# THE IMPACT OF IFRS 9, LIQUIDITY RISK, CREDIT RISK, AND CAPITAL ON BANKS' PERFORMANCE

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## Abstract

This study investigates the impact of International Financial Reporting Standard (IFRS) 9, liquidity risk, credit risk, and capital on Jordanian banks' performance. Aiming to mitigate liquidity and credit risks while ensuring adequate capital ratios to prevent bankruptcy. The study aligns with the findings of Abbas et al. (2019) and Abdelaziz et al. (2022), highlighting the influence of these factors on profitability in the Middle East and North Africa (MENA) region. Data from annual reports of 13 banks listed on the Amman Stock Exchange from 2012 to 2021 was analysed quantitatively, focusing on profitability metrics like return on assets (ROA) and equity (ROE). The results indicate a significant impact of IFRS 9 implementation and a negligible effect of liquidity risk. Notably, an increase in credit risk detrimentally impacts both ROA and ROE. The study also discovers a positive link between bank capital and ROA but a negative association with ROE, underscoring the nuanced interplay between risk management and financial performance in banking.

**Keywords:** IFRS 9, Liquidity Risk, Credit Risk, Bank Capital, Bank Performance

**Authors' individual contribution:** Conceptualization — K.A.; Methodology — S.E.; Software — S.E.; Validation — Z.M.; Formal Analysis — S.E.; Investigation — S.E.; Resources — Z.M.; Data Curation — Z.M.; Writing — Original Draft — S.E.; Writing — Review & Editing — K.A.; Supervision — K.A.; Project Administration — Z.M.; Funding Acquisition — K.A.

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## 1. INTRODUCTION

The financial systems in Jordan are crucial to the country's economic growth, with banks playing a significant role through their various services. In these banks, loan issuance is a primary source of income, drawing new customers and generating interest revenue. Making informed decisions, such as maintaining capital ratios above the minimum requirement, preserving deposits, and judicious loan granting, contributes to higher profit margins.

The adoption of reporting standards like the International Financial Reporting Standard (IFRS) 9, effective from January 1, 2018, has been instrumental in enhancing financial stability. It obliges banks to accumulate loss reserves if they fall below a certain threshold, thus strengthening their financial footing (Engelmann, 2021). Liquidity risks, associated with fluctuations in deposit flows, pose a significant threat to banking operations. Banks are therefore encouraged to implement efficient risk management practices to safeguard investor interests and ensure sustainability (Harb et al., 2022). Credit risk, defined as the debtor's failure to fulfil obligations leading to an increase in non-performing loans, can precipitate a banking crisis (Ahmed et al., 2022). Banks with higher capital levels can engage in diverse business activities and achieve greater profitability (Abbas et al., 2019).

The 2008 global financial crisis underscored the interplay between liquidity and credit risks, leading to the collapse of numerous banks due to

an imbalance between these risks (Harb et al., 2022; Reitgruber, 2016). This crisis was characterized by sudden, large-scale withdrawals by depositors, impacting banks' ability to sustain operations and finance loans, thereby reducing their profitability (Rokhim & Min, 2020; Ibe, 2013).

IFRS 9, a successor to International Accounting Standard (IAS) 39, incorporates prior requirements with additional amendments to address issues surfaced during the 2007–2008 global financial crisis (Madah Marzuki et al., 2021; Stander, 2021). It enhances depositor confidence by recognizing expected credit losses early, in contrast to the earlier practice of allocating funds only after incurring losses (Reitgruber, 2016).

Credit risks fluctuate with economic conditions, typically easing during recessions and tightening in booms (Kesraoui et al., 2022). They are pivotal in the financial sector, often leading to serious banking issues due to customer non-performance (Madugu et al., 2020). Poorly managed credit risks can precipitate bank failures and economic stagnation (Rehman et al., 2019).

