

Article

Empirical Examination of Credit Risk Determinant of Commercial Banks in Jordan

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Abstract: The current research aims to examine the credit risk determinants in Jordan's banks. Macroeconomic factors were included to examine credit risk in commercial banks by adopting the balanced data for the examination between 2008–2019. The result shows that credit risk relates to foreign direct investment (FDI) and the output gap. The relation existed since FDI helped the country create job opportunities, increase administrative efficiency and capacity, and work to exchange technologies, ideas, opinions, and human resources, especially in emerging economies. The output gap relates to CR by the ability that borrowers' cash inflows are reduced when growth slows or turns negative, making it harder for them to meet the interest and principal of bank loans in exchange, especially in markets that have the potential to decrease the output gap. The result specified that as remittance (REMIT) grows, credit risk considerably accelerates, and the same effect was also recognised for public debt (DEBT). The outcomes revealed an important influence of tax on personal income (TAXINC). The examination result proves that credit risk is affected by several factors, which may relate significantly to implications as expected.

Keywords: credit risk; non-performing loans; Jordan; macro-economic



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1. Introduction

The stability of the financial sector is critical for every country's economic progress. The global economic crisis (GFC) of 2008–2009 was a threat that directly affected global financial stability. Internal and external risks like ineffective managers, bad regulation, and economic difficulties, to name a few, may have an impact on the banking sector's essential role (Naili and Lahrichi 2022; Tehulu and Olana 2014). Considering the impact of various types of risks, credit risk (CR) is regarded as the first type that can jeopardise a bank's survival and financial stability (Caruso et al. 2021). The GFC has recently paid more attention to non-performing loans (NPLs) by regulators and commercial banks since it threatens the bank's stability and can lead to bank failure (Naili and Lahrichi 2022; Ghosh 2015). This form of risk is rooted in the conventional role of banks, which is essentially to provide credit.

According to Caruso et al. (2021), a bank's earnings are most often shaped by the interest on the bank's money that is lent. Banks should ensure consumers' ability to repay the amount owed as well as the loan interest, which can be a difficult process and may not always be as fruitful as estimated. Furthermore, according to a recent study, macroeconomic considerations have had the greatest influence on NPLs since 2008, and the macroeconomic climate is currently the most widely reflected determinant of NPLs (Manz 2019; Us 2017; Katuka 2017).

Lately, there has been a growing interest in investigating NPLs, as the rising ratio of NPLs is viewed as the primary reason for financial crisis and breakdown (Adebola et al. 2011). The banking sector in Jordan is recognised as the nation's largest and strongest sector, contributing over 20% of the country's GDP in 2019. The banking sector remains stable and

secure, offering an appealing investment opportunity. However, as a consequence of the previous financial crisis as well as the tough circumstances of area conflict and instability, a decline in GDP growth, and a rise of DEBT burden, an increased rate of NPLs has been documented, which has been significantly related to bank failure. The years following the GFC have witnessed an increasing pattern of NPLs reaching a new level. The NPLs in the year 2009 reached 6.5% and continued to accelerate to 8.1%, and 8.4% between 2010 and 2011 (CBJ 2017), (this page can be accessed by <http://www.cbj.gov.jo/> (accessed on 4 March 2022)). The recent year's record an increasing pattern of NPLs, the years 2017, 2018, and 2019 reaching 4.6% and 4.9% and 5.5%, respectively. The rising level of NPLs raises serious concerns about Jordan's banking sector's long-term financial stability.

Several objectives were covered from this analysis by examining the different factors that relate to CR, particularly risk management. The main purpose of this study was to examine some of the key factors that relate to the banks' CR in Jordan. The first objective is to determine the effect of macroeconomic factors on NPLs. This study contains several main factors such as FDI, output gap, TAXINC, REMIT, and DEBT. The gathered balanced data for commercial banks for the period between 2008 and 2019 for the commercial banks in Jordan were used as a sample.

The significance of this research arises from a range of factors. First, the latest studies have discovered that macroeconomic variables have the greatest influence on NPLs after 2008 and that the macroeconomic condition continues to be the most influential factor in NPLs (Manz 2019; Us 2017; Katuka 2017). The existing literature is primarily from advanced countries, with very little investigation on CR determinants from developing countries (Kharabsheh 2019; Manz 2019; Qwader 2019). Second, recent studies have confirmed that the majority of past studies focused on developed countries, implying that there are few studies on CR in developing countries (Kharabsheh 2019; Kuzucu and Kuzucu 2019; Manz 2019; Qwader 2019). Furthermore, it has been documented that the rising level of NPLs in developing countries was higher than in developed countries. The financial crisis in 2008 caused credit risk as a common problem for commercial banks in the Middle East and North Africa (MENA) Region. According to Bougatef and Nidhal (2016), banks are essential for the MENA economy and it is essential to maintain their economic soundness. However, despite MENA countries' significant steps over the last few decades to improve banks and risk control mechanisms, the region still has a 4.6 percent of NPL to an overall total loan, representing a greater ratio than the world average of 4.1% (Sharma 2016).

