The Role of Using CAMELS Model in Analyzing the Factors Affecting the Performance of The Jordanian Commercial Banks (2014-2019)

SENAN AMER
PHD CANDIDATE
UNIVERSITY OF MISKOLC
e-mail: amer.senan@student.uni-miskolc.hu

SUMMARY
In this study, the factors affecting the performance of Jordanian commercial banks have been analyzed using the elements of the CAMELS model, along with identifying the most important factors. The study targeted the impact of twenty Jordanian commercial banks on performance; these banks were listed on the Amman Stock Exchange during the period of 2014-2019. The researcher used the Data Pooled Regression Method, due to its relevance to the nature of the data used in the study, where this method is used in the case of a time series and cross-sectorial data. The Rate of Return on Assets and the Rate of Return on Equity were used as the two variables on which the banks' performance was measured. However, the independent variables included the CAMELS model elements which are capital adequacy, asset quality, management efficiency, earnings, liquidity, and sensitivity to market risks, in addition to macroeconomic variables, which include the rate of economic growth and the rate of inflation. The study concluded that capital adequacy, asset quality, management efficiency, and earnings are among the most important and most influential factors with regards to the Jordanian commercial banks, which are represented by the Rate of Return on Assets and the Rate of Return on Equity. Moreover, the study also concluded that it is possible to derive a miniature model from the CAMELS model called the CAME model, which has a great ability to explain and measure the performance of commercial banks in Jordan. Finally, the study recommended the Central Bank of Jordan to use the CAMELS model to evaluate Jordanian commercial banks.

Keywords: Performance Evaluation, CAMELS model, Return on Equity, Return on Assets, Jordanian Banks.
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INTRODUCTIONS
Banks have a great importance in the economies of developed and developing countries alike, due to several reasons, such as the large proportion of banks compared to other types of companies, and the multiplicity of Stakeholders who have a relationship with the Bank as shareholders, depositors and borrowers. The country's economic situation along with the effectiveness of the monetary policy depends on the situation of the financial system, in particular of the banks (Swyngedouw et al., 2002). In light of the crucial role of banks, and in view of the multiplicity of banks’ stakeholders, it has become necessary to impose direct monitoring over banks in order to ensure their safety and durability, and to avoid exposing the banks to any undesirable events that may affect them, the stakeholders, and the economy as a whole. Hence it has increased the importance of banks monitoring by authorities, since it plays an important role in protecting the rights of depositors, shareholders, customers and various stakeholders in the bank. In addition, it strengthens the confidence in the banking sector and enhances the monetary and banking stability. (Mishkin, 2001) and (Noy, 2004) indicated
that the weakness of the monitoring and supervisory systems in - banks is regarded as one of the most important factors- which leads to bank failure and generate banking crises. Central banks are one of the most important supervisory bodies over banks due to the existence of a legal basis that enables them to exercise monitoring over banks- this field banks usually use a group of monitoring tools in both the field and the office. One of the most important tools is the CAMELS Model, which evaluates the whole bank situation and identifies its strengths and weaknesses. The CAMELS model is defined as a comprehensive assessment tool used by oversight bodies to assess the financial strength of banking institutions. This model includes six basic dimensions, which are the Capital Adequacy, Assets Quality, -Management -Efficiency, Earnings, Liquidity, and Sensitivity to market risk. The name of the model reflects the first letter of each of the above dimensions. Based on the foregoing, this study comes to analyze the factors affecting the performance of the Jordanian commercial banks using the elements of the CAMELS model, and to determine the factors that most affect the performance of these banks. In this regard, it is noted that many previous studies that examined the performance of banks used macroeconomic variables as intermediate variables, due to the presence of a significant impact of the country's economic condition on the bank’s performance indicators. Therefore, the current study will use two variables of the macroeconomic, the rate of economic growth and the rate of inflation in order to extract the net effect of the CAMELS model elements on the banks performance indicators. The importance of this study stems from the fact that it links the elements of -the CAMELS model, and the performance of Jordanian commercial banks, -as the CAMELS model, is one of the most important tools that Central banks use to evaluate and - monitor banks to -ensure (Thagunna and Poudel ,2013), the integrity and durability of the banking system. Moreover, the central bank of Jordan uses this method to evaluate the performance of banks in Jordan. Therefore, the results obtained by this study is of great importance to banking regulators because it gives them more understanding of the impact of the CAMELS model elements on the performance of banks, and it also gives the benefit of determining the most influential elements of the model on the banks performance. This study also adds to the previous studies and opens new horizons for future studies, because it follows the same methodology used by the regulatory authorities for the purposes of bank performance assessment. This study is trying to answer the following questions:

- What is the effect of the bank specific variables represented in Elements of the CAMELS model on the performance of the Jordanian banks?
- What is the impact of macroeconomic variables on the performance of the Jordanian commercial banks?