This study underscores the importance of balancing liquidity and risk in banking to generate profits. Future profitability hinges on maintaining an optimal balance between these factors and adhering to international financial reporting standards, such as IFRS 9, which is viewed as a means to improve bank profitability through the recognition of losses (Mitoi et al., 2020). The challenge lies in balancing banks to mitigate liquidity and credit risks, maintain capital ratios to avert bankruptcy, and implement IFRS 9 to assess its impact on bank performance.

The remainder of the paper is structured as follows. Section 2 presents relevant theories and empirical studies. Section 3 introduces the research methodology. Section 4 describes the results and discussion. Section 5 presents conclusions and some recommendations.

## 2. LITERATURE REVIEW

The 2008 global financial crisis not only triggered a significant critique of the banking sector's collapse but also highlighted the contrasting aims of regulators and standard setters. Regulators were mainly concerned with diminishing the risk levels for bankers, while standard-setters focused on ensuring that investors had access to useful information for informed decision-making (Madah Marzuki et al., 2021). In an effort to address these concerns, the International Accounting Standards Board (IASB) introduced IFRS 9, adopted by banks to improve the recognition and estimation of loan losses, thereby enhancing both risk management and the accuracy of financial reporting (Oberson, 2021; Stander, 2021).

Despite its benefits, the transition to IFRS 9 was not without challenges, as it led to reduced bank values and equity (Groff & Mörec, 2021). However, it brought about increased transparency in investor and creditor information, facilitating better decision-making (Schaap, 2020). IFRS 9's approach to expected credit loss — losses resulting from customer default — aids in reducing loss accumulation, bolstering financial stability, and fulfilling disclosure requirements (Novotny-Farkas, 2016).

The implementation of IFRS 9 requires banks to continuously recognize and update anticipated credit loss values, which vary according to the financial tool and available information (Du et al., 2022; Gebhardt, 2016). Managing liquidity risks, such as the conversion of assets into cash or obtaining central bank loans, is crucial for banks to mitigate borrower defaults (Fayman et al., 2022; Mdaghri, 2021). Furthermore, elevated levels of non-performing loans can severely impact a bank's balance sheet, potentially leading to failure (Riahi, 2019).

Various studies have investigated the interplay between liquidity risk, credit risk, and bank performance. Alim et al. (2021) demonstrated that in Pakistan (2006–2009), higher liquidity ratios positively influenced bank performance. Altarawneh and Shafie (2018) found a marginal positive link between liquidity risk and performance but a negative correlation between operating and credit risk in banks listed on the Amman Stock Exchange. Chowdhury and Zaman (2018) concluded that liquidity risk adversely affected bank performance, using a sample of six banks (2012–2016). Similarly, Chen et al. (2018) noted that liquidity risks negatively impacted bank profitability due to increased financing costs and net interest margins. In contrast, Abdelaziz et al. (2022) observed that heightened credit risk intensified liquidity risk, adversely affecting profitability in Middle Eastern and North African banks (2004–2015). Moreover, Ekinci and Poyraz (2019) reported an inverse relationship between credit risk and bank performance in Turkish banks (2005–2017).

Interestingly, some studies like that of Boahene et al. (2012) found a positive correlation between credit risk and bank profitability in Ghana (2005–2009). Post-crisis, Basel III was proposed to boost banking capital requirements and decrease financial leverage (Obadire et al., 2022). Noman et al. (2015) emphasized the importance of capital adequacy in safeguarding banks against insolvency and its role in promoting financial stability (Mendoza & Rivera, 2017).

The relationship between bank capital and profitability has been the subject of mixed findings in various studies. Ayaydin and Karakaya (2014) identified both positive and negative effects in Turkish banks (2003–2011). Akhmedjonov and Balci Izgi (2015) found a positive relationship in Turkish banks, both pre- and during the 2008–2009 crisis. Conversely, Saleh and Abu Afifa (2020) reported a positive correlation (2010–2018), while Rifqah Amaliah and Hassan (2019) observed a negative relationship in Indonesian banks (2007–2016), attributing it to the trade-off between higher profits and maintaining liquidity.