The rate of the NPLs inside MENA countries is also worrying, undermining financial stability and preventing the region from attracting investment and achieving desired economic development (Jabbouri and Naili 2019). The increasing ratio of NPLs in the MENA region is a result of commercial banks' excessive loans to huge corporations (World Bank 2011). Third, Jordan's economic challenges may have an impact on CR. Examining the potential indicators may indeed assist in the protection of financial performance. Furthermore, conducting this study may contribute to the discovery of the primary influences that may increase the growth of NPLs' size in Jordan. Furthermore, the significance of Jordan's banking sector indicates the significance of such a study to cover any potential impact on bank performance.

2. Literature Review

Past research has classified the factors that affect CR into two groups (Bayar 2019; Waemustafa and Sukri 2015). The first group is concerned with internal bank factors, also known as bank-specific factors. The second group is concerned with macroeconomic variables, also known as external factors. Several past studies have looked at various macroeconomic variables and come up with conflicting and significant results (Pažický and Bohdalova 2019; Dimitrios et al. 2016; Şan 2016).

Konstantakis et al. (2016) recently investigated NPLs in the Greek financial industry during a recession. FDI was found to be significantly linked to NPLs, according to the analysis. Kuzucu and Kuzucu (2019), on the other hand, found that FDI in the post-crisis

era was strongly and positively correlated with NPLs in developed countries. However, Şan (2016) used the Least Squares Method to inspect the influence of variation in the quantity of macroeconomic factors on the NPLs ratio. The effect of change in FDI amount was investigated, and the regression analysis revealed that NPLs were insignificantly associated with FDI.

Dimitrios et al. (2016) explored the causes of NPLs in a model of European banks from 1990 to 2015. According to the GMM estimation, output gap and personal income tax were introduced as new factors to be studied, reflecting the business cycle that has a substantial impact on NPLs. Furthermore, Pažický and Bohdalova (2019) investigated loan quality checks in the United States of America's economy from 1984 to 2017. Using transition probability matrices, computed Markov chain models were used. The study found interesting implications for credit rating models when it considered macroeconomic performance as represented by the output gap. The primary goal was to assess the likelihood of a performing loan becoming an NPL and vice versa. In terms of macroeconomic performance and business cycle phase, when the output gap was steady and nearly zero, the best credit performance was seen. Credit situations do not become stronger throughout years of the positive output gap and vice versa, according to research.

Şan (2016) examined some macroeconomic factors and how it affects the NPLs' ratio in Albania's banking sector. The study highlights that NPLs are also affected by other factors like other sectors, debtors, and legal system elements. The findings demonstrated that REMIT, as an elementary macroeconomic variable, has a significant negative association with NPLs. Mohanty et al. (2018), on the other hand, used static and dynamic estimation panel methods to investigate the macroeconomic and bank-specific determinants of NPLs in Nepal's banking sector. According to the findings, REMIT has a negligible relationship with NPL. This demonstrated that the inflow of transfers via official channels was not consistent. Due to poor governance, REMIT was not invested in profitable industries. Moreover, Ghosh (2015) analysed the NPL for 50 US states during the period between 1984–and 2013. Through implementing fixed effects and complex GMM estimates, DEBT is shown to increase NPLs dramatically.

Zheng et al. (2018) found that retained assets, size, and capital ratios are negatively related to the non-performing loan. However, net interest margin and operating inefficiency were positively associated with non-performing loans. However, De Nicolo (2001) and Rajan and Dhal (2003) found positive association between bank size and credit risk and explained that larger banks may have higher credit risk as a result of lower control. Alexandri and Santoso (2015) studied 26 Indonesian banks from the period 2009–2013. From five variables taken into this study (bank size, capital adequacy, return on assets, GDP, and inflation), return on assets (ROA) had a positive and significant impact on non-performing loans. Bank size and GDP had a negative and significant impact on non-performing loans, while capital adequacy and inflation had a non-significant positive impact.

Koju et al. (2018b) studied the macroeconomic variables that affect the NPL between 1998 and 2015 for 19 countries in Asia (low- to high-income countries) by using GMM estimation. The countries' classifications were based on the average gross national income per capita as set by the World Bank. Specifically, the study aimed to determine whether the NPL determinants differed with countries' income levels. The findings demonstrated the NPL was highly affected by the inflation rate. The result specifically showed the strong effect of REMIT in low- or high-income countries. The REMIT had a positive correlation in the high-income and a significant negative correlation in low-income countries.

