R-squared	**0.913409**	Mean dependent var	8.735699
Adjusted R-squared	**0.905162**	S.D. dependent var	19.12270
S.E. of regression	5.888974	Akaike info criterion	6.475806
Sum squared resid	2913.121	Schwarz criterion	6.720896
Log likelihood	-292.1250	Hannan-Quinn criter.	6.574767
F-statistic	110.7598	**Durbin-Watson stat**	**2.034740**
Prob(F-statistic)	0.000000		

Inverted AR Roots	.99

Source: Own calculations in Eviews

The resulted regression equation is:
ROE = -0.946979436238*CAR - 33.8019877236*CD - 19.0367995286*DE - 5.60000404916*NIM - 2.59969000141*NPL + 129.253824164*TDR + 129.463978152*DDR - 12692.6165119 + [AR(1)=0.986125834275]

At the same time, in order for the interference based on the results of the linear regression is valid, the ***multicollinearity*** must be tested, namely one must check that the independent variables are not correlated among them. This thing is realized by using the Variance Influence Factor (VIF) from Eviews. So that no multicollinearity exists the VIF values must be below 10 (there are opinions in literature that say they should be below 5, see http://www.researchconsultation.com/multicollinearity-regression-spss-collinearity-diagnostics-vif.asp). From table no.3 one observes that the TDR and DDR independent variables are very correlated between them, the obtained VIF values being very high.

Table no.3. The Variance Influence Factor (VIF) Test

Variance Inflation Factors
Date: 10/05/18 Time: 14:17
Sample: 2010Q1 2017Q4
Included observations: 93

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
CAR	0.008838	3.981686	3.294621
CD	1.947269	1.515321	1.446390
DE	0.019083	2.249138	2.076211
NIM	0.041263	1.572980	1.489661
NPL	0.001066	1.680307	1.497335
TDR	**23.89014**	**147100.7**	**142837.2**
DDR	**23.97536**	**159280.8**	**142793.2**
C	240249.3	37657.49	NA
AR(1)	0.000877	2.198890	1.030517

Variance Inflation Factors
Date: 10/05/18 Time: 14:19

Sample: 2010Q1 2017Q4
Included observations: 93

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
CAR	1.186883	3.738290	3.311387
CD	259.3251	1.452267	1.444804
DE	2.543867	2.147349	2.078679
NIM	5.494520	1.530060	1.493657
NPL	0.141305	1.630622	1.493768
TDR	**3173.783**	**142545.3**	**142138.4**
DDR	**3185.120**	**153763.3**	**142093.4**
C	31949608	16503.37	NA
AR(1)	0.000590	2.418013	1.033533

Source: Own calculations in Eviews

Therefore, we consider it is necessary to eliminate from the two equations the DDR independent variable and consequently the following results are obtained:

Table no. 4. The estimation of the regression equation with the dependent variable ROA

Dependent Variable: **ROA**
Method: Panel Least Squares
Date: 10/05/18 Time: 14:47
Sample (adjusted): 2010Q2 2017Q4
Periods included: 31
Cross-sections included: 3
Total panel (balanced) observations: 93
Convergence achieved after 12 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CAR	-0.035572	0.094408	-0.376788	0.7073
CD	-2.801946	1.415430	-1.979571	0.0510
DE	-1.606507	0.138836	-11.57126	0.0000
NIM	-0.324331	0.209759	-1.546210	0.1258
NPL	-0.190498	0.032734	-5.819651	0.0000
TDR	-0.003144	0.015276	-0.205814	0.8374
C	20.19158	3.710447	5.441820	0.0000
AR(1)	0.971421	0.029756	32.64651	0.0000

R-squared	**0.908258**	Mean dependent var	0.929785
Adjusted R-squared	**0.900702**	S.D. dependent var	1.663330
S.E. of regression	0.524141	Akaike info criterion	1.627983
Sum squared resid	23.35152	Schwarz criterion	1.845841
Log likelihood	-67.70119	Hannan-Quinn criter.	1.715947
F-statistic	120.2152	**Durbin-Watson stat**	**2.017989**
Prob(F-statistic)	0.000000		

Inverted AR Roots	.97

Source: Own calculations in Eviews

The regression equation is:

ROA = -0.0355717777199*CAR - 2.8019456115*CD - 1.60650719752*DE - 0.324331302466*NIM - 0.19049811737*NPL - 0.0031440767744*TDR + 20.1915817001 + [AR(1)=0.971420872373]

Table no. 5. The estimation of the regression equation with the dependent variable ROE

Dependent Variable: **ROE**
Method: Panel Least Squares
Date: 10/05/18 Time: 14:46
Sample (adjusted): 2010Q2 2017Q4
Periods included: 31
Cross-sections included: 3
Total panel (balanced) observations: 93
Convergence achieved after 10 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CAR	-1.480602	1.090118	-1.358203	0.1780
CD	-40.75295	16.23841	-2.509664	0.0140
DE	-19.83059	1.595114	-12.43209	0.0000
NIM	-5.754836	2.407380	-2.390498	0.0190
NPL	-2.377488	0.374883	-6.341953	0.0000
TDR	0.021934	0.175668	0.124858	0.9009
C	266.6026	51.01567	5.225896	0.0000
AR(1)	0.980443	0.024231	40.46277	0.0000