Prasetyo and Darmayanti (2015) discovered that while credit risk adversely affected profitability, liquidity risk had a positive impact, and capital adequacy negatively influenced profitability. This literature review underscores the complexity and context-dependence of the relationship between bank capital and profitability, highlighting the significance of capital adequacy in ensuring sustainable and profitable banking operations.

## 3. RESEARCH METHODOLOGY

This research utilizes panel data to analyze the impact of IFRS 9, liquidity risk, credit risk, and capital risk on the performance of Jordanian banks. Data has been sourced from the annual reports of

13 banks listed on the Amman Stock Exchange, spanning the years 2012 to 2021.

The methodology is grounded in an analytical quantitative research approach. To accomplish the research objectives, statistical analysis of the panel data will be employed. This includes three primary models: 1) the fixed effect model, 2) the random effect model, and 3) the pooled ordinary least squares (OLS) regression.

In addition to these primary methods, alternative methodologies include time-series analysis, which could provide insights into trends over time, and cross-sectional analysis, offering a snapshot view of data at a single point in time. Another viable method is the use of structural equation modeling (SEM), which could help in understanding the complex relationships between observed and latent variables. Each of these alternative methods has its own set of advantages and limitations, and their applicability depends on the specific research questions and the nature of the available data.

## 3.1. Data

In this study, IFRS 9, liquidity risk, credit risk, and capital risk are assumed as independent variables, while the profitability of banks is considered a dependent variable. This section presents the schedule of variables along with their definitions.

### *3.1.1. Dependent variables*

*Return on assets (ROA):* An essential measure of profitability, ROA refers to returns generated by a company's owned assets. It is defined as net income divided by total assets (Brealey et al., 2014).

*Return on equity (ROE):* Another profitability metric, ROE assesses how effectively a bank uses shareholder funds to generate income. ROE is defined as net income divided by total equity (Brealey et al., 2014).

### *3.1.2. Independent variables*

*IFRS 9:* Treated as a dummy variable. A value of 1 is assigned for the company year ending after the local mandatory IFRS adoption date from 2018 to 2021, and 0 for the years 2012 to 2017 (Santos Garcia & Lopes Lucena, 2022).

*Liquidity risk (LR):* An indicator of a bank's management efficiency and its ability to fulfill obligations. It is calculated by comparing deposits to assets, with the LR ratio being deposits divided by total assets (Al Zaidanin & Al Zaidanin, 2021; Das & Rout, 2020).

*Credit risk (CR):* This reflects the likelihood of a borrower failing to meet obligations or pay off debts and is used to predict the risk of bad debts. It is measured by the ratio of non-performing loans to gross loans (Harb et al., 2022).

*Bank capital (B-Cap):* In this research, it refers to "Bank Capital Adequacy", measured as total equity to total assets (Abbas & Masood, 2020).

### *3.1.3. Control variables*

*Bank size:* Measured as the logarithm of the total assets. Larger banks, offering more extensive financial services, typically have a greater number of clients and assets, leading to higher profits and reduced risk exposure (Al-Tarawneh et al., 2017; Sinha & Sharma, 2016; Rahaman & Akhter, 2015).

*Loan growth:* The capacity to raise new funds in relation to the expansion of the loan business, measured as the year-to-year difference in loan growth compared to the bank's total loans in the previous year (Saleh & Abu Afifa, 2020).

*Non-interest expense:* Part of a bank's operating expenses, this is calculated by dividing non-interest expenditures by total average assets. It includes costs like employee training, rent, workplace expenses, information technology, data processing, and other expenses (Sullivan, 2000).

