

Print ISSN: 2288-4637 / Online ISSN 2288-4645
doi:10.13106/jafeb.2021.vol8.no6.0769

The Impact of Credit Concentration on Firm Performance: An Empirical Study of Jordanian Commercial Banks

Fadi Kamal ALFARAJ¹, Qasem HAMOURI²

Received: March 05, 2021 Revised: May 08, 2021 Accepted: May 15, 2021

Abstract

This study aimed to identify the impact of credit concentration on the performance of Jordanian commercial banks listed on the Amman Stock Exchange (ASE). The study sample consisted of 13 commercial banks during the period 2010–2019. The results showed that there is no statistically significant impact of credit concentration on financial performance as measured by ROA, ROE, and EPS, while there is a positive and statistically significant impact of bank size on the financial performance as measured by ROA and EPS. Also, there is no statistically significant impact of bank size on financial performance as measured by ROE. The results also showed that there is a negative impact of financial leverage on financial performance as measured by ROA, ROE, and EPS. The study recommended that commercial banks focus on all the elements in evaluating and determining their level of financial performance and work to compare the credit concentration in commercial banks with one another and ensure that a certain percentage of credit concentration exists to maintain the quality of work of these commercial banks and to achieve a high level of financial performance.

Keywords: Credit Concentration, Commercial Banks, Financial Performance, Amman Stock Exchange

JEL Classification Code: G21, F30, F65

1. Introduction

Banks play a vital role in the economy across countries by accumulating savings and accepting them in the form of deposits, employing a large part of such deposits in the form of credit facilities that benefit all sectors of the economy to finance their multiple operations and keeping track of the effects provided by granting bank credit on all economic sectors because such effects are intertwined with a great extent of complexity, and have direct and indirect implications for all macroeconomic variables in the economy (Arif & Awwaliyah, 2019).

The general role of commercial banks is to provide financial services to the general public and business, ensuring economic and social stability and sustainable growth of the economy. In this respect, credit creation is the most significant function of commercial banks. Therefore, the banking system encompasses a group of institutions that deal with credit in which the majority of banks' revenues emanate from credit activities, and their interest in the credit function is considered one of the characteristics of banks because the financial position of any bank is affected by many variables and elements. However, the credit portfolio occupies an important place in the bank's items. Commercial banks create credit by advancing loans and purchasing securities. They lend money to individuals and businesses out of deposits accepted from the public. Hence, the integrity of the loan portfolio is necessary to achieve high returns for the bank at the lowest possible levels of risks associated with decisions to extend credit (Bolarinwa & Obembe, 2017). Commercial banks faced many financial crises in the past, forcing economic, financial, and international institutions such as the International Monetary Fund, the World Bank, and the Bank for International Settlements to study the causes of banking crises, particularly the major ones, and work to develop appropriate solutions, and one of the most

¹First Author and Corresponding Author. Financial and Banking Sciences Department, Faculty of Economics and Administrative Sciences, Yarmouk University, Jordan [Postal Address: Shafiq Irshidat Street, Irbid, Jordan] Email: Fadi.faraj1@gmail.com
²Financial and Banking Sciences Department, Faculty of Economics and Administrative Sciences, Yarmouk University, Jordan. Email: Qasem@yu.edu.jo

important causes of these crises was credit concentration and its risks.

Credit concentration risk occurs when loans are susceptible to a specific sector of the economy or business group that has slowed down, which is particularly risky for banks and financial institutions. Credit concentration risk has been the specific cause of many occurrences of financial distress of banks worldwide. This requires the central bank to fully understand this issue and exercise its supervisory functions according to the latest supervisory frameworks and standards issued by the Basel Committee. The emergence of concentration risk is closely linked to the business strategy orientation of banks. International experiences suggest concentration risk has a direct impact on a bank's portfolio loss and hence core capital and solvency position.

Managing concentration risk means mitigating the effects of systematic risk resulting from dependence in losses across loans and idiosyncratic risk associated with large exposures to individual obligors. Credit concentration depends on increasing the volume of banks' work and raising their level of performance; it is considered one of the most important features of economic activity at present (Duong et al., 2020; Le & Diep, 2020; Nguyen & Lien, 2019; Sarwar et al., 2020). The current study aims at pinpointing the effect of credit concentration on the performance of Jordanian commercial banks listed on the Amman Stock Exchange (ASE). As a consequence, this study is of interest to many parties, and its importance stems from commercial banks.