**THEORETICAL-FRAMEWORK OF THE STUDY**

**Evaluation of bank performance**

The Bank's performance evaluation aims to ensure that the resources available -for it are used efficiently, therefore it is a comprehensive process in which all Data, accounting, etc., determine the financial situation of the bank, and specifying how its resources were managed during a specified period of time. The financial performance of banks is defined as all the activities and efforts made by the banks to play their role and carry out their functions to provide banking services (Berger et al, 2005). The financial performance of the bank is an important mean for diagnosing weakness and strength -in the performance and the various activities of the bank, which are aimed at providing the necessary information to take appropriate measures to guarantee the bank’s achieving revenues and profits and to remain in the competitive market (Nadiri, et al ,2009).

Also, the evaluation of financial performance is also an important and necessary process to know the extent to which the bank has achieved its plans and objectives, which are an imperative pillar of its work monitoring. The importance of evaluating the performance of banks stem from several aspects, most notably that it constitutes the basis for measuring the bank success and the extent to which it seeks to follow up on its activity to achieve its objectives, and that it provides an information system for the purpose of planning, monitoring and decision making (Soana ,2011). For a successful performance assessment three pillars must be taken into consideration:

1. Economy in the use of resources: -The bank is efficient when -obtaining good economic resources at the lowest possible cost, and this requires the existence of an effective monitoring system within the bank (Buyya& Venugopal, 2005).

2. Efficiency: Is the optimal use of available resources to achieve a certain volume or level of output at the lowest costs, and it is one of the most important measures of success for organizations in achieving their goals (Gunasekaran & Kobu ,2007).

3. Effectiveness: This reflects the extent to which the bank has achieved its main and minor
objectives, and the consistency of the achieved objectives with the planned objectives. It also reveals deviations, their causes, and the ways to correct and avoid them in the future. (Dibbern et al., 2004).

Performance evaluation criteria are based on a set of criteria that can be used to measure and compare the level of performance, which includes the following (Hashimoto et al., 1992).

1. Historical criteria: They are based on a comparison between the current financial indicators and the historical indicators of the bank and determine the extent of improvement or decline in those indicators.
2. Targeted criteria: It is based on comparing the bank's performance with the planned standards.
3. Industry criteria: These are based on the comparison between the bank's performance with the rest of the banks.

**CLASSIFICATION SYSTEM (CAMELS)**

The CAMELS system is one of the most important classification systems used by the world's supervisory bodies to assess the safety of banks. The history of this system dates back to November 1979 when it was first used by the American Federal Council for the Examination of Financial Institutions, after which this system was adopted by the National Credit Union Administration (NCUA) in the USA in October of the year 1987 (Cole & Gunther, 1998). The word indicates (CAMELS) the first letters of the components of this system, which includes six elements: Capital Adequacy, Asset Quality, Management, Earnings, Liquidity, and Sensitivity to Market Risk (Guan et al., 2019). The CAMELS system is based on a quintuple classification - ranging from one to five, as the following: Rating 1 is the best rating and reflects the soundness of the bank's operations and the presence of strong performance and risk management practices, while rating 5 is the worst rating for the bank because it reflects that the bank's performance is not satisfactory and indicates a high probability of bank failure, and also the presence of significant challenges - to be faced by the management.

Usually, the following procedures here carried out by the supervisory authorities are to liquidate the bank, or resort to merger and acquisition (Hashemi et al., 1998).

**METHODOLOGY**

By going through the methodologies of previous studies, which aimed at knowing the effect of the CAMELS model elements on the performance of commercial banks including studies such as (Nguyen et al., 2020) and (Sangmi et al., 2010). In light of the objectives of this study to be achieved, a standard model for the current study was developed, which tests the effect of CAMELS model elements and the macroeconomic variables on the performance of the Jordanian commercial banks. This form is formulated as follows:

\[
\text{Performance} = (\text{CAMELS, Macroeconomic, } \epsilon) \cdot \ldots \cdot (1)
\]