## 3.2. Empirical model

In this study, standard estimation techniques utilizing the constant effect regression model of panel data were applied to analyze the impact of IFRS 9, liquidity risk, credit risk, and capital on the performance of Jordanian banks. The equation used in the analysis is detailed as follows:

$$Profit = \alpha_0 + \beta_1 IFRS\ 9_{it} + \beta_2 LR_{it} + \beta_3 CR_{it} + \beta_4 B\_Cap_{it} + \beta_5 Size_{it} + \beta_6 Growth_{it} + \beta_7 NIX_{it} + \varepsilon_{it} \quad (1)$$

where,

- $\alpha_0$ represents a constant term.
- $\beta_1$ to $\beta_7$ are the coefficients of the respective variables.
- *I* denotes a specific bank.
- *t* indicates the time period.
- *IFRS 9* is a dummy variable assigned a value of 1 for the company years ending after the local mandatory IFRS adoption date, and 0 otherwise.
- *LR* signifies the liquidity risk.
- *CR* denotes the credit risk.
- *B-Cap* represents bank capital.
- *Size* refers to the size of the bank.
- *Growth* signifies loan growth.
- *NIX* stands for non-interest expense.
- $\varepsilon_{it}$ symbolizes the error term.

In this model, *Profit* is understood as profitability, measured using ROA and ROE. This approach aims to provide a comprehensive understanding of how various financial factors affect the profitability of banks in Jordan.

## 3.3. Data analysis

This section offers an analysis and findings related to the risks affecting bank performance, organized into several key parts. Initially, it presents a summary of the descriptive statistics for all study variables, showcased in Table 1. This is followed by an exposition of the results derived from the primary model used to investigate the relationship between bank risk variables and bank performance. Additionally, the section includes the results of the correlations among the study variables, which are detailed in Table 2. After these presentations, further analysis will be conducted to determine the most suitable model for the study. The panel

data is to be scrutinized through one of three models: the fixed effect model, the random effect model, or the Pooled model. These models are essential in examining the intricate relationship between bank risk variables and bank performance, providing a comprehensive understanding of the dynamics at play.

**Table 1.** Descriptive analysis

| *Variables* | *Mean* | *Std. Dev.* | *Median* | *Max* | *Min* |
|---|---|---|---|---|---|
| *ROA* | 0.011 | 0.005 | 0.011 | 0.020 | -0.002 |
| *ROE* | 0.078 | 0.033 | 0.083 | 0.156 | -0.010 |
| *IFRS 9* | 0.400 | 0.492 | 0.000 | 1.000 | 0.000 |
| *LR* | 0.746 | 0.050 | 0.748 | 0.837 | 0.589 |
| *CR* | 0.074 | 0.031 | 0.074 | 0.200 | 0.002 |
| *B-Cap* | 0.136 | 0.027 | 0.136 | 0.220 | 0.075 |
| *Size* | 9.174 | 0.572 | 9.305 | 9.926 | 7.379 |
| *Growth* | 0.081 | 0.128 | 0.056 | 0.860 | -0.092 |
| *NIX* | 0.009 | 0.007 | 0.009 | 0.084 | 0.005 |

*Source: Authors' calculations.*

Table 1 presents the descriptive statistics for the study:

• *ROA:* The mean *ROA* was 0.011 with a standard deviation of 0.005, suggesting values close to the mean. The median was 0.011, with a maximum of 0.020 and a minimum of -0.002. The variation in ROA can be attributed to the Bank of Jordan's high returns in 2014 and the low returns of Jordan Kuwait Bank in 2020, influenced by the COVID-19 pandemic.

• *ROE:* The mean *ROE* was 0.078 with a standard deviation of 0.033. The median stood at 0.083, with the highest value at 0.156 and the lowest at -0.010. These differences can be linked to Capital Bank of Jordan's high returns in 2021 and Jordan Kuwait Bank's low returns in 2020 due to the pandemic.

• *IFRS 9:* The average score for IFRS 9 was 0.400 with a standard deviation of 0.492. The median was 0.000, with values ranging from 0.000 to 1.000, reflecting the period before and after the implementation of the IFRS 9 (2012–2017 and 2018–2021, respectively).

• *LR:* The mean liquidity risk was 0.746 with a standard deviation of 0.050, and a median of 0.748, indicating high liquidity risks among Jordanian banks during 2012–2021. The highest risk was recorded by Arab Jordan Investment Bank (AJIB) in 2017 (0.837), and the lowest by Jordan Ahli Bank in 2013 (0.589).