2. Literature Review

The main goal of commercial banks is profit-oriented as opposed to the goal of the central bank, as they try to achieve the highest profit at the lowest cost (Ayman, 2011; Nguyen & Lien, 2019). All commercial banking business is subject to the supervision of the Central Bank. The jobs of commercial banks are classified into two types: primary and modern. The primary functions are manifested in accepting deposits of several types through the commercial banks and working on granting loans. Commercial banks employ their resources through loans granted to clients and various investments, taking into account the basic principles of employing profitability, liquidity, and security of the banks' money. As for the modern jobs, the emergence of the expansion of commercial banking business and work to increase its activity has led to a change in the perception of the bank from a place for collecting and lending to a large institution working to provide banking services to the public. One of the most important modern functions lies in providing advisory services to clients regarding their work and their development projects by developing their confidence in the bank, and work to contribute towards supporting and financing development projects that serve the community in

the first place. Other services include collecting commercial securities for the benefit of customers, credit card services, and buying, selling, and transferring foreign currencies abroad (Al-Assar & Al-Halabi, 2009).

Commercial banks are known as the only banks that work to keep deposits to be withdrawn afterward through checks and other means. The term commercial bank was used because commercial banks in the past used to have the role of financing short-term loans (Al-Qazuni, 2007). A bank can be defined as a financial institution that invests the money of its clients and investors. It acts as a financial intermediary between investors, depositors, and investors who borrow these funds to cover all their investment needs.

Banks are considered one of the financial institutions that invest deposits from investors to earn profit. Banks generally make money by borrowing money from depositors and compensating them with a certain interest rate. The banks will lend the money out to borrowers, charging the borrowers a higher interest rate, and profiting off the interest rate spread (Goddard et al., 2004). Banks, moreover, provide financial activities to their clients, such as credit services, exchange checks, issuance of letters of credit, letters of guarantee, safety deposit funds, portfolio management, foreign exchange services, trading of commercial papers, bank acceptance, and underwriting of financial instruments (Al-Qaisi, 2017).

Thus, the banking sector in Jordan plays an important role in improving the economy and its stability to increase economic growth, and the banks' activities are important in the process of money formation, which may affect the payment system. The banking sector in Jordan has witnessed considerable change and improvement in the past two decades, which has affected both the growth and the profitability of banks. Jordanian banks have taken advantage of all recent developments in the field of banking technology and from the growth in the number of investors

Alshatti (2015) investigated the impact of credit risk management on financial performance. The sample consisted of 13 Jordanian commercial banks from 2005-2013. The performance of commercial banks was measured by return on assets and shareholders' equity, along with using many statistical methods such as descriptive statistics and multiple regression analysis. The findings revealed that credit risk management indicators have a significant impact on the financial performance of Jordanian commercial banks, and they maintain appropriate credit management that includes monitoring and processing as well as adequate controls over credit risk. Banks need to develop and innovate strategies that will not only expose banks to credit risk but also develop the performance and competitiveness of banks as well. The study recommended that banks improve their credit risk management to make more profits. They should take into account the indicators of non-performing loans, total loans,

facilities losses, net facilities, and the leverage ratio that is important in identifying credit risk management.

Al-Ta'ae (2013) aimed at identifying the impact of the risks of credit concentration on the profitability and capital of commercial banks. The sample consisted of the Jordanian Housing Bank for Trade and Finance and the Jordan Kuwait Bank, during 2001–2011. Several statistical methods were used, such as the correlation coefficient and simple linear regression analysis. The study concluded a strong inverse relationship between the degree of sectoral concentration in the loan portfolio and profitability of the portfolio as well as a strong inverse relationship between the degree of sectoral concentration in the loan portfolio and the capital of commercial banks. The results indicated that the sectoral concentration risk in the loan portfolio has a significant impact on the capital of Jordan Housing Bank for Trade and Finance and Jordan Kuwait Bank. The study recommended working to reduce the level of credit concentration in the loan portfolio by following a set of methods, the most important of which is diversification and compliance with the credit limits set by the supervisory authorities.

3. Research Methodology

3.1. Sample and Population

The population consists of all the banks listed on the Amman Stock Exchange (ASE) numbering (16) commercial and Islamic banks, while the sample consists of Jordanian commercial banks numbering (13) as listed in the Amman Stock Exchange website. The sample is chosen according to the following conditions:

1. Providing all necessary data in the financial reports for the study variables that are listed on Amman Stock Exchange from 2010 to 2019.
2. The bank's fiscal year shall be at the end of December of each year.
3. The bank should not be merged nor suspended from trading during the study period.