Whereas performance refers to the performance measures of Jordanian commercial banks, which include the Rate of Return on Assets (ROA), and the Rate of Return on Equity (ROE). CAMELS refers to the elements of the CAMELS model, where Macroeconomic is the macroeconomic variable, and \( \epsilon \) is the random error coefficient. Through the previous model, two sub-models of the study can be formulated as follows:

\[
\begin{align*}
\text{ROAi} & = \beta_1 + \beta_2Ci_i + \beta_3Ai_i + \beta_4Mi_i + \beta_5Ei_i + \beta_6Li_i + \beta_7Si_i + \beta_8GRT_Ht + \beta_9Inft + \epsilon \ldots (2) \\
\text{ROEi} & = \beta_1 + \beta_2Ci_i + \beta_3Ai_i + \beta_4Mi_i + \beta_5Ei_i + \beta_6Li_i + \beta_7Si_i + \beta_8GRT_Ht + \beta_9Inft + \epsilon \ldots (3)
\end{align*}
\]

Whereas ROAi is the rate of Return on Assets for the bank i per year t, and ROEi, t is the Return on Equity for the bank i per year t. The independent variables however, include elements of the six CAMELS model, Ci.t is the bank's capital adequacy i per year t, and Ai. t is the quality of the bank's assets for the Bank i per year t, Mi.t is the bank management efficiency i per year t, Ei.t is the bank earnings i per year t, Li.t is the bank liquidity i per year t, Si.t is the sensitivity to market risk of the bank i per year t, the macroeconomic variables include two variables, GRT.H - which reflects the rate of economic growth per year t, and Inft which is the inflation rate per year t.

**PROCEDURAL DEFINITIONS OF STUDY VARIABLES**

**The Dependent variables**

Previous studies include several measures of bank performance, including the most important ones, which are the Return on Assets and the Return on Equity and these measures will be used in the current study.

1. The Rate of Return on Equity: This scale refers to the achieved net profit on the investors' money in the bank. It also refers to the return achieved by investors in the bank, and it shows the bank effectiveness in using the investors' money (Arditti, 1967). The rate of Return on Equity is estimated through dividing the after tax on the total Equity.
2. The Rate of Return on Assets: The rate of Return on Assets measures the achieved net profit on assets invested in the bank, and it shows how much profit is achieved by a company for every JOD of its assets, therefore it is considered as an important indicator of the administrative efficiency in the bank. Moreover, this scale presents the extent of Effectiveness of managing the bank’s assets to achieve profits (Burton et al., 2002). The Rate of Return on Equity will be calculated through dividing the net profit after tax on the total Equity of the bank.

3. Management Quality: This element includes the analysis of five qualitative indicators, which are mainly: governance, human resources, procedures, control, audit, information system and strategic planning (Saraph et al., 1989). Therefore, the quality of the bank’s management is evaluated through the following criteria:
   a) Governance: where the work of the board of directors is evaluated on the basis of the diversity of technical expertise and its ability to make decisions independently of management, effectively and flexibly (Tushman & Nadler, 1986).
   b) Human Resources: It constitutes the second criterion that evaluates whether the Human Resources Department provides advice and guidance and has a clear impact on users, through the recruitment and training criterion as well as the workers’ motivation system and the performance appraisal system (Diallo et al., 2003).
   c) Monitoring and auditing process: where the degree of formation of the basic processes and their effectiveness in managing risks at the organization level -are evaluated, through an evaluation of the internal control system and the quality of internal and external audits. (Dipper, 1998).
   d) Information system: which evaluates the efficiency and effectiveness of the information system in providing accurate and timely annual reports (Narasimhan & Kim, 2001).
   e) Strategic planning: which determines whether the organization has developed an integrated approach to short- and long-term financial projections (Kotler & Murphy, 1981).

4. Earnings: is one of the most important ratios that measure the performance of the bank. Earnings is the main objective of the banks and the prime source of increase in capital of a bank. The ratio that is used to evaluate the earnings is the interest margin to gross income (Sayed, G & Sayed, N, 2013). The bank's earnings through net interest margin will be calculated by dividing the difference between the interest received and the interest paid by the total income. (Maudos & De Guevara, 2004).