3. Methodology

Initially, the sample of the study includes all of the banks operating in Jordan, consisting of 24 banks according to the central bank of Jordan report in 2019. However, the foreign banks were subsequently excluded since foreign banks only provide about 6.8% of the total facilities provided to borrowers. As an outcome, the sample consisted of 16 Jordanian commercial banks throughout the study between 2008–2019 since it represents 93.2% of the

total loans granted. Factors such as FDI, output gap, TAXINC, REMIT, DEBT, net interest margin, loan to deposit ratio, capital adequacy ratio, and bank size retained on assets and retained on equity were found to affect the bank's performance. The data were gathered from publications of CBJ and banks' financial reports. The details for each variable are listed below.

3.1. Measurement of Variables

3.1.1. Dependent Variable

The amount of NPLs divided by total loans in a given year was used as a measurement of CR, which was used as a dependent variable (Zheng et al. 2018; Waqas et al. 2017).

3.1.2. Independent Variables

To measure FDI, the net inflows of investment in a firm operating in a country other than the investor are expressed as a proportion of GDP. FDI is considered a component of GDP and is related to GDP growth (Kuzucu and Kuzucu 2019; Omoush 2018). The output gap represents the difference between actual output and potential output, which provides a measure of aggregate demand intensity in a given economy in relation to its possibilities at a given period (Anastasiou et al. 2019; Dimitrios et al. 2016; Sandica and Monica 2017). The percentage of personal income tax as a percentage of GDP is the best, and it is an appropriate way to measure TAXINC (Anastasiou et al. 2019; Dimitrios et al. 2016). The research adopted the amount of REMIT as a percentage of GDP to measure the REMIT (Koju et al. 2018a; Şan 2016). DEBT also was one of the factors that can affect CR. Moreover, this variable's measurement dominates as a percentage of GDP (Roman and Bilan 2015; Ghosh 2015; Jabbouri and Naili 2019; Makri 2015).

Since the banks have applied Basel agreement standards, the capital is divided into main or core capital and supplementary capital. Both core and supplementary capitals were used as a cushion against risk. Hence, the total equity capital to total assets ratio (CAR) measures the association between a level of capital and CR (Wood 2018; Zhang et al. 2016; Poudel 2013). A division of the outcome on the difference between interest revenue and interest expense by total asset was used to measure net interest margin (Mohanty et al. 2018; Cankaya 2017). Moreover, bank size was one of the main factors used in previous studies. A natural log of the total assets' dollar value was used to measure the bank size (Zheng et al. 2018; Khan et al. 2017; Bougatef and Nidhal 2016). The ratio of net profit after tax to average total assets was used to calculate retained assets (Kharabsheh 2019; Abbas et al. 2019). The ratio of net profit after tax to shareholders' equity was used to calculate retained equity (Madugu et al. 2020). This subsection describes the measurement of the variables of the present study, as shown in Table 1.

Table 1. Variables measurement.

Variable	Measurement
Credit Risk	The loans that are nineteen days or three months overdue and that are not accruing interest or principal payment (NPLs)
Foreign Direct Investment	Net inflows of foreign investment as a percentage of GDP (FDI)
Output Gap	The difference between potential and actual GDP (OUTPUT_GAP)
Tax on Personal Income	The amount of personal tax as a percentage of GDP (TAXINC)
Remittance	The amount of remittance as a percentage of GDP (REMIT)
Public Debt	Total public debt as a percentage of GDP (DEBT)
Capital Adequacy Ratio	The total equity capital to total assets ratio (CAR)
Loan to Deposit Ratio	The loan by domestic money banks as a share of total deposits (LDR)
Net Interest Margin	(Interest income-interest expense)/total assets (NIM)
Bank size	Natural logarithm of total assets (SZE)
Retained on Asset	Expressed as the ratio of net profit after tax to average total assets (ROA)
Retained on Equity	Expressed as the ratio of net profit after tax to shareholders' equity (ROE)

Following Dimitrios et al. (2016) and Katuka (2017), this study employed the following panel data regression model to examine the macroeconomic determinants of credit risk:

$$CR_{it} = \beta_0 + \beta_1 FDI_{it} + \beta_2 OUTPUT_GAP_{it} + \beta_3 TAXINC_{it} + \beta_4 REMT_{it} + \beta_5 DEBT_{it} + \beta_6 CAB + \beta_7 LDR + \beta_8 NIM + \beta_9 SIZE_{it} + \beta_9 ROA_{it} + \beta_9 ROE_{it} + \varepsilon_{it}$$

where CR_{it} is the credit risk of bank i at time t , β_0 is the intercept, and ε_{it} is a random error. The model consists of five macroeconomic variables. These variables are foreign direct investment (FDI), output gap (OUTPUT_GAP), tax on personal income (TAXINC), remittance (REMIT), and public debt (DEBT). Moreover, the model consisted also of bank-specific variables (control variables), which are capital adequacy ratio (CAB), loan to deposit ratio (LDR), net interest margin (NIM), bank size (SIZE), retained on asset (ROA), and retained on equity (ROE).