3.2. Variables and Measures

A set of independent, dependent, and control variables have been developed that are mainly related to the subject of the study:

3.2.1. Dependent Variable

An indicator that reflects the bank's activities and profitability is calculated by dividing net income by total assets annually. The (ROA) and (ROE) are important indicators for determining the level of the bank's financial performance

and an index of profitability. In the current study, financial performance was measured by the following equations:

- i. **Return on Assets (ROA) Ratio:** The concept of return on assets ratio is a broad concept and has many fields. ROA is a profitability ratio that measures the net income produced by total assets during a period by comparing net income to the average total assets. The issue of measuring it is a delicate matter. Thus, it is not significant unless it is attributed to a specific reference period, and such a concept is applied to every economic business, and through it, the financial and human resources are used. It is expressed in the relationship between the outcome and the used resources (Goddard et al., 2004). It is measured by the following equation:

$$\text{Return on Assets Ratio (ROA)} = \frac{\text{Net income after tax}}{\text{Total assets}}$$

- ii. **Return on Equity (ROE) Ratio:** It is defined as an integrated indicator that describes the reciprocal relationship between return and risk, and it is a model that enables the analyst to evaluate the source, and the bank size profits, particularly credit risk, liquidity risk, interest rate risk, operational risk, and capital risks (Goddard et al., 2004). ROE is a ratio that provides investors with insight into how efficiently a company (or more specifically, its management team) is handling the money that shareholders have contributed to it. It is measured as follows:

$$\text{Return on Equity Ratio (ROE)} = \frac{\text{Net income after tax}}{\text{Total of equity}}$$

- iii. **Earnings per share:** It is defined as the share in the ownership of the bank, as it gives the right to its owner to obtain profits after the payment of all obligations and the holder of a common share has the right to participate in the management of the bank. It is measured as follows:

$$\text{Earnings Per Share (EPS)} = \frac{\text{Net income after tax}}{\text{Subscribed shares}}$$

3.2.2. Independent Variable

An indicator that helps in determining the level of credit concentration in commercial banks, which is (HHI) Herfindahl Hirshman Indicator, which measures the extent to which a few clients represent a large part of the bank's investments (Reynolds, 2009):

This ratio is located between:

1. Null indicates the lowest level of concentration.
2. One indicates the highest level of concentration.

$$HI = \frac{\sum EAD^2}{(\sum EAD)^2}$$

To illustrate:

HI: Herfindahl indicator identifies the credit concentration.

EAD = It represents the total employment of the bank with companies only and includes small and medium-sized enterprises without deducting provisions, and includes placements on all borrowing companies' debts, including discounted commercial papers, credit facilities, loans, debt instruments, stocks, off-balance sheet items, and any other form of financial support.

3.2.3. Control Variables

A variety of variables have been selected that are related to the performance of Jordanian commercial banks as follows:

1. Bank size
2. Debt ratios (leverage)
 - (i) It expresses the level of what the bank owns and determines the extent of its viability. It is measured by total assets in the current study.
 - (ii) It expresses the level of debt borne by the bank (Al-Ali, 2013). It is measured by the total liabilities divided by the total assets in the current study.

3.3. Research Model

According to the previous studies and the presentation of the variables that were used in the current study, the study model is illustrated as follows (Table 1):

$$\text{Perf} = \alpha + \beta_1 \text{HHI}_t + \beta_2 \sum \text{Control Variable}_t + e$$

To clarify:

Perf = the dependent variable financial performance, as measured by the rate of return on assets, rate of return on equity, and earnings per share.

β = regression coefficient ($\beta_1, \beta_2, \dots, \beta$).

HHI = the independent variable is the credit concentration index.

Control Variables = controlling variables, including bank size and debt / leverage ratio.
 e = Random Measurement Error.

3.4. Data and Estimation Method

The statistical analysis program (E-Views) was used to analyze the data and test hypotheses, by adopting many of the statistical methods, such as:

- **Descriptive Statistic:** It helps in obtaining a description of all the study variables, by extracting the arithmetic means and standard deviations of those variables, along with clarifying the highest and the lowest value.
- **Pearson test:** It is used to examine the independent variables adopted in the study, thus, they are examined through this test to see the extent of their correlation with each other.
- **Regression Analysis:** Fixed Effect Model is used to estimate Panel Data by the use of the regular least squares or the random effect model that is estimated by using the Generalized Least Squares method. The difference between the fixed effect and the random effect method is clear regarding the individual factors, in addition to the time factor associated either with or without the independent variables. The random effect method assumes the randomness of its appearance and its non-correlation with the independent variables, thus, the existence of this correlation makes the random effect method inefficient in estimating the study coefficients and vice versa for the fixed effect.

4. Results

4.1. Descriptive Statistics

Table 2 shows the arithmetic averages, standard deviations, the highest value, and the lowest value.