5. Liquidity Position: Liquidity in the bank is one of the most important indicators that customers rely on in comparing banks, as it represents Liquidity is the most important means of protecting the bank from the risk of bankruptcy through its ability to meet the obligations that are distinguished with immediate payment, banks have this feature without other institutions because they cannot postpone casing a check drawee, or postpone the payment of a deposit payable, and it cannot demand the debtors to pay loans -that they owe -and financing which have not yet matured, in addition, it is difficult to predict the

THE INDEPENDENT VARIABLES

CAMELS model elements

The study will rely on the six elements of the CAMELS model to explain the financial performance of banks, and these elements include the following:

1. Capital Adequacy Ratio: The capital adequacy ratio reflects the ability of the bank's capital to afford the unexpected losses and to satisfy the obligations, and Capital Adequacy Ratio will be measured in accordance with the instruction - regarding capital adequacy issued by the Jordan central bank. (Moyer, 1990). The capital adequacy ratio according to (Fouche et al, 2006) is defined as a measurement of a bank's available capital expressed as a percentage of a bank's risk-weighted credit exposures. The capital adequacy ratio, also known as capital to risk weighted assets ratio, is used to protect depositors and promote the stability and efficiency of financial systems around the world.

2. Asset Quality: is of particular importance in the appraisal system because it is the critical part of a bank’s business that leads its operations towards generating revenues, because the bank’s possession of good assets will mean generating more income and better valuation both for liquidity, management and for capital-. Asset Quality is measured by dividing the non-performing loans by the bank's total loans. (Chan et al., 1986). The quality of assets is classified based on the study of the following issues:
   a) The size and severity of non-performing assets in relation to the total capital.
   b) The size and trends of the loan repayment terms that are past due, and the measures taken to reschedule them.
   c) Large credit concentrations and the risks of the single borrower or related borrowers.
   d) Amount and management's treatment of employee loans.
size and timing of the movement of funds from and to the bank, and which constitutes a great difficulty for the management of the bank (Qin & Pastory, 2012). Liquidity can be defined in general as the ability to convert assets into cash quickly and without realizing a loss (Arif & Anees, 2012). As for liquidity in the bank, it can be defined as the bank’s ability to meet depositors’ withdrawals and meet the needs of financiers in a timely manner and without having to sell securities at large losses or borrow with high interest. Liquidity is measured by dividing the bank’s liquid assets by the total assets (Acharya et al., 2012).

6. Market risk sensitivity: In light of the financial and banking developments that occurred at the international level, which made banks more vulnerable to financial crises, it is necessary to focus on many topics in this regard, including the sensitivity of the bank’s net profits to different expectations of changes in interest rates, fluctuations in foreign exchange centers, and in prices securities, in addition to measuring and following up on many risks, the most important of which are: Credit risk, Price risk - and Marketing-risks.

**Macroeconomic variables:** the study will depend on two macroeconomic variables, namely the economy growth rate and the rate of inflation. The economic growth rate will be measured by the annual rate of change in the GDP at constant market prices, while the inflation rate will be measured by calculating the annual rate of changes in the Consumer Price Index.

**STUDY POPULATION AND SAMPLE**

The study population consists of all Jordanian commercial banks listed on the Amman Stock Exchange, which were 20 at the end of 2019, and the study will be based on all Jordanian commercial banks that make up the study population, after excluding Islamic banks - because of the difference in its structure and the laws followed within Islamic banks. The data, which is the annual financial statements of these banks has been acquired for calculating the variables based on the companies guide issued by the Amman Stock Exchange during the period 2014-2019, in addition to the annual reports issued by the banks included in the study sample.