This study used a proper estimating strategy to conduct a comprehensive analysis. It is worth noting that many tests were carried out to rule out the possibility of a different fault in the dataset. The descriptive statistics of the variables are presented in Table 2 below.

Table 2. Descriptive statistics.

Variables	Mean	Std. Dev	Max	Min
FDI	0.0561	0.0288	0.126	0.019
Output Gap	−0.003	0.053	0.082	−0.083
TAXINC	0.024	0.003	0.031	0.02
REMIT	0.13	0.021	0.165	0.099
DEBT	0.826	0.129	0.958	0.602
CAR	0.198	0.088	0.702	0.106
LDR	0.692	0.176	1.732	0.425
NIM	0.06	1.4	0.05	0.01
B.SIZE	21.36	1.00	23.99	18.42
ROA	0.013	0.054	0.025	−0.013
ROE	0.091	0.041	0.218	−0.032
CR	0.057	0.032	0.165	0.01

Note: CR = credit risk, FDI = foreign direct investment, TAXINC = tax on personal income, REMIT = remittance, DEBT = public debt, CAR = capital adequacy ratio, LDR = loan to deposit ratio, NIM = net interest margin, B.SIZE = bank size, ROA = retained on asset, ROE = retained on equity.

The above table shows the descriptive statistics for the study variable, where for the CR variable, its average value was (5.75) with a standard deviation of (3.25) and the maximum value was (16.5). The average for FDI was (5.61), with a standard deviation of (2.88), a largest value of (12.6), and a lowest value of (1.9). The average value of the TAXINC variable was (2.46) with a standard deviation of (0.313) and a maximum value of (3.1). The average value for the REMIT variable was (13.05) with a standard deviation of (2.13), a maximum value of (16.5), and a minimum value of (9.9). The mean value for the DEBT variable was (82.68) with a standard deviation of (12.91) and a maximum value of (95.8), whereas the minimum value was (60.2).

As for the CAR variable, its average value was (19.85) with a standard deviation of (8.87). The LDR variable had an average of (69.20) with a standard deviation of (17.64), a maximum value of (173.26), and the lowest value of (42.54). The average value of the NIM variable was (0.0642) with a standard deviation of (1.46), a maximum value of (0.0547), and a minimum value of (0.011). The average value of the bank size variable was (21.36) with a standard deviation of (1.00), a maximum value of (23.99), and a minimum value of (18.42). The average value of the ROA variable was (1.139) with a standard deviation of (0.541) and a maximum value of (2.5). Meanwhile, the average value of the ROE variable was (9.01) with a standard deviation of (4.18) and a maximum value of (21.8).

Jarque–Bera test were used to determine if the data normally distributed and the result is represented in Table 3.

Table 3. Jarque–Bera normality test.

Variable	Jarque–Bera Test		Skewness	Kurtosis
	Statistic Value	<i>p</i> -Value		
Regression residuals	4.14	0.126	0.059	0.313

Table 3 shows the Jarque–Bera test values for the regression residuals equation, as it was found that the value of the Jarque–Bera test was greater than (0.05), and therefore states that the data are distributed normally.

The inconsistent result may be due to the existence of a correlation in the relationship between the independent variables. The existence of multicollinearity can be discovered through the correlation between the independent variables and the variance inflation factor (VIF). The current study used Pearson’s correlation (correlation matrix) to identify the multicollinearity issues. The result confirms the existence of a multicollinearity problem since the correlation is higher than 80% between FDI and DEBT as shown in Table 4. The presented outcome in Table 5 shows that DEBT and TAXINC are not free of multicollinearity since the VIF exceeded 10.

Table 4. Pearson’s correlation matrix.

	FDI	Output Gap	TAXINC	REMIT	DEBT	CAR	LDR	NIM	B.SIZE	ROA	ROE	CR
FDI	1											
Output Gap	−0.138 *	1										
TAXINC	−0.674 ***	−0.397 ***	1									
REMIT	0.681 ***	0.342 ***	−0.614	1								
DEBT	0.815 ***	0.169 **	0.8 ***	−0.481 ***	1							
CAR	0.169 ***	0.0008	0.17 **	0.13 2 **	−0.189 ***	1						
LDR	0.11	−0.126 *	−0.002	−0.026	−0.066	0.564	1					
NIM	0.014	0.128 *	−0.089	0.0611	0.009	−0.17	−0.03 ***	1				
B.SIZE	−0.241	0.006	0.267	−0.181	0.264	−0.5	−0.41 **	−0.06 ***	1			
ROA	0.155 **	0.101	0.16 **	0.184 ***	−0.098	−0.34	−0.27 ***	0.39 ***	0.25	1		
ROE	0.112	0.025	−0.066	0.128*	−0.059	−0.31	−0.24 ***	0.3 ***	0.23	0.775 ***	1	
CR	−0.146 **	0.2 *	−0.15 *	0.042	−0.005	−0.37 ***	−0.23 ***	0.08	0.046	−0.04	−0.2 ***	1

* Correlation is significant at 0.10, ** Correlation significant at 0.05, *** Correlation significant at 0.01.