Table 2 indicates the following:

Table 1: Study Variables and the Methods of Measuring Them

Variables	Its measurement
Performance	The ability of banks to survive through achieving profitability, and performance will be measured by the return on assets ratio.
Credit Facility Construction	Credit concentration in which it expresses the concentration in the loan portfolio due to the concentration of the bank's dealings with a single customer or a whole group. It will be measured by Herfindhal Hirshman Indicator (HHI).
Control Variables	They are controlling variables such as debt ratio and bank size.

Table 2: The Descriptive Statistics for the Whole Variables

Variables	Arithmetic Average	Standard Deviations	The Highest Value	The Lowest Value
The return on assets ratio	1.17168%	0.48002%	2.50550%	−0.16591%
The return on equity assets	8.70950%	3.39989%	16.8744%	−1.44790%
Earnings per share	0.19995%	0.14054%	0.67652%	−0.01606%
Credit concentration	0.69230%	0.46332%	1.00000%	0.00000%
Bank size	9.34310%	0.39798%	10.4204%	8.53485%
Leverage	86.2499%	2.77569%	92.8621%	78.0360%

- The arithmetic mean of the variable “return on assets ratio” (ROA) is 1.17168%, while the standard deviation is 0.48002%. Accordingly, the ROA reflects the level of financial performance of banks listed on the ASE and indicates the ratio of comparison between net income and total assets of commercial banks. This ratio also responds to the change in share prices and overcomes many problems related to defining the level of financial performance by including elements that reflect the level of the bank’s performance. It was evident that there is a fluctuation in the levels of ROA ratio in the commercial banks where the arithmetic mean of this ratio was compared with the highest and lowest values that were 2.50550% and −0.16591% respectively.
- The arithmetic mean of the variable “return on equity ratio” (ROE) is 8.70950%, and the standard deviation is 3.39989%. ROE ratio is considered one of the main elements in measuring the financial performance of commercial banks and is calculated by dividing the total shareholders’ equity by the total assets. Therefore, this ratio indicates that commercial banks have an average level of financial performance, and this result was inferred by comparing the arithmetic mean of this variable with the highest value, which is 16.8744%; however, there is a discrepancy between the level of ROE in Jordanian commercial banks during 2010–2019.
- The arithmetic mean of the “earnings per share” (EPS) variable is 0.19995% while the standard deviation is 0.14054%. EPS reflects the bank’s net profits per share. It is calculated by dividing total assets by the number of ordinary shares. The result indicates an average level of earnings per share in commercial banks. This reveals that the net profit is not increased compared to the number of commercial bank shares, and this result was confirmed by calculating the highest value, which is 0.67652%, while the lowest value is −0.01606%.
- The arithmetic mean of the “credit concentration” variable is 0.69230%, and the standard deviation is 0.46332%. The credit concentration reflects the banks’ focus on extending their loans to a specific class or sector. Credit concentration in Jordanian commercial banks was considered as medium to high by comparing the arithmetic mean with the highest and lowest value of this variable, which is 1 and 0, respectively.
- The arithmetic mean of the “bank size” variable is 9.34310%. Accordingly, the bank size reflects the total assets of Jordanian commercial banks. The bigger the bank size, the more the bank’s ability in terms of continuing, developing its performance, and achieving a high level of financial performance consistent with its size. We infer that the bank size for the study sample was appropriate by comparing the arithmetic mean with the highest value which is 10.4204%, and the lowest value which is 8.53485%, and the standard deviation is 0.39798%, which indicates the bank size dispersion among banks.
- The arithmetic mean of the “financial leverage” variable is 86.2499%, which expresses the amount or percentage of debts that banks bear on an annual basis. Thus, the financial leverage reflects the degree to which banks rely on financing sources that have fixed income, such as loans, Preferred bonds, or stocks to finance their assets. Consequently, they affect the profits that investors obtain, and by looking at the highest and lowest value, it was found that the level of debt borne by banks is high, reaching the highest value of 92.8621% and the lowest value of 78.0360%, while the standard deviation is 2.77569%. This indicates that there is a discrepancy between Jordanian commercial banks in terms of the level of financial leverage. Before conducting the hypothesis test, we should examine all the independent variables and their compatibility with each other to make a suitable hypothesis test as illustrated below.

4.2. Multiple Correlation among the Dependent Variables

This test shows that either independent variables or dependent variables are not highly correlated. However, it is mainly considered helpful in determining the level of correlation between these variables.

As shown in Table 3, the findings of the correlation between the independent variables indicate that the correlation ratios between the variables were less than (0.80), which is the ratio that determines the level of correlation. This indicates the absence of a multiple linear correlation phenomenon between the independent variables. The value of the correlation coefficient that surpasses (0.80) indicates the existence of a multiple high linear regression problem. To confirm the previous result, the variance inflation factor was calculated for all independent variables to ensure the existence of multiple linear regression, and the results were as follows:

4.3. Multicollinearity Test

Table 4 shows the extent of the correlation of the independent variables. Multiple regression test was used between these variables as follows:

Table 4 shows that the values of the variance inflation factor were all greater than 1 and less than the 10, and the Tolerance value was between 0.1–1, which indicates the absence of a multiple linear regression problem between all the study variables, and thus hypotheses of the study can be tested.