• *CR:* The average credit risk was 0.074 with a standard deviation of 0.031. The median value was also 0.074. The introduction of IFRS 9 in 2018, which necessitates faster recognition of expected credit losses, contributed to more accurate credit lending and a reduction in non-performing loans. Credit risk varied from a maximum of 0.200 (Societe Generale De Banque Jordan [SGBJ] in 2012) to a minimum of 0.002 (Jordan Commercial Bank in 2021).

• *B-Cap*: The mean *B-Cap* was 0.136 with a standard deviation of 0.027. The median was 0.136. Bank capital ranged from a high of 0.220 (SGBJ in 2012) to a low of 0.075 (SGBJ in 2018).

• *Size*: The mean size was 9.174 with a standard deviation of 0.572. The median was 9.305, indicating significant variations in bank asset values. The size varied from a maximum of 9.926 (Housing Bank for Trade and Finance (HBTF) in 2019) to a minimum of 7.379 (Arab Bank in 2012).

• *Growth:* The mean growth was 0.081 with a standard deviation of 0.128. The median was 0.056. Growth ranged from a high of 0.860 (AJIB in 2014) to a low of -0.092 (Jordan Commercial Bank in 2019).

• *NIX:* The mean was 0.009 with a standard deviation of 0.007. The median was also 0.009. *NIX* varied from a high of 0.084 (Bank al Etihad in 2019) to a low of 0.005 (Bank al Etihad in 2012).

### 3.4. Correlation matrix test

Table 2 presents the correlations between the variables studied, utilizing Pearson's correlation coefficient as the method of analysis. This coefficient, as explained by Ly et al. (2018), is used to assess the strength and direction of relationships between variables, with values ranging from +1 to -1.

A correlation coefficient of +1 indicates a strong positive relationship between variables, meaning that as one variable increases, the other also increases. Conversely, a coefficient of -1 signifies a strong negative relationship, where an increase in one variable is associated with a decrease in the other. A coefficient of zero, on the other hand, indicates no correlation, implying that the variables do not exhibit any linear relationship.

**Table 2.** Correlations matrix

| *Variables* | *ROA* | *ROE* | *IFRS 9* | *LR* | *CR* | *B-Cap* | *Size* | *Growth* | *NIX* |
|---|---|---|---|---|---|---|---|---|---|
| ***ROA*** | 1 | | | | | | | | |
| ***ROE*** | 0.902 | 1 | | | | | | | |
| ***IFRS 9*** | -0.404 | -0.346 | 1 | | | | | | |
| ***LR*** | -0.064 | 0.144 | -0.095 | 1 | | | | | |
| ***CR*** | -0.096 | -0.274 | -0.141 | -0.355 | 1 | | | | |
| ***B-Cap*** | 0.501 | 0.121 | -0.272 | -0.487 | 0.332 | 1 | | | |
| ***Size*** | 0.067 | 0.192 | 0.100 | 0.153 | -0.117 | -0.185 | 1 | | |
| ***Growth*** | 0.026 | 0.125 | -0.173 | 0.115 | -0.146 | -0.109 | 0.092 | 1 | |
| ***NIX*** | -0.054 | -0.018 | 0.137 | 0.085 | -0.101 | -0.070 | 0.117 | 0.032 | 1 |

*Source: Authors' calculations.*

The analysis results indicate that most correlations in the study are weak to moderate. The strength of the associations varies, with the strongest positive correlation being 0.902 between *ROA* and *ROE*. Conversely, the most substantial negative correlation is -0.487, observed between liquidity risk (*LR*) and bank capital (*B-Cap*). The analysis reveals no concerning linear issues among the study variables, suggesting that the correlations are within acceptable ranges for this type of research.