The Hausman test is applied to choose between the random or fixed-effect model and the result represented in Table 6.

The represented result shows that the *p*-value of (1.00) was greater than the significant level (not significant) which implies that the random effect model is more appropriate to utilise to examine the panel data in the study.

In addition, Breusch and Pagan tests were applied to choose between utilised pooled OLS or the random-effect model, and the result is represented in Table 7.

Table 5. Variance inflation factor (VIF).

Independent Variable	VIF	1/VIF
FDI	5.62	0.177
Output Gap	6.90	0.145
TAXINC	16.15 *	0.061 *
Remit	3.14	0.318
DEBT	14.19 *	0.07 *
CAR	1.89	0.529
LDR	1.65	0.605
NIM	1.27	0.786
B.SIZE	1.56	0.639
ROA	2.90	0.344
ROE	2.58	0.387

* Correlation is significant. Note: CR = credit risk, FDI = foreign direct investment, TAXINC = tax on personal income, REMIT = remittance, DEBT = public debt, CAR = capital adequacy ratio, LDR = loan to deposit ratio, NIM = net interest margin, B.SIZE = bank size, ROA = retained on asset, ROE = retained on equity.

Table 6. Breusch and Pagan Lagrange multiplier test.

Dependent Variable	Statistic Value	<i>p</i> -Value
Credit Risk	117.45	0.000

Table 7. Results of Hausman test.

Dependent Variable	Statistic Value	<i>p</i> -Value
Credit Risk	0.000	1.000

The test result shows that the *p*-value is (0.00) which is a significant level and implies the appropriate of utilizing the random-effects model for this study.

The presence of autocorrelation cannot be ruled out as we used panel data. We employed the feasible generalized least squares (FGLS) method to estimate the parameters due to the problems of multicollinearity.

4. Regression Result

The random effect method results are shown in Table 8. The result shows that FDI and CR were found to have a strong and negative significant relationship. This negative effect indicates that as FDI increased, repayment capacity increased, and CR decreased as a result. The FDI positively relates to CR through the possibility that FDI can enhance and support the economy by increasing job opportunities and worker income 213 (Ozili 2019; Hossain 2018). Consequently, an enhanced financial position will affect the borrower's income and reduce the loans default rate which will decrease CR. On the other hand, FDI inflows primarily through banks, which causes an increase in liquid funds and the provision of more loans. As a result, these loans are exposed to increased CR and may not be repaid, giving growth to NPLs. However, a significant and negative relationship indicates that FDI enhances the administrative efficiency and capacity of the banks, resulting in a decrease and control of NPLs. This finding is consistent with the findings of (Ozili et al. 2020) Beaton et al. (2016), and Konstantakis et al. (2016), who discovered that FDI is positively associated with NPLs.

Table 8. Testing the linear regression for CR using random effect method.

Independent Variables	B	Z-Value	p-Value
Constant	42.120	4.350	0.000 ***
FDI	−0.810	−7.220	0.000 ***
Output Gap	−0.239	−3.590	0.000 ***
TAXINC	−9.110	−5.090	0.000 ***
REMIT	0.459	4.030	0.000 ***
P DEBT	0.079	1.970	0.049 **
CAR	−0.093	−2.680	0.007 ***
LDR	−0.016	−1.230	0.217
NIM	−0.068	−0.380	0.702
B.SIZE	−0.827	−1.890	0.059 *
ROA	−0.743	−1.270	0.204
ROE	−0.054	−0.730	0.467
R2		0.430	
F/Wald		123.47	
Sig F/Wald		0.000	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

The present study investigated the link between TAXINC and CR in Jordanian commercial banks. The study findings revealed that the link between TAXINC and CR was statistically significant and negative. This finding is consistent with the idea that an effective management must have adequate information about their customers' financial capability (Bhattarai 2020). Furthermore, the management needs to include any relevant information to anticipate and assist the customer in dealing with any potential problems that may influence their financial stability and prevent them from meeting their financial obligations. As a result, such details provide a good evaluation to the management to deal with any potential loan defaults and reduced CR. The bank management could decrease the CR through counselling the borrower and performing an appropriate credit assessment and decision.