Table 3: The Findings of Pearson Correlation Among the Independent Variables

Variables	Concentration	Bank size	Leverage
Concentration	1		
Bank size	0.10088	1	
Leverage	0.03881	0.14727	1

Table 4: The Findings of Multiple Regression Test Among the Independent Variables

Variables	VIF	Tolerance	Result
Credit concentration	1.165	0.8581	There is no multiple correlation
Bank size	1.260	0.7932	There is no multiple correlation
Leverage	1.054	0.9483	There is no multiple correlation

4.4. Hypotheses Testing

Regression analysis was used to test all the study hypotheses (Table 5). All variables were examined through Hausman Test, and then regression analysis was applied for each of them.

4.4.1. The Impact of Credit Concentration on the Return of Assets (ROA)

ROA: First hypothesis testing (H_0)

There is no statistically significant effect (at the significance level ($\alpha \leq 0.05$)) of credit concentration on the ROA ratio in Jordanian commercial banks listed on the ASE during 2010–2019.

As indicated in Table 5, the results of the Hausman test revealed that employing the Fixed Effect Model is better than employing the Random Effect Model to estimate the study parameters. (Hausman Test) is statistically significant at the significance level (5%). Therefore, the fixed-effect method is better than the random effect method to come up with accurate and efficient results that are used for testing the study hypotheses. For the purposes of the analysis, the discussion is limited only to the results of the fixed effect model that considers the optimal method for analyzing the study data.

Credit concentration, moreover, is not statistically significant at the significance level of 1%, and the estimation of factor score for credit concentration is 0.6435, and indicates that credit concentration has no effect on the ROA ratio. Therefore, the level of credit concentration followed in Jordanian commercial banks, whether it is significantly high or low does not affect ROA.

Therefore, the first hypothesis will be accepted, which states that there is no statistically significant effect at the significance level ($\alpha \leq 0.05$) of credit concentration on the

Table 5: The Estimation Results of the Impact of Credit Concentration on the Return of Assets (ROA) of the Commercial Banks

Dependent Variable	ROA _{it}
Independent Variable	Fixed Effects Model
Intercept	8.719927 (0.003)
Concentration	0.068117 (0.6435)
Size	4.462603 (0.0499)
D.R	-0.037951 (0.0289)
R ²	0.471724
F-statistic	3.906649 (0.0001)
Hausman Test	χ^2 Statistic = 3.722509 Prob > χ^2 = (0.000)
VIF-Means	1.159

ROA in Jordanian commercial banks listed on the ASE during the period 2010–2019. This result is consistent with the results of Daw (2012) who revealed that there is no effect of credit concentration on ROA of Libyan commercial banks from 1999 to 2008.

Second hypothesis testing (H1)

H1: there is no statistically significant effect (at the significance level ($\alpha \leq 0.05$)) of bank size on ROA ratio in Jordanian commercial banks listed on the ASE during the period (2010–2019).

The *p*-value for the bank size variable is 0.0499, and this indicates the existence of a statistically significant effect at the significance level ($\alpha \leq 0.05$), and the estimation of factor score reached 4.462603. Hence, there is a positive effect of the bank’s size on ROA in commercial banks listed on the ASE. Consequently, the higher the level of total assets (the bank size), the higher the level of ROA for the commercial banks listed on the ASE from 2010 to 2019, which reflects the extent of the impact of the size of the assets on the bank’s profitability is impacted by ROA.

Hence, the second hypothesis is rejected and the alternative hypothesis is accepted, which states that there is a statistically significant effect at the significance level ($\alpha \leq 0.05$) of bank size on ROA in Jordanian commercial banks listed on the ASE during the period 2010–2019.

Third hypothesis testing (H2)

H2: there is no statistically significant effect (at the significance level ($\alpha \leq 0.05$)) of financial leverage on the ROA ratio in Jordanian commercial banks listed on the ASE during the period (2010–2019).

The *p*-value for the financial leverage variable is 0.0289, which indicates the existence of a statistically significant effect at the significance level ($\alpha \leq 0.05$). The financial leverage ratio has increased in commercial banks, and this will lead to a decrease in the ROA ratio, and if the leverage ratio decreases, this will increase the ROA ratio in commercial banks listed on the ASE during 2010–2019.