### 3.5. Model specification tests

Selecting an appropriate functional model is crucial for examining the hypotheses in panel data analysis. This analysis typically involves estimating time cross-sectional data using three methods:

1. Pooled OLS regression.
2. Fixed-effects model
3. Random-effects model

In this study, two specific tests are employed to determine the most suitable model. The first test, the Breusch-Pagan Lagrange multiplier (LM) test, helps decide between the pooled OLS regression and the random-effects model. The second test, the Hausman test, is used to choose between the fixed-effects model and the random-effects model.

The pooled OLS regression is considered the appropriate model when its p-values are higher than 0.05. Conversely, if the p-values are lower than 0.05, the random-effects model is accepted as the alternative.

**Table 3.** Test Breusch-Pagan of ROA and ROE

| ***Breusch-Pagan test for ROA*** | | | |
|---|---|---|---|
| F-statistic | 0.98 | Probability | 0.45 |
| Obs* R-squared | 6.92 | Probability | 0.44 |
| ***Breusch-Pagan test for ROE*** | | | |
| F-statistic | 1.10 | Probability | 0.37 |
| Obs* R-squared | 7.74 | Probability | 0.36 |

From the data presented in Table 3, it is evident that the random-effects model should be accepted, while the pooled OLS regression model is to be rejected.

### 3.6. Hausman test

The Hausman test, a commonly used method in panel data analysis, assists in choosing the best model by comparing the fixed effect model with the random effect model (Amini et al., 2012). This test is crucial for accepting or rejecting the null hypothesis, which is centered on determining if there is a correlation between the unique errors and the regression factors within the model. Essentially, the null hypothesis posits that there is no such correlation.

If the p-value of the Hausman test is greater than 0.05, the null hypothesis is accepted, indicating that the random effect model is the appropriate choice. Conversely, if the p-value is less than 0.05, the alternative hypothesis is accepted, and the fixed effect model is deemed suitable for use.

**Table 4.** Hausman test

| ***Variables*** | ***Chi-square statistic*** | ***Degree of freedom (DF)*** | ***Probability*** |
|---|---|---|---|
| *ROA* | 22.56 | 6 | 0.0010 |
| *ROE* | 20.64 | 6 | 0.0021 |

*Source: Authors' calculations.*

Table 4 presents the results of the Hausman test, indicating that the null hypothesis should be rejected in favor of the alternative hypothesis. This conclusion is based on the probability values of ROA ($0.0010 < 0.05$) and ROE ($0.0021 < 0.05$), suggesting that the fixed effect model is the most suitable for our analysis.

In this section, the study's results are analyzed using the EViews program.

## 4. RESULTS

Table 5 presents the effects of implementing IFRS 9 on liquidity risk, credit risk, and bank capital in Jordanian banks from 2012 to 2021. The impact of IFRS-9 is measured using a dummy variable. Key indicators include liquidity risk (calculated as deposits/total assets), credit risk (non-performing loans/gross loans), and bank capital (equity/total assets), along with control variables such as size, growth, and non-interest expense, in relation to the dependent variable (net income/total assets).

**Table 5.** Regression analysis for ROA

| ***Fixed-effects model*** | | | | |
|---|---|---|---|---|
| ***Variables*** | ***Coefficient*** | ***Std. Error*** | ***T-statistic*** | ***Prob.*** |
| Const. | 0.103 | 0.038 | 2.739 | 0.007 |
| *IFRS 9* | -0.003 | 0.001 | -4.306 | 0.000 |
| *LR* | 0.014 | 0.008 | 1.785 | 0.077 |
| *CR* | -0.032 | 0.010 | -3.258 | 0.002 |
| *B-Cap* | 0.017 | 0.017 | 0.960 | 0.339 |
| *Size* | -0.011 | 0.004 | -2.720 | 0.008 |
| *Growth* | 0.000 | 0.002 | 0.249 | 0.804 |
| *NIX* | 0.016 | 0.025 | 0.635 | 0.527 |
| Adjusted R-squared | | 0.81 | | |
| F-statistic | | 29.34 | | |
| Prob. (F-statistic) | | 0.000 | | |

*Source: Authors' calculations.*

The analysis involved two tests. The first, the Breusch-Pagan LM test, was used to determine the more appropriate model between pooled OLS regression and the random effect model. The second test, the Hausman test, helped in selecting the best model between the fixed effect model and the random effect model. Ultimately, the fixed effect model was chosen as the most suitable for addressing the study's issue.