**DESCRIPTIVE STATISTICS**

Table (1) shows the specific descriptive statistics with the variables of the study, and through the previous table, it can be noted that the average rate of return on assets for the Jordanian commercial banks during the study period amounted to about 1.3%. This rate ranged from 0.0% to 2.5%, with a standard deviation of 0.5%. Previous statistics indicate that there is a clear discrepancy in the rate of return on assets among commercial banks, while the average rate of return on equity for the Jordanian commercial banks during the study period was about 9.0%. This rate ranged from 1.4% to 16.9%, with a standard deviation of 3.6%. Previous statistics indicate a clear discrepancy in the rate of return on equity among commercial banks. As for the components of the CAMELS model, the average capital adequacy ratio of the Jordanian commercial banks during the study period was about 16.7%, and the ratio ranged from 13.0% to 24.2%, with a standard deviation of 2.1%. The previous statistics indicate that the Jordanian commercial banks enjoy high capital adequacy ratios that exceed the minimum required by the Central Bank of Jordan of 12%, as well as the minimum required by the Basel Committee of 8%. The average asset quality which was measured by the ratio of inactive loans to the Jordanian commercial banks was about 9.9%, the percentage ranged from 2.6% to 22.4%, with a standard deviation of 4.3%. The ratios of inactive loans are generally accepted as they are less than 10%, which reflects the high quality of the assets of the Jordanian commercial banks in general, but it is noted that the banks suffer from a rise in the inactive loan’s ratio, which indicates the low-quality assets. As for the management, the average operating expenses ratio to the total assets of the Jordanian commercial banks is about 2.6%, and this percentage ranged from 1.3% to 4.3% with a standard deviation of 0.7%. From the above, it is clear that the Jordanian commercial banks are characterized by similar levels of operational expenses, with no significant fluctuation in the ratio during the study period, which indicates the efficiency of the Jordanian commercial banks departments. As for earnings, the average net interest margin ratio to the total assets of Jordanian commercial banks during the study period, is about 69.3%, and this rate ranged from 51.8% to 81.9%, with a standard deviation of 5.8%. From the above, it is noted that the Jordanian commercial banks are characterized with relatively high interest rates, as it constitutes more than two-thirds of its sources of income. The average liquidity ratio of the Jordanian commercial banks during the study period was about 24%, and the percentage ranged from 12.5% to 36.7% with a standard deviation of 5.9%. From the above, it is noted that the Jordanian commercial banks maintained good liquidity ratios and enough to meet any unexpected needs. The average sensitivity to market risk was measured by the ratio of securities to total assets of the Jordanian commercial banks during the study period,
which was about 25%, the percentage ranged from 11.1% to 37.9%, with a standard deviation of 6.3%. Previous statistics indicate that about a quarter of the Jordanian commercial bank’s assets are exposed to market risks, which reflects their high sensitivity to these risks. With regard to macroeconomic variables, the average economic growth rate during the study period was 3.2%, and the growth rate ranged from 2.3% to 5.5% with a standard deviation of 1.6%. The average inflation rate was 3.4%, which ranged from -0.7% to 4.8%. Other statistics including Skewness and Kurtosis indicate that the shape of the distribution of the dependent variables is close to the shape of the normal distribution, this is confirmed by the Jarque_Bera statistic, which reflects that the distribution of the two dependent variables follows a normal distribution, and the number of observations reached 91 views, which reflects the data of 20 banks over the six years’ period.

### Table 1

| Capital Adequacy Ratio | Return on Equity | Return on Assets | Assets Quality | Inflation | Liquidity | Earnings Sensitivity to market risk | average economic growth rate | Management Efficiency |
|------------------------|------------------|------------------|----------------|-----------|-----------|------------------------------------|-----------------------------|-----------------------|
| Minimum                | 0.12876          | -0.01451         | 0.02610        | -0.73974  | 0.12482   | 0.51771                            | 0.11111                     | 2.31150               | 0.01258               |
| Maximum                | 0.24160          | 0.16964          | 0.02562        | 4.83933   | 0.36652   | 0.81938                            | 0.37881                     | 5.47708               | 0.04293               |
| Mean                   | 0.16720          | 0.09013          | 0.09901        | 3.41793   | 0.23993   | 0.69283                            | 0.24893                     | 3.15854               | 0.02645               |
| Median                 | 0.16816          | 0.09073          | 0.09000        | 4.34224   | 0.23512   | 0.68637                            | 0.24160                     | 2.73980               | 0.02590               |
| Std. Dev               | 0.02080          | 0.03563          | 0.00510        | 1.98435   | 0.05874   | 0.05790                            | 0.06302                     | 1.07074               | 0.00671               |
| Kurtosis               | 3.98040          | 3.48407          | 3.48203        | 3.50032   | 3.40444   | 2.26164                            | 3.37598                     | 2.32691               | 3.86010               | 2.72851               |
| Skewness               | 0.69732          | -0.29150         | -0.58931       | 0.87833   | -1.40506  | 0.20204                            | -0.32086                    | 0.32696               | 1.59210               | 0.30613               |
| Probability            | 0.00981          | 0.39509          | 0.10638        | 0.00442   | 0.00000   | 0.31624                            | 0.40702                     | 0.23905               | 0.00000               | 0.48243               |
| Jarque-Bera            | 9.4586           | 1.8724           | 4.4637         | 10.9125   | 26.1961   | 2.3025                             | 1.7978                      | 2.8622                | 35.3264               | 1.4578                |
| Observations           | 91               | 91               | 91             | 91        | 91        | 91                                  | 91                          | 91                    | 91                    |
| Cross-sections         | 20               | 20               | 20             | 20        | 20        | 20                                  | 20                          | 20                    | 20                    |

Source: Central Bank of Jordan, annual report, various issues.
Source: Association of Banks in Jordan, annual report, various issues.
Source: Amman Stock Exchange, annual report, various issues.