R-squared	**0.907983**	Mean dependent var	8.735699
Adjusted R-squared	**0.900405**	S.D. dependent var	19.12270
S.E. of regression	6.034872	Akaike info criterion	6.515081
Sum squared resid	3095.673	Schwarz criterion	6.732939
Log likelihood	-294.9513	Hannan-Quinn criter.	6.603046
F-statistic	119.8201	**Durbin-Watson stat**	**2.027543**
Prob(F-statistic)	0.000000		

Inverted AR Roots	.98

Source: Own calculations in Eviews

The regression equation is:
ROE = -1.48060223388*CAR - 40.7529493931*CD - 19.8305922924*DE - 5.75483572344*NIM - 2.37748800446*NPL + 0.0219335422045*TDR + 266.602605984 + [AR(1)=0.9804430175]

By applying the VIF test again for testing the multicollinearity the following results are obtained:

Table no. 6. The Variance Influence Factor (VIF) test in case ROA is the dependent variable

Variance Inflation Factors
Date: 10/05/18 Time: 14:59
Sample: 2010Q1 2017Q4
Included observations: 93

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
CAR	0.008913	4.118088	3.124774
CD	2.003443	1.599079	1.397830
DE	0.019275	2.288152	1.963604
NIM	0.043999	1.641943	1.484838
NPL	0.001071	1.633276	1.406874
TDR	0.000233	1.431961	1.310800
C	13.76741	3.807200	NA
AR(1)	0.000885	1.466397	1.029175

Source: Own calculations in Eviews

Table nr. 7. The Variance Influence Factor (VIF) test in case ROE is the variable dependent

Variance Inflation Factors
Date: 10/05/18 Time: 15:00
Sample: 2010Q1 2017Q4
Included observations: 93

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
CAR	1.188358	3.755057	3.150135
CD	263.6860	1.443893	1.393281
DE	2.544388	2.111809	1.969937
NIM	5.795477	1.562428	1.489504
NPL	0.140537	1.567857	1.404795
TDR	0.030859	1.341889	1.312282
C	2602.599	2.543618	NA
AR(1)	0.000587	1.508201	1.028543

Source: Own calculations in Eviews

From tables no. 6 and 7 one observes that the best VIF values are obtained in the case of the regression equation in which the dependent variable is the return on assets ROA which suggests that the chosen independent variables had a greater impact on ROA than on ROE.

This if we take into account the results obtained after the multiple linear regression in which ROA is the dependent variable, we can observe that for the CAR

variable, P-value has the value 0.70 > 0.05, which means that this variable is not strongly significant and thus the relation between ROA and CAR is not very strong. One observes the existence of a negative correlation of this variable with the dependent variable, this that on a growth of the capital adequacy ratio by one unit, a decrease of the ROA by 1.48 units will take place

For the CD and DE variables the P-value is 0.05 respectively 0.00 < 0.05, which means that these variables are significant and indicate us that a growth of the CD or DE indicator level by one unit determines the decrease of the dependent variable by 2.80 and 1.60 units.

The value of the probability associated to the NIM variable is 0.12 > 0.05, which means that this variable is not statistically significant, and the coefficient associated to it shows us that on a growth of the independent variable by one unit, we shall register a decrease of ROA by 0.32.

For the NPL variable the P-value 0.00 < 0.05 which means that this variable is significant and its modification by one unit generates a decrease of ROA by 2.37 units.

For the TDR variable the P-value 0.83 > 0.05 which means that this variable is not significant and its modification by one unit generates a decrease of ROA by 0.003 units.

The determination coefficient R-squared is 0.91, which shows the fact that 91% from the ROA variation is explained by the evolution of the independent variables included in the regression. The adjusted value of the determination coefficient in 0.90, approximately equal to the one of the determination coefficient and it explains the fact that the sample is representative for an as most concise as possible depiction of reality.

Durbin Watson statistic (DW) is a statistic test which tests the serial correlation of errors. If the errors are not correlated, then the value of DW will be around 2. In the example below this indicator has the value 2.02, and therefore, there is no serial correlation of errors between the independent variables and ROA.

One can observe that between the dependent variable ROA and the independent variables there are negative correlations, some weaker and others stronger. Therefore, the increase of the values of the independent variables has negative effects on the dependent variable ROA, namely an increase of the credits/deposits report, of the debts/equity report and of the nonperforming loans ratio has negative repercussions on the performances of the analyzed banks and in fact it is the inefficient management of these indicators that led to weak results obtained by the performance indicators.

5. Conclusions

Thus, the study made shows us that the performances of the bank are negatively influenced by the NPL, the DDR and the NIM, the NIM is tightly connected to the volume of the time deposits, the NPL to the CD report, and the CAR is influenced by the NPL, but also by the net profit and the ROE.