The output gap and CR had a significant and inverse relationship. According to the findings, when the output gap was steady and close to zero, a strong credit quality performance was seen (Pažický and Bohdalova 2019). The borrowers' ability to repay their loans increases as the positive output gap and high returns of businesses and households increase, and bank CR exposure decreases. Concurrently, a negative output gap raises the unemployment rate, resulting in a decreased or sustained income. As a result, their default rate rises, as does the banks' CR (Sandica and Monica 2017; Dimitrios et al. 2016).

REMIT increases the bank funds, which leads to an increase in loanable funds, resulting in greater credit growth (Şan 2016). High credit growth in the market may be associated with increased CR in the financial system. This study's findings are consistent with the agency theory, which suggests that the management should increase bank profits while protecting investors from threats such as CR (Mohanty et al. 2018). This result is consistent with the findings of Koju et al. (2018a), Mohanty et al. (2018), and Şan (2016), who discovered that REMIT was significantly linked with CR.

Finally, according to the estimation methods, the coefficients on DEBT were positive and significant. The high DEBT may encourage the policymakers to increase taxation, which will affect the financial stability of the borrowers (Perotti 1996). This finding demonstrates that lowering the level of DEBT can boost and improve economic growth, easing the burden on borrowers and, as a result, lowering CR (Naili and Lahrichi 2022). The country's high DEBT is viewed as a challenge that prevents it from achieving proper economic growth (Ahlborn and Schweickert 2018). A rise in the national debt necessitates fiscal measures, and most notably the decrease in social spending and the wage component of government consumption (Ghosh 2015).

5. Limitations and Recommendations of the Study

This study is limited to secondary data of Jordanian banks; consequently, attention to foreign banks was not considered due to the small share in the loan portfolio. In addition, the study was limited to examine five macroeconomic factors.

Future research could extend the macroeconomic factors that were used in the current study like sales tax, inflation rate, and GDP growth. In addition, comparing the different types of factors that affect credit risk may be useful to understand the different effects of each group such as macroeconomic factors, bank-specific factors, and corporate governance factors.

6. Conclusions

This study looked into the association between macroeconomic factors and bank CR. Emerging countries have not received a considerable amount of research interest in exploring the determinants of CR. According to the latest research, the impact of macroeconomic factors has accelerated in recent years, yet there exists a scarcity of investigations on the influence of macroeconomic factors. Several studies have implied the importance and the limited research of examining the effect of macroeconomic factors on CR, especially in the emerging economy. In addition, several studies mentioned that CR is still unsolved and needs extensive research. As a result, the current study can be regarded as a study that fills the gap in the literature.

The DEBT and REMIT are both among the other factors in this study that increase CR. The analysis result indicates that REMIT has a significant effect on CR since the probability value was (p value = 0.00). The raising of REMIT may increase the loans granted and as a result, will also increase CR. In addition, DEBT tends to increase CR, since a high DEBT rate weakens the public expenditure and affects the borrowers' ability to repay their outstanding loans due to interrupted cash flow. On the other hand, FDI and output gap enhanced the borrower's income by decreasing the unemployment rate and enhancing the economic conditions in Jordan. The result of the TAXINC towards credit risk proves that bank management plays a vital role. Risk management has the ability to control the effect of tax income on the borrower's income. Following this, assessing the financial position of the borrowers could decrease credit risk.

Furthermore, the research endorses that the government in Jordan should undertake policies and initiatives to minimise total NPLs, such as requiring local banks to cut borrowing costs. To boost the local economic growth and minimise unemployment, authorities should also help stimulate investments. Besides that, the surrounding environment of Jordan has impacted the economy adversely, which could be shown through different aspects. The economy has witnessed a decrease in external grants and produced tough policies and measures, where the Jordanian government has attempted to control the general budget through controlling the expenditure. In addition, the authorities should also fight corruption and robbery. The presence of tax evasion is another issue that requires action from the government, compared to the constant tax rate rises due to the negative effect on the economy and banks' CR. These recommendations may enhance and control the economic conditions which may help protect the banks' operations and decrease CR.