### REGRESSION ANALYSIS RESULTS

This part aims to test the effect of the elements of the CAMELS model on the performance Jordanian commercial banks, commercial banks, and will use the Data Pooled Regression Method, due to its relevance to the nature of the data used in the study, where this method is used in the case of a time series and cross-sectorial data. Table (2) shows the regression analysis outputs for the study models, based on this table, it can be seen that the ratio of capital adequacy, management efficiency and earnings have positive and statistically significant effect at 5% level on the rate of return on assets and the rate of return on equity, which indicates that a high capital adequacy, high management efficiency and high earnings will help improve the bank's performance. However, the assets quality has a
negative and significant statistical effect at the 5% level on the rate of return on assets and the rate of Return on Equity, which indicates that the bank's asset quality rises from the decline in the ratio of inactive loans will contribute to improving bank performance (Jha and Hui, 2012). The table also shows that the liquidity ratio or Sensitivity to Market Risk have no effect with a statistical significance on Return on Assets or Return on Equity. Moreover, the macroeconomic variables - represented in the rate of economic growth and the rate of inflation had no statistically significant effect on the rate of return on assets or the rate of return on equity (Onjala, 2012).

| Variable                  | Model 1: Return on Equity |             | Model 2: Return on Assets |             |
|---------------------------|---------------------------|-------------|---------------------------|-------------|
| Variable                  | t-Statistic | Coefficient | Prob. | t-Statistic | Coefficient | Prob. |
| Constant                  | 1.2738       | 0.0845      | 0.2255 | -0.3088     | -0.0033      | 0.7614 |
| Capital Adequacy Ratio    | 2.2852       | 0.1355      | 0.0426 | 4.6681       | 0.0764       | 0.0000 |
| Assets Quality            | -4.8866      | -0.4548     | 0.0000 | -7.1113      | -0.0759      | 0.0000 |
| Management Efficiency     | 2.8721       | 1.4811      | 0.0050 | 3.1065       | 0.2016       | 0.0027 |
| Earnings                  | 2.5929       | 0.0907      | 0.0236 | 2.3140       | 0.1131       | 0.0352 |
| Liquidity                 | 1.3966       | 0.0566      | 0.1732 | 1.6947       | 0.0095       | 0.0946 |
| Sensitivity               | -0.4591      | -0.0182     | 0.6690 | 0.5154       | 0.0033       | 0.6079 |
| Average Economic Growth Rate | -1.0249    | -0.0093     | 0.3156 | -0.9908      | -0.0013      | 0.3253 |
| Inflation                 | -0.5879      | -0.0027     | 0.5771 | -0.5275      | -0.0004      | 0.5996 |
| R-squared                 | 0.5123       |             | 0.6521 |             |             |       |
| Adjusted R-squared        | 0.5571       |             | 0.5417 |             |             |       |
| Durbin-Watson Stat        | 1.8112       |             | 1.9449 |             |             |       |
| F-statistic               | 9.119        |             | 11.846 |             |             |       |
| Prob(F-statistic)         | 0.0000       |             | 0.0000 |             |             |       |

(*) Method: Pooled EGLS (Cross-section weights)
- White diagonal standard errors & covariance (d.f. corrected).
Source: Own calculations

CONCLUSION AND RECOMMENDATION

This study aimed at analysing the factors affecting the performance of the Jordanian commercial banks using CAMELS model elements, and to determine the factors that most affect the performance of these banks. The results indicated that Jordanian commercial banks are characterized by high capital adequacy ratios that exceed the minimum required by the Central Bank of Jordan and the Basel Committee, it is also distinguished by the high quality of its assets, the efficiency of its management, and their ability to achieve relatively high profit margins. In addition, the Jordanian commercial banks maintain a good and sufficient liquidity ratios to meet any unexpected needs, however, there has been an increase in their Sensitivity to Market Risk. The results also indicated that capital adequacy, asset quality, efficiency of management and earnings are among the most important and influential factors on the performance measures of the Jordanian commercial banks, represented by the rate of return on assets and rate of return on equity. For the purposes of evaluating the performance of the Jordanian commercial banks, this study recommend that it is possible to rely on a miniature model of the CAMELS model, which is the CAME model, which has a great ability in interpreting and measuring the performance of the Jordanian banks.
commercial banks, and this model includes four components, namely, capital adequacy, asset quality, management efficiency, and earnings. This, however, does not mean that the rest of the elements should be neglected, because they have effects on the other aspects of the banks such as risks of all kinds. The study also recommends the Central Bank of Jordan, when evaluating the performance of banks, to give importance to the four most influential elements on the performance of banks, which includes CAME elements in order to reach a more suitable tool for the assessment of the Jordanian commercial bank’s performance.