The adjusted R-squared of the fixed effect model proved to be the most effective for this study. This model, which followed generalized least squares (GLS) cross-section weights, showed that independent variables (*IFRS 9, LR, CR, B-CAP*) and control variables (*Size, Growth, NIX*) explained 81% of the variation in return on assets (*ROA*). Notably, the F-statistic value was higher for this model, confirming its significance.

Regarding the impact of each independent variable on ROA:

- *IFRS 9*: Exhibited a negative, albeit very weak, impact on *ROA* (coefficient: -0.003). T-statistic of -4.306 and a probability of less than 0.05 indicate

a statistically significant negative effect of *IFRS 9* on *ROA* in Jordanian commercial banks from 2012 to 2021.

• *LR*: Showed a positive but weak effect on *ROA* (coefficient: 0.014). T-statistic of 1.785 and a probability higher than 0.05 suggest a statistically significant positive impact of *LR* on *ROA* in the same period. This indicates that increased bank liquidity leads to higher returns from lending operations, aligning with findings by Warsa and Mustanda (2016).

• *CR*: Had a negative and weak effect on *ROA* (coefficient: -0.032), with a t-statistic of -3.258 and probability less than 0.05, indicating a statistically significant negative impact on *ROA* in Jordanian banks' commercial activities from 2012 to 2021. Poor credit risk management, leading to increased unsecured assets, contributed to this decline in ROA. This finding is consistent with Ekinci and Poyraz (2019).

• *B-Cap*: The coefficient of 0.017 suggests a positive but weak effect on *ROA*. However, with a t-statistic of 0.96 and probability of 0.339, there's no statistically significant impact of *B-Cap* on *ROA* in Jordanian commercial banks during this period, in line with Saleh and Abu Afifa (2020).

• *Size:* A negative and very weak effect on *ROA* was observed (coefficient: -0.011). T-statistic of -2.72 and probability less than 0.05 indicate a statistically significant negative effect of *Size* on *RO*A from 2012 to 2021 in Jordanian commercial banks. Larger banks tend to have lower ROA, possibly due to asset diversification or accounting practices aimed at audit-related profit reduction, as discussed by Golubeva et al. (2019).

• *Growth:* Displayed a neutral impact on *ROA* (coefficient: 0), with a t-statistic of 0.249 and probability of 0.804, suggesting no statistically significant effect of growth on ROA in the same period.

• *NIX:* Showed a positive but not statistically significant effect on ROA (coefficient: 0.016), with a t-statistic of 0.635, and a probability of 0.527, indicating a non-significant impact of *NIX* on ROA in Jordanian commercial banks from 2012 to 2021.

**Table 6.** Regression analysis for ROE

| *Fixed-effects model* | | | | |
|---|---|---|---|---|
| ***Variables*** | ***Coefficient*** | ***Std. Error*** | ***T-statistic*** | ***Prob.*** |
| Const. | 0.883 | 0.300 | 2.946 | 0.004 |
| *IFRS 9* | -0.018 | 0.005 | -3.644 | 0.000 |
| *LR* | 0.126 | 0.061 | 2.056 | 0.042 |
| *CR* | -0.225 | 0.082 | -2.754 | 0.007 |
| *B-Cap* | -0.356 | 0.138 | -2.578 | 0.011 |
| *Size* | -0.090 | 0.032 | -2.786 | 0.006 |
| *Growth* | 0.009 | 0.012 | 0.734 | 0.465 |
| *NIX* | 0.149 | 0.201 | 0.739 | 0.461 |
| Adjusted R-squared | | | 0.61 | |
| F-statistic | | | 11.59 | |
| Prob. (F-statistic) | | | 0.000 | |

*Source: Authors' calculations.*

The adjusted R-squared of the fixed effect model, which employed GLS cross-section weights, emerged as the most suitable for this study, explaining 61% of the variation in return on equity (*ROE*). The higher value of the F-statistic for this model underscores its significance.