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References

- Abbas, Faisal, Shahid Iqbal, and Bilal Aziz. 2019. The impact of bank capital, bank liquidity and credit risk on profitability in postcrisis period: A comparative study of US and Asia. *Cogent Economics & Finance* 7: 1605683.
- Adebola, Solarin Sakiru, WS Wan Yusoff, and Jauhari Dahalan. 2011. An ARDL approach to the determinants of nonperforming loans in Islamic banking system in Malaysia. *Kuwait Chapter of Arabian Journal of Business and Management Review* 1: 20–30.
- Ahlborn, Markus, and Rainer Schweickert. 2018. Public debt and economic growth—economic systems matter. *International Economics and Economic Policy* 15: 373–403. [CrossRef]
- Alexandri, Moh Benny, and Teguh Iman Santoso. 2015. Non performing loan: Impact of internal and external factor (Evidence in Indonesia). *International Journal of Humanities and Social Science Invention* 4: 87–91.
- Anastasiou, Dimitrios, Helen Louri, and Mike Tsionas. 2019. Nonperforming loans in the Euro area: Are core-periphery banking markets fragmented? *International Journal of Finance & Economics* 24: 97–112.
- Roman, Angela, and Irina Bilan. 2015. An empirical analysis of the macroeconomic determinants of non-performing loans in the Eu28 banking sector. *Revista Economica* 67: 108–27.
- Bayar, Yilmaz. 2019. Macroeconomic, institutional and bank-specific determinants of non-performing loans in emerging market economies: A dynamic panel regression analysis. *Journal of Central Banking Theory and Practice* 8: 95–110. [CrossRef]
- Beaton, Kimberly, Alla Myrvoda, and Shernnel Thompson. 2016. *Non-Performing Loans in the ECCU: Determinants and Macroeconomic Impact*. IMF Working Papers. Washington, DC: International Monetary Fund, vol. 16, p. 1.
- Bhattarai, Seema. 2020. An Analysis of the Perceptions of Regulatory Authorities about the Causes of Non-Performing Loans. *Journal of Business and Social Sciences Research* 5: 35–51. [CrossRef]
- Bougatef, Khemaies, and Mgdmi Nidhal. 2016. The impact of prudential regulation on bank capital and risk-taking: The case of MENA countries. *The Spanish Review of Financial Economics* 14: 51–56. [CrossRef]
- Cankaya, Serkan. 2017. Does reputation still matter to credit rating agencies? In *Global Financial Crisis and Its Ramifications on Capital Markets*. Cham: Springer, pp. 445–58.
- Caruso, Giulia, Antonio Stefano Gattone, Francesca Fortuna, and Tonio Di Battista. 2021. Cluster Analysis for mixed data: An application to credit risk evaluation. *Socio-Economic Planning Sciences* 73: 100850. [CrossRef]
- De Nicolo, Gianni. 2001. Size, Charter Value and Risk in Banking: An International Perspective. Available at SSRN 255465. Available online: <https://ssrn.com/abstract=255465> (accessed on 10 September 2017).
- Dimitrios, Anastasiou, Louri Helen, and Tsionas Mike. 2016. Determinants of non-performing loans: Evidence from Euro-area countries. *Finance Research Letters* 18: 116–19. [CrossRef]
- Ghosh, Amit. 2015. Banking-industry specific and regional economic determinants of non-performing loans: Evidence from US states. *Journal of Financial Stability* 20: 93–104. [CrossRef]
- Hossain, Sahadat. 2018. Impact of selected determinants on foreign direct investment (FDI) in Bangladesh: An empirical study based on panel data. *Journal of Applied Business and Economics* 20: 1–21. [CrossRef]
- Jabbouri, Imad, and Maryem Naili. 2019. Determinants of nonperforming Loans in emerging markets: Evidence from the MENA region. *Review of Pacific Basin Financial Markets and Policies* 22: 1950026. [CrossRef]
- Katuka, Blessing. 2017. Credit Risk Dynamics in Listed Local Banks in Zimbabwe 2009. *Journal of Economics and Sustainable Development* 8: 33–38.
- Khan, Muhammad Saifuddin, Harald Scheule, and Eliza Wu. 2017. Funding liquidity and risk-taking. *Journal of Banking & Finance* 82: 203–16.
- Kharabsheh, Buthiena. 2019. Determinants of bank credit risk: Empirical evidence from Jordanian commercial banks. *Academy of Accounting and Financial Studies Journal* 23: 1–12.
- Koju, Laxmi, Ghulam Abbas, and Shouyang Wang. 2018a. Do macroeconomic determinants of non-performing loans vary with the income levels of countries? *Journal of Systems Science and Information* 6: 512–31. [CrossRef]
- Koju, Laxmi, Ram Koju, and Shouyang Wang. 2018b. Macroeconomic and bank-specific determinants of non-performing loans: Evidence from Nepalese banking system. *Journal of Central Banking Theory and Practice* 7: 111–38. [CrossRef]
- Konstantakis, Konstantinos N., Panayotis G. Michaelides, and Angelos T. Vouldis. 2016. Non performing loans (NPLs) in a crisis economy: Long-run equilibrium analysis with a real time VEC model for Greece (2001–2015). *Physica A: Statistical Mechanics and Its Applications* 451: 149–61. [CrossRef]
- Kuzucu, Narman, and Serpil Kuzucu. 2019. What drives non-performing loans? Evidence from emerging and advanced economies during pre- and post-global financial crisis. *Emerging Markets Finance and Trade* 55: 1694–708. [CrossRef]
- Madugu, Ali Hussam, Muazu Ibrahim, and Joseph Owusu Amoah. 2020. Differential effects of credit risk and capital adequacy ratio on profitability of the domestic banking sector in Ghana. *Transnational Corporations Review* 12: 37–52. [CrossRef]
- Makri, Vasiliki. 2015. What triggers loan losses? An empirical investigation of Greek financial sector. *Journal of Economics and Business* 65: 119–43.