REFERENCES

ACHARYA, V. V., GROMB, D., & YORULMAZER, T. (2012). Imperfect competition in the interbank market for liquidity as a rationale for central banking. American Economic Journal: Macroeconomics, 4(2), 184-217. DOI: 10.1257/mac.4.2.184

ARDITTI, F. D. (1967). Risk and the required return on equity. The Journal of Finance, 22(1), 19-36. https://doi.org/10.2307/2977297

ARIF, A., & ANEES, A. N. (2012). Liquidity risk and performance of banking system. Journal of Financial Regulation and Compliance, https://doi.org/10.1108/135819812121218342

Association of Banks in Jordan, annual report, various issues. https://uabonline.org/the-association-of-banks-in-jordan

BERGER, A. N., MILLER, N. H., PETERSEN, M. A., RAJAN, R. G., & STEIN, J. C. (2005). Does function follow organizational form? Evidence from the lending practices of large and small banks. Journal of Financial economics, 76(2), 237-269. https://doi.org/10.1016/j.jfineco.2004.06.003

BURTON, R. M., LAURIDSEN, J., & OBEL, B. (2002). Return on assets loss from situational and contingency misfits. Management science, 48(11), 1461-1485. https://doi.org/10.1287/mnsc.48.11.1461.262

BUYYA, R., ABRAMSON, D., & VENUGOPAL, S. (2005). The grid economy. Proceedings of the IEEE, 93(3), 698-714, doi: 10.1109/JPROC.2004.842784.

Central Bank of Jordan, annual report, various issues. https://www.cbj.gov.jo/Pages/viewpage.aspx?pageID=176

CHAN, Y. S., GREENBAUM, S. I., & THAKOR, A. V. (1986). Information reusability, competition and bank asset quality. Journal of Banking & Finance, 10(2), 243-253. https://doi.org/10.1016/0378-4266(86)90008-7

COLE, R. A., & GUNTHER, J. W. (1998). Predicting bank failures: A comparison of on-and off-site monitoring systems. Journal of Financial Services Research, 13(2), 103-117. https://doi.org/10.1023/A:1007954718966.

DIALLO, K., ZURN, P., GUPTA, N., & DAL POZ, M. (2003). Monitoring and evaluation of human resources for health: an international perspective. Human resources for health, 1(1), 1-13. https://doi.org/10.1186/1478-4491-1-3

DIBBERN, J., GOLES, T., HIRSCHHEIM, R., & JAYATILAKA, B. (2004). Information systems outsourcing: a survey and analysis of the literature. ACM SIGMIS Database: the DATABASE for Advances in Information Systems, 35(4), 6-102. https://doi.org/10.1145/1035233.1035236

DIPPER, B. (1998). Monitoring and post-auditing in environmental impact assessment: a review. Journal of environmental planning and management, 41(6), 731-747. https://doi.org/10.1080/09640569811399

FETHI, M. D., & PASIOURAS, F. (2010). Assessing bank efficiency and performance with operational research and artificial intelligence techniques: A survey. European journal of operational research, 204(2), 189-198. https://doi.org/10.1016/j.ejor.2009.08.003

FOUCHE, C. H., MUKUDEEM-PETERSEN, J., & PETERSEN, M. A. (2006). Continuous-time stochastic modelling of capital adequacy ratios for banks. Applied Stochastic Models in Business and Industry, 22(1), 41-71. https://doi.org/10.1002/asmb.609.

GUAN, F., LIU, C., XIE, F., & CHEN, H. (2019). Evaluation of the competitiveness of China’s commercial banks based on the G-CAMELS evaluation system. Sustainability, 11(6), 1791. https://doi.org/10.3390/su11061791.

GUNASEKARAN, A., & KOBU, B. (2007). Performance measures and metrics in logistics and supply chain management: a review of recent literature (1995–2004) for research and applications. International Journal of production research, 45(12), 2819-2840. https://doi.org/10.1080/00207540600806513.

HASHEMI, R. R., LE BLANC, L. A., RUCKS, C. T., & RAJARATNAM, A. (1998). A hybrid intelligent system for predicting bank holding structures. European Journal of Operational Research, 109(2), 390-402. https://doi.org/10.1016/S0377-2217(98)00065-4.
HASHIMOTO, T., STEDINGER, J. R., & LOUCKS, D. P. (1982). Reliability, resiliency, and vulnerability criteria for water resource system performance evaluation. *Water resources research, 18*(1), 14-20. https://doi.org/10.1029/WR018i001p00014.