Accordingly, the third main hypothesis is rejected and the alternative hypothesis is accepted, which states that there is a statistically significant effect at the significance level of ($\alpha \leq 0.05$) of financial leverage on ROA in Jordanian commercial banks listed on the ASE during the period 2010–2019.

4.4.2. The Impact of Credit Concentration on the Return of Equity (ROE)

ROE: First hypothesis testing (H0):

H3: there is no statistically significant effect (at the significance level ($\alpha \leq 0.05$)) of credit concentration on the

Table 6: The Estimation Results of the Impact of Credit Concentration on the Return of Equity (ROE) of the Commercial Banks

Dependent Variable	ROE _{it}
Independent Variable	Fixed Effects Model
Intercept	-0.502823
	0.9778
Concentration	0.949876
	0.4063
Size	-2.559066
	0.1604
D.R	0.376398
	(0.0056)
R ²	0.365529
F-Statistic	2.520512
	(0.0006)
Hausman Test	χ^2 Statistic = 3.501943 Prob > χ^2 = (0.0205)
VIF-Means	1.159

ROE ratio in Jordanian commercial banks listed on the ASE during the period 2010–2019.

As illustrated in Table 6, the results of the Hausman test demonstrated that using the Fixed Effect Model is better than using the Random Effect Model to estimate the study parameters. Hausman test was statistically significant at the significance level (5%). Therefore, the fixed effect model is better than the random effect method to reach accurate and efficient results for testing the study hypotheses. To analyze the findings, the discussion is limited only to the results of the fixed effect that proved its efficiency in analyzing the data.

As shown in Table 6, credit concentration was not statistically significant at the significance level of 1%, and the *p*-value of credit concentration was 0.4063 suggesting that credit concentration has no effect on the ROE ratio. Hence, the credit concentration level adopted in Jordanian commercial banks, whether it is significantly high or low, does not affect the ROE.

Therefore, the first main hypothesis will be accepted, which states that there is no statistically significant effect (at the significance level ($\alpha \leq 0.05$)) of credit concentration on ROE in Jordanian commercial banks listed on the ASE during the period 2010–2019. This result is in sharp contrast with Alshatti (2015) who revealed that credit risk management indicators have a significant impact on the financial performance of Jordanian commercial banks.

Second hypothesis testing (H1):

There is no statistically significant effect (at the significance level ($\alpha \leq 0.05$)) for bank size on the ROE ratio in Jordanian commercial banks listed on the ASE during the period 2010–2019.

The *p*-value for the bank size variable is 0.1604, and this indicates that there is no statistically significant effect (at the significance level ($\alpha \leq 0.05$)), and the estimation of factor scores reached 2.559066. There is no effect of bank size on the ROE ratio in Jordanian commercial banks listed on the ASE. Regardless of the fluctuation in the level of total assets (the bank size) between high and low, it does not affect the level of ROE of the commercial banks listed on the ASE during the period 2010–2019.

As a consequence, the second main hypothesis is accepted, which states that there is no statistically significant effect (at the significance level ($\alpha \leq 0.05$)) of bank size on the ROE in Jordanian commercial banks listed on the ASE during the period 2010–2019.

Third hypothesis testing (H2):

There is no statistically significant effect (at the significance level ($\alpha \leq 0.05$)) of financial leverage on the ROE ratio in Jordanian commercial banks listed on the ASE during the period 2010–2019.

The *p*-value for the financial leverage variable is 0.0056, which indicates the existence of a statistically significant effect at the significance level ($\alpha \leq 0.05$), and the estimation of factor scores reached -0.376398 , revealing a negative impact. If the financial leverage increases in commercial banks, this will lead to a decrease in the level of ROE in commercial banks listed on the ASE during the period 2010–2019. There is a diverse impact of financial leverage on the performance of banks measured by ROE.

Accordingly, the third main hypothesis is rejected and the alternative hypothesis is accepted, which states that there is a statistically significant effect (at the significance level ($\alpha \leq 0.05$)) of financial leverage on ROE in Jordanian commercial banks listed on the ASE during the period 2010–2019.

4.4.3. The Impact of Credit Concentration on the Earnings Per Share (EPS)

EPS: First hypothesis testing (H0):

There is no statistically significant effect (at the significance level ($\alpha \leq 0.05$)) of credit concentration on EPS in Jordanian commercial banks listed on the ASE during the period 2010–2019.