- Manz, Florian. 2019. Determinants of non-performing loans: What do we know? A systematic review and avenues for future research. *Management Review Quarterly* 69: 351–89. [CrossRef]
- Mohanty, Asit Ranjan, Binay Ranjan Das, and Satyendra Kumar. 2018. Determinants of non-performing loans in India: A system GMM panel determinants of non-performing loans in India. *National Institute of Bank Management* 47: 37–56.
- Naili, Maryem, and Younes Lahrichi. 2022. The determinants of banks' credit risk: Review of the literature and future research agenda. *International Journal of Finance & Economics* 27: 334–60.
- Omoush, Mohammad Muthana. 2018. Time series analysis among tourism, financial development, FDI and economic growth in Jordan. *International Journal of Economics and Finance* 10: 150–62. [CrossRef]
- Ozili, Peterson K., Asma Salman, and Qaisar Ali. 2020. The impact of foreign direct investment inflows on nonperforming loans: The case of UAE. Available at SSRN 3742785. Available online: <https://ssrn.com/abstract=3742785> (accessed on 10 September 2017).
- Ozili, K. Peterson. 2019. Non-performing loans and financial development: New evidence. *The Journal of Risk Finance* 20: 59–81. [CrossRef]
- Pažický, Martin, and Maria Bohdalova. 2019. Consequences of monetary policy for credit risk in the USA. *International Journal of Economics, Finance and Business Management Studies* 4: 4–16.
- Perotti, Roberto. 1996. Fiscal consolidation in Europe: Composition matters. *The American Economic Review* 86: 105–110.
- Poudel, Ravi Prakash. 2013. Macroeconomic Determinants of Credit Risk in Nepalese Banking Industry. *International Business Research Conference* 25: 12.
- Qwader, Amjad. 2019. Relationship between macroeconomic variables and their impact on non-performing loans in Jordanian banks. *Asian Economic and Financial Review* 9: 166–75. [CrossRef]
- Rajan, Rajiv, and Sarat C. Dhal. 2003. Non-performing loans and terms of credit of public sector banks in India: An empirical assessment. *Reserve Bank of India Occasional Papers* 24: 81–121.
- Şan, Turan. 2016. The effects of the changes in some macroeconomic indicators on the non-performing loans in the Albanian banking sector (2007–2014). *Mediterranean Journal of Social Sciences* 7: 162–70. [CrossRef]
- Sandica, Ana-Maria, and Dudian Monica. 2017. Summary for Policymakers. *The USV Annals of Economics and Public Administration* 17: 1–30. [CrossRef]
- Sharma, K. K. 2016. Chart Alert: MENA NPL to Gross Loans Ratio Lower than South Asia but Higher than World Average. Report. Available online: <http://algorithm-research.com/post/chart-alert-mena-npl-to-gross-loans-ratio-lower-than-south-asia-but-higher-than-world-average> (accessed on 10 September 2017).
- Tehulu, Tilahun Aemiro, and Dugasa Rafisa Olana. 2014. Bank-specific determinants of credit risk: Empirical evidence from Ethiopian banks. *Research Journal of Finance and Accounting* 5: 80–85.
- Us, Vuslat. 2017. Dynamics of non-performing loans in the Turkish banking sector by an ownership breakdown: The impact of the global crisis. *Finance Research Letters* 20: 109–17. [CrossRef]
- Waqas, Muhammad, Nudrat Fatima, Aryan Khan, and Muhammad Arif. 2017. Determinants of non-performing loans: A comparative study of Pakistan, India, and Bangladesh. *International Journal of Finance & Banking Studies (2147-4486)* 6: 51–68.
- Waemustafa, Waeibrorheem, and Suriani Sukri. 2015. Bank specific and macroeconomics dynamic determinants of credit risk in Islamic banks and conventional banks. *International Journal of Economics and Financial Issues* 5: 476–81. [CrossRef]
- Wood, Anthony. 2018. Determinants of non-performing loans: Evidence from commercial banks in Barbados. *The Business and Management Review* 9: 9–10.
- World Bank. 2011. *Financial Access and Stability: A Road Map for the Middle East and North Africa*. MENA Development Report. Washington, DC: The World Bank.
- Zhang, Dayong, Jing Cai, David G. Dickinson, and Ali M. Kutan. 2016. Non-performing loans, moral hazard and regulation of the Chinese commercial banking system. *Journal of Banking & Finance* 63: 48–60.
- Zheng, Changjun, Niluthpaul Sarker, and Shamsun Nahar. 2018. Factors affecting bank credit risk: An empirical insight. *Journal of Applied Finance and Banking* 8: 45–67.