JHA, S., & HUI, X. (2012). A comparison of financial performance of commercial banks: A case study of Nepal. *African Journal of Business Management, 6*(25), 7601-7611. https://doi.org/10.5897/AJBM11.3073.

KOTLER, P., & MURPHY, P. E. (1981). Strategic planning for higher education. *The journal of higher education, 32*(5), 470-489. https://doi.org/10.1080/00221546.1981.11778119.

MISHKIN F. (2001), Financial Policies and the Prevention of Financial Crises in Emerging Market Countries. NBER Working Papers, No:8087, National Bureau of Economic Research, Inc. https://doi.org/10.3386/w8087.

NADIRI, H., KANDAMPULLY, J., & HUSSAIN, K. (2009). Zone of tolerance for banks: a diagnostic model of service quality. *The Service Industries Journal, 29*(11), 1547-1564. HTTPS://DOI.ORG/10.1080/02642060902793425.

NGUYEN, A. H., NGUYEN, H. T., & PHAM, H. T. (2020). Applying the CAMEL model to assess performance of commercial banks: Empirical evidence from Vietnam. *Banks and Bank Systems, 15*(2), 177-186. http://dx.doi.org/10.21511/bbs.15(2).2020.16.

NOY I. (2004), Financial Liberalization, Prudential Supervision and the Onset of Banking Crises. Emerging Markets Review, No. 5: 341-359. https://doi.org/10.1016/j.ememar.2004.05.001.

ONJALA, V. N. (2012). Determinants of financial performance of commercial banks in Kenya (Doctoral dissertation). http://erepository.uonbi.ac.ke:8080/xmlui/handle/123456789/14225.

SANGMI, M. U. D., & NAZIR, T. (2010). Analyzing financial performance of commercial banks in India: Application of CAMEL model. *Pakistan Journal of Commerce and Social Sciences (PJCSS), 4*(1), 40-55. http://hdl.handle.net/10419/187999.

SARAPH, J. V., BENSON, P. G., & SCHROEDER, R. G. (1989). An instrument for measuring the critical factors of quality management. *Decision sciences, 20*(4), 810-829. https://doi.org/10.1111/j.1540-5915.1989.tb01421.x.

SOANA, M. G. (2011). The relationship between corporate social performance and corporate financial performance in the banking sector. *Journal of business ethics, 104*(1), 133-148. https://doi.org/10.1007/s10551-011-0894-x.

SAYED, G. J., & SAYED, N. S. (2013). Comparative analysis of four private sector banks as per CAMEL rating. Business Perspectives and Research, 1(2), 31-46. https://doi.org/10.1177/22785372130204.

SWYNGEDOUW, E., MOULAERT, F., & RODRIGUEZ, A. (2002). Neoliberal urbanization in Europe: large-scale urban development projects and the new urban policy. Antipode, 34(3), 542-577. https://doi.org/10.1111/1467-8330.00254.

MAUDOS, J., & DE GUEVARA, J. F. (2004). Factors explaining the interest margin in the banking sectors of the European Union. Journal of Banking & Finance, 28(9), 2259-2281. https://doi.org/10.1016/j.jbankfin.2003.09.004.

MOYER, S. E. (1990). Capital adequacy ratio regulations and accounting choices in commercial banks. *Journal of accounting and economics, 13*(2), 123-154. https://doi.org/10.1016/0165-4101(90)90027-2.

NARASIMHAN, R., & KIM, S. W. (2001). Information system utilization strategy for supply chain integration. *Journal of business logistics, 22*(2), 51-75. https://doi.org/10.1002/j.2158-1592.2001.tb00003.x.

QIN, X., & PASTORY, D. (2012). Comparative analysis of commercial banks liquidity position: The Case of Tanzania. http://dspace.cbe.ac.tz:8080/xmlui/handle/123456789/239.

THAGUNNA, K., AND POUDEL, S., (2013), Measuring Bank Performance of Nepali Banks: A Data Envelopment Analysis (DEA) Perspective. International Journal of Economics and Financial Issues, 3(1): 2013, pp.54-65. https://www.proquest.com/scholarly-journals/measuring-bank-performance-nepali-banks-data/docview/1266465918/se-2?accountid=28062

Tushman, M., & Nadler, D. (1986). Organizing for innovation. *California management review, 28*(3), 74-92. https://doi.org/10.2307/41165203.