As shown in the previous Table 7, the results of the Hausman test indicated that using the Fixed Effect Model is better than using the Random Effect Model, to estimate the study parameters. Hausman Test is statistically significant

Table 7: The Estimation Results of the Impact of Credit Concentration on the Earnings Per Share (EPS) of the Commercial Banks

Dependent Variable	EPS _{it}
Independent Variable	Fixed Effects Model
Intercept	0.386096
	0.5341
Concentration	0.010871
	0.7821
Size	0.050308
	(0.0210)
D.R	-0.007695
	(0.0095)
R ²	0.560520
F-Statistic	5.579957
	(0.0000)
Hausman Test	χ^2 Statistic = 5.973112 Prob > χ^2 = (0.0029)
VIF-Means	1.159

at the level of significance (5%). Therefore, the fixed effect method is better than the fixed effect to achieve accurate and efficient results, which can be referred to test the hypotheses of the study. To analyze the data, the discussion is limited only to the results of the fixed effect that proved its efficiency in analyzing the data.

As indicated in Tables 5, 6 and 7, the credit concentration is not statistically significant at the significance level of 1%, and the *p*-value of credit concentration is 0.781, which indicates that credit concentration has no effect on the EPS in commercial banks listed on the ASE. Thus, the level of credit concentration followed in Jordanian commercial banks, whether considerably high or low, does not affect the level of earnings per share for those banks.

As a result, the first main hypothesis will be accepted, which states that there is no statistically significant effect (at the significance level ($\alpha \leq 0.05$)) of credit concentration on EPS in Jordanian commercial banks listed on the ASE during 2010–2019. Such finding is inconsistent with the findings of Al-Ali (2013) who showed that there is an effect of the concentration of the credit portfolio on the performance of the traditional private banks listed on the Damascus Stock Exchange.

Second hypothesis testing (H1):

There is no statistically significant effect (at the significance level ($\alpha \leq 0.05$)) of the bank's size on EPS in

the Jordanian commercial banks listed on the ASE during 2010–2019.

The *p*-value for the bank size variable is 0.0210, which indicates the existence of a statistically significant effect at the significance level (0.05) for the bank size on EPS, and the estimation factor score is 0.050308 and it is evident that there is a positive effect of the bank's size on EPS in the commercial banks listed on the ASE. If the level of total assets (the bank size) is high, it will increase the level of EPS for the commercial banks listed on the ASE during 2010–2019, and vice versa.

Accordingly, the second main hypothesis is rejected and the alternative hypothesis is accepted, which states that there is a statistically significant effect (at the significance level ($\alpha \leq 0.05$)) of the bank's size on EPS in Jordanian commercial banks listed on EPS from 2010 to 2019.

Third hypothesis testing (H2):

There is no statistically significant effect (at the significance level ($\alpha \leq 0.05$)) of financial leverage on EPS in Jordanian commercial banks listed on the ASE during 2010–2019.

The *p*-value for the financial leverage variable is 0.0095, which indicates the existence of a statistically significant effect at the significance level ($\alpha \leq 0.05$). The financial leverage has increased in the commercial banks leading to a decrease in the level of EPS for the commercial banks listed on the ASE during 2010–2019. If the commercial banks listed on the ASE tolerate a low amount of debt, this will give an opportunity to increase the level of EPS.

Accordingly, the third main hypothesis is rejected and the alternative hypothesis is accepted, which states there is a statistically significant effect (at the significance level ($\alpha \leq 0.05$)) on EPS in the Jordanian commercial banks listed on the ASE during 2010–2019.

5. Conclusion

This study finds that there is no statistically significant effect at the significance level ($\alpha \leq 0.05$) for credit concentration on financial performance as measured by the rate of return on assets, rate of return on equity, and earnings per share, in the Jordanian commercial banks listed on the Amman Stock Exchange during the period 2010–2019. There is a positive significant effect at the significance level ($\alpha \leq 0.05$) for the bank size on the financial performance as measured by the rate of return on assets and earnings per share, in Jordanian commercial banks listed on the Amman Stock Exchange during 2010–2019. There is no statistically significant effect at the significance level ($\alpha \leq 0.05$) for the bank size on the financial performance measured by return on equity ratio in the Jordanian commercial banks listed on the Amman Stock Exchange during 2010–2019. There

is a statistically negative effect at the significance level ($\alpha \leq 0.05$) of financial leverage on financial performance as measured by return on assets ratio, return on equity ratio, and earnings per share, in Jordanian commercial banks listed on the Amman Stock Exchange during 2010–2019).

This research contributes to commercial banks, as the current study focused on the issue of credit concentration and its impact on the performance of Jordanian commercial banks listed on the Amman Stock Exchange. This facilitates commercial banks of the role that credit concentration plays, and its impact on their performance, and many suggestions that serve the work of commercial banks for the better. It is beneficial for researchers and analysts interested in the issue of credit concentration in Jordanian commercial banks, as it contained a detailed discussion about credit concentration in Jordanian commercial banks as well as revealing the extent of the importance of credit concentration, its objectives, and activities while clarifying the relationship between credit concentration and the performance of commercial banks. Therefore, this study will facilitate the researchers to refer to information on credit concentration in commercial banks, and also help analysts interested in examining banks' status in terms of the credit concentration of banks. This study recommended that carrying out further studies that include other factors not included in this study that affect credit concentration in Jordanian commercial banks.