In relation to the performances of each of the three banks we can conclude that BCR, although it has the highest capital adequacy degree, the greatest interest margin and the best time deposits ratio, these resources do not generate high profits, but on the contrary, the return ratios are the weaker of the three analyzed banks, in most part, as it also results from the analysis of the existing correlations, determined by the very high nonperforming loans ratio.

In the case of BRD, it has the lowest net interest margin and the less advantageous demand deposits ratios, but, however the return ratios are not the lowest also because of the nonperforming loans level, of the credits/deposits report and of the time deposits ratios.

In the case of Raiffeisen, although it has the lowest capitalization of the three banks, and it does not have the greatest net interest margin, still it has the best return ratios, the lowest nonperforming loans ratio and the best credits/deposits report.

Based on the multivariate regression for the identification of the factors that influence the evolution of the return ratios we can conclude that the credits/deposits report, the debts/equity report and the nonperforming loans ratio have a significant influence, but negative effects on the return on assets, while the capital adequacy ratio, the interest margin and the time deposits ratio do not have a considerable effect on the return.

References

Ahmad, A.U.F. & Hassan, M.K., (2007). Regulation and Performance of Islamic Banking in Bangladesh, *Thunderbird International Business Review*, 49(2), 251-277.

Alam, H.M., Raza, A. &Akram, M.A. (2011). Financial performance comparison of public vs private banks: The case of commercial banking sector of Pakistan. *International Journal of Business and Social Science*, 2(11), 56-64.

Ali, R. &Muhammad, F. (2011). A Comparison of Financial Performance in Investment Banking Sector in Pakistan*. International Journal of Business and Social Science*, Vol. 2(9), 72-81.

Andrieş, A.M. (2010). *Performanţa şi eficienţa activităţii bancare*, Iaşi, Editura Universităţii Alexandru Ioan Cuza din Iaşi.

Anghelache, C., (2009) *Metode şi modele de măsurare a riscurilor şi performanţelor financiar-bancare*, Bucureşti, Artifex Publishing House.

ArzuTektas & Gokhan G., (2005) Asset and liability management in financial crisis, *The Journal of Risk Finance*, Vol. 6, No.2, pp.135-149.

Avkiran, N.K. (1995). Developing an instrument to measure customer service quality in branch banking. *International Journal of Bank Marketing*, 12(6), 10-18.

Bakar, N. & Tahir, I.M.(2009). Applying multiple linear regression and neural network to predict bank performance. *International Business Review*, 2(4), 176-183.

Chien, Ho. & Danw Song Zhu. (2014). Performance measurement of Taiwan commercial banks, *International Journal of Productivity and Performance management*, 53(5), 425-434.

Duncan, E.& Elliot, G. (2004). Efficiency, customer service and financial performance among Australian financial institutions, *International Journal of Bank marketing*, 22(5), 319-342.

Faisal, A., &Tahir, M. R. (2014). A Comparison of Financial Performance in the Banking Sector: Some Evidence of Pakistani Commercial Banks. *Journal of Business Administration and Education*, 1(1), 1-14.

Gopinathan, T. (2009). Financial ratio analysis for performance, check., http://suite101.com/article/financial-ratio-analysis-for-performancecheck-a109025, 2009.

Hempel, G., Coleman, A. & Smon, D. (1986). *Bank Management Text and Cases*, New York, NY:Wiley.

Hempel, G. H., &Simonson, D.G. (1999). *Bank Management: Text and Cases*, New York, NY: Wiley and Sons, 5th Ed.

Jha, D.K.&Sarangi, D.S. (2011). Performance of New Generation Banks in India: A Comparative Study, *International Journal of Research in Commerce and Management*, 2 (1), 85-89.

Mishkin, Frederic S. - *The Economics of Money, Banking and Financial Markets* (7th Ed.) – Chapter 9, NY: Addison-Wesley.

Spathis, K. & Doumpos, M. (2002). Assessing profitability factors in the Greek banking system: A multi criteria methodology*. International transaction in Operational Research*, 9, 517-530.

Thabet A., Edris (1997) Services considered important to business customer and determinants of bank selection in Kuwait: A segmentation analysis. *International Journal of Bank marketing*, 15(4),126-133.

Munteanu A., Brezeanu P. & Badea M. (2013). Modele de transformare a productivităţii în sistemul bancar românesc – impactul dimensiunii şi al originii acţionariatului asupra productivităţii totale. *Economie teoretică şi aplicată*, XX(6), pp. 31-48.

Popescu, J., Meiță, L., Popa, B. (2016). ”*A Comparative Analysis of Bank Performance in Romania in the Period before the Global Financial Crisis and Post - Crisis*”, Review Finance - Challenges of the Future, no.16/2016, pg. 36-44.

BCR, Rapoarte financiare 2010-2017, retrieved from https://www.bcr.ro/ro/investitori/rapoarte-financiare.

BRD, Rapoarte anuale 2010-2017 retrieved from https://www.brd.ro/despre-brd/investitori-si-actionari/comunicare-financiara/rapoarte-anuale.

Raiffeisen, Rapoarte anuale 2010-2017 retrieved from https://www.raiffeisen.ro/despre-noi/guvernanta-corporativa/rapoarte-anuale/.