The impacts of each independent variable on ROE in the fixed effect model are detailed as follows:

• *IFRS 9*: The coefficient was -0.018, indicating a negative and weak effect on *ROE*. The t-statistic of -3.644 and a probability of less than 0.000, below the significance level of 0.05, highlight a statistically significant negative impact of IFRS 9 on ROE in Jordanian commercial banks during 2012–2021.

• *LR*: With a coefficient of 0.126, there was a positive and strong effect on *ROE*. T-statistic was 2.056 and the probability of 0.042, under the 0.05 significance level, suggesting a statistically significant positive impact of *LR* on *ROE* during the same period.

• *CR*: The coefficient of -0.225 indicates a negative and strong effect on ROE. T-statistic of -2.754 and probability of 0.007, also below the 0.05 significance level, confirm a statistically significant negative impact of *CR* on *ROE* in Jordanian commercial banks from 2012 to 2021.

• *B-Cap*: A coefficient of -0.356 shows a negative and strong effect on ROE. With a t-statistic of -2.578 and a probability of 0.011, this indicates a statistically significant negative impact of *B-Cap* on *ROE* from 2012 to 2021. An increase in capital tends to reduce ROE.

• *Size*: The coefficient of -0.090 reveals a negative and weak effect on ROE. The t-statistic of -2.786 and a probability of 0.006, below the 0.05 significance level, indicate a statistically significant negative effect of *Size* on *ROE* in Jordanian commercial banks during 2012–2021.

• *Growth*: The coefficient of 0.009 suggests a positive but not statistically significant effect on *ROE*, with a t-statistic of 0.734 and a probability of 0.465, which is above the 0.05 significance level.

• *NIX*: The coefficient of 0.149 shows a positive effect on *ROE*. However, with a t-statistic of 0.739 and a probability of 0.461, this effect is not statistically significant, as it exceeds the 0.05 significance threshold. This indicates a non-significant positive impact of *NIX* on *ROE* in Jordanian commercial banks during 2012–2021.

## 5. CONCLUSION

The statistical analysis conducted in this study revealed several key findings regarding the impact of various factors on the performance of Jordanian banks from 2012 to 2021. The implementation of IFRS 9 exhibited a negative effect on both ROA and ROE. This outcome suggests that the adoption of the expected loss approach under IFRS 9 increases impairment provisions, enhancing transparency but potentially reducing bank lending operations and profitability, as supported by the study of Chan and Phua (2022).

Liquidity risk showed a positive impact on both ROA and ROE, indicating that Jordanian banks possessed high liquid assets during this period, which mitigated liquidity risks and reduced the need for external financing. This scenario likely led to increased economic activity and profitability.

Credit risk had a negative impact on the banks' performance, attributable to inadequate credit risk management and a challenging economic climate marked by increased unemployment and default rates. The results underscore the need for Jordanian banks to implement stringent regulations and efficient credit policies to control credit risk, thereby minimizing non-performing loans and losses.

The effect of bank capital on bank performance was mixed, with positive implications for ROA and negative implications for ROE. An increase in capital seems to enhance bank performance and profitability, enabling banks to better manage risks and enjoy lower financing costs.

The study recommends enhancing the procedures for IFRS 9 application and advises banks to maintain sufficient liquid assets. Emphasis should also be placed on employing effective credit risk management policies. Future research should explore each risk category in detail, particularly focusing on liquidity, credit, and capital risks. This approach would provide comprehensive insights for banks to mitigate and control these risks. Additionally, extending the sample period for applying IFRS 9 could yield more robust and insightful results.

The research encountered some challenges. The recent implementation of IFRS 9 limited the sample period to four years, potentially introducing bias in the estimations. Additionally, difficulties in data collection from annual reports for 2012–2021 were encountered, primarily due to the scanning of documents in black and white, which complicated the readability of these reports.

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