References

- Al-Ali, A. (2013). *Commercial bank management: risk management approach*. Amman, Jordan: Al-Thakara for Publishing and Distribution.
- Al-Assar, A. Q. M., & Al-Halabi, K. A. A. (2009). *Fundamentals of financial management*. Khartoum: University of Khartoum House for Printing and Publishing.
- Al-Qaisi, F. (2017). Analyzing the factors affecting the performance of the Jordanian commercial banks Using the components of CAMELS Model: An Applied Study. *Jordanian Journal of Business Administration*, 13(4), 461–474. <https://journals.ju.edu.jo/JJBA/article/view/100600>
- Al-Qazuni, A. H. (2007). *Banking administration*. Mosul, Iraq: University of Mosul.
- Al-Ta'ae, S. (2013). Impact of the sectoral concentration of credit risk in the profitability and capital of commercial banks: An applied study on the housing bank of Jordan and the Jordan-Kuwait Bank. *Tanmiyat Al-Rafidain*, 35(114), 87–104. <https://doi.org/10.33899/tanra.2013.162058>
- Alshatti, A. S. (2015). The effect of credit risk management on the financial performance of the Jordanian commercial banks. *Investment Management Financial Innovations*, 12(1), 338–345. https://businessperspectives.org/images/pdf/applications/publishing/templates/article/assets/6515/Iimfi_en_2015_01cont_2_Alshatti.pdf

- Arif, M., & Awwaliyah, T. B. (2019). Market share, concentration ratio, and profitability: Evidence from Indonesian Islamic banking industry. *Journal of Central Banking Theory Practice*, 8(2), 189–201. <https://doi.org/10.2478/jcbtp-2019-0020>
- Ayman, Z. M. (2011). *Determinants of the financial performance of Islamic and conventional banks in Jordan using Tobin's Q and return on assets (ROA) in light of global financial crisis: An empirical study during (1999–2012)* [Doctoral thesis, University of Islamic Sciences, Amman, Jordan]. <https://ajsrp.com/m0280918.html>
- Bolarinwa, S. T., & Obembe, O. B. (2017). Concentration–profitability nexus: New approach from causality. *Studies in Microeconomics*, 5(1), 84–98. <https://doi.org/10.1177/2321022217695993>
- Daw, A. K. (2012). *Analysis of the impact of banking concentration and market share on the performance of commercial banks* [Doctoral thesis Amman Arab University, Amman, Jordan]. <https://search.emarefa.net/ar/detail/BIM-553433>
- Duong, T. T. N., Phan, H. T., Hoang, T. N., & Vo, T. T. T. (2020). The effect of financial restructuring on the overall financial performance of the commercial banks in Vietnam. *The Journal of Asian Finance, Economics, and Business*, 7(9), 75–84. <https://doi.org/10.13106/jafeb.2020.vol7.no9.075>
- Goddard, J., Molyneux, P., & John, O. S. W. (2004). Dynamics of growth and profitability in banking. *Journal of Money, Credit and Banking*, 36(6), 1069–1090. <https://doi.org/10.1353/mcb.2005.0015>
- Le, T. T. D., & Diep, T. T. (2020). The effect of lending structure concentration on credit risk: The evidence of Vietnamese commercial banks. *The Journal of Asian Finance, Economics, and Business*, 7(7), 59–72. <https://doi.org/10.13106/jafeb.2020.vol7.no7.059>
- Nguyen, H. H., & Lien, T. T. (2019). Factors influencing the family business decision for borrowing credit from commercial banks: Evidence in Tra Vinh province, Viet Nam. *The Journal of Asian Finance, Economics, and Business*, 6(2), 119–122. <https://doi.org/10.13106/jafeb.2019.vol6.no2.119>
- Reynolds, D. (2009). *Analyzing concentration risk* (Technical Paper). Algorithmic Software LLC. http://www.algorithmics.com/EN/media/pdfs/Algo-WP0109_AnalyzingConRisk.pdf
- Sarwar, B., Muhammad, N., & Zaman, N. U. (2020). Diversification, industry concentration, and bank margins: Empirical evidence from an emerging south Asian economy. *The Journal of Asian Finance, Economics, and Business*, 7(7), 349–360. <https://doi.org/10.13106/jafeb.2020.vol7.no7.349>