Macroeconomic and Bank-Specific Determinants of Non-Performing Loans for Jordanian Banks: The Effect of COVID-19

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ABSTRACT

Non-performing loans ratio, as a proxy of banks' credit risk, and its impact on banks' performance and financial stability as well as its bad effect on the entire economy is a main concern for many researchers. Therefore, this study aims at exploring the factors affecting the non-performing loans ratio in the context of Jordan by using balanced panel data OLS regression analysis taking into consideration the effect of COVID-19 pandemic. The results report that the non-performing loans ratio is negatively affected by return on assets, gross domestic product (GDP), and stock market index, while positively affected by previous non-performing loans ratio and COVID-19. Banks managers', policy makers, regulatory bodies can depend on the findings of this study in developing polices to overcome the negative effect of some factors and adopting polices to enhance the positive effect of others.

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ملخص

تعتبر نسبة القروض المتعثرة، كمؤشر لمخاطر الائتمان لدى البنوك، وتأثيرها على أداء هذه الأخيرة واستقرارها المالي بالإضافة إلى تأثيرها السيئ على الاقتصاد بأكمله، مصدر قلق رئيسي لعدد من الباحثين. لذلك، تهدف هذه الدراسة إلى استكشاف العوامل المؤثرة على نسبة القروض المتعثرة في سياق الأردن باستخدام تحليل انحدار مخطط المربعات الصغرى لمجموعة بيانات متوازنة مع الأخذ في الاعتبار تأثير جائحة كوفيد-19. وتشير النتائج إلى أن نسبة القروض المتعثرة تتأثر سلبا بالعائد

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على الأصول والناتج المحلي الإجمالي ومؤشر سوق الأوراق المالية، بينما تتأثر بشكل إيجابي بنسبة
القروض المتعثرة السابقة وجائحة كوفيد-19. ويمكن لمديري البنوك وصناع السياسات والهيئات
التنظيمية الاعتماد على نتائج هذه الدراسة في وضع سياسات للتغلب على التأثير السلبي لبعض
العوامل وتبني سياسات لتعزيز التأثير الإيجابي لعوامل أخرى.

ABSTRAITE

Le ratio des prêts non performants, en tant qu'indicateur du risque de crédit des banques, et son impact sur la performance et la stabilité financière des banques ainsi que ses effets négatifs sur l'ensemble de l'économie, constituent une grande préoccupation pour de nombreux chercheurs. Par conséquent, cette étude vise à explorer les facteurs affectant le ratio des prêts non performants dans le contexte de la Jordanie en utilisant des données de panel équilibrées, une analyse de régression OLS prenant en considération l'effet de la pandémie COVID-19. Les résultats indiquent que le ratio des prêts non performants est affecté négativement par le rendement des actifs, le produit intérieur brut (PIB) et l'indice boursier, tandis qu'il est affecté positivement par le ratio des prêts non performants antérieurs et la pandémie COVID-19. Les directeurs de banques, les décideurs politiques et les organismes de réglementation peuvent s'appuyer sur les résultats de cette étude pour élaborer des politiques visant à surmonter l'effet négatif de certains facteurs et adopter des politiques visant à renforcer l'effet positif d'autres facteurs.

1. Introduction

The contribution of financial institutions, especially banks, to the gross domestic product (GDP) is usually greater than the contribution of other sectors in almost all countries word wide. Because of its importance to the economic growth, economic development, and economic activities, policy makers, governments and regulatory authorities pay a great attention to this sector in general, and particularly to the issue of non-performing loans ratio. Non-performing loans ratio is a main concern for all banks because of its effect on banks' profitability, efficiency, liquidity, financial stability, future loans, and even its impact on the whole economy, especially if the amount of non-performing loans are huge. Moreover, the balance sheet of all banks, as a whole, and the assets side, in particular, is affected by the ratio of non-performing loans ratio because the majority of bank's assets are loans. Sometimes, the problem of bad loans could appear as a result of high competition among banks in granting loans without assessing the credit process carefully. Non-performing loans can be defined as "income-generating loans that are past due for 90 days or more" (Rose and Hudgins, 2008, p. 203).

Almost all life's aspects in all over the world are negatively affected by the COVID-19 crisis, and Jordan, like any country, was not far from the rest of the world. In Jordan almost all aspects have been affected negatively by COVID-19 and one of the negative impacts is banks' performance, where a lot of people have lost their jobs as well as wages and salaries of many people have declined, so their ability to repay loans is reduced, which negatively affect banks' revenues and profitability, and then banks' ability for granting new loans to the households in the future. In addition, revenues and profits of many firms have declined, furthermore, some firms have become out of the market, which results in the inability to those firms or, at least, some of them to repay their loans. As a result of the negative impact of COVID-19 crisis on the banking sector, the economic growth, and economic activities, as well as the economic development are negatively affected.

Banking sector in Jordan is the most important one among the four sectors in terms of its contribution to the gross domestic product (GDP), where the ratio of banks' total assets to the (GDP) is about 189%, and the ratio of banks' total deposits to the GDP is about 122%, as well as the ratio of total credits granted by banks to the GDP is about 96% in 2021

(Association of banks in Jordan, 2021). These ratios show the importance of the banking sector to the national economy. The banking sector in Jordan comprises of 16 banks listed in the Amman stock exchange at the end of 2020, where 13 are commercial and 3 are Islamic. The banking sector in Jordan is characterized by high soundness and efficiency, despite that, it has negatively affected by COVID-19 and one of the problems that facing the banking sector is increasing the non-performing loans ratio, where this ratio was 5.5% at the end of 2020 comparing to 5% at the end of 2019, furthermore, the amount of non-performing loans increased by about 15.20% from 2019 to 2020, where it was 2111 million (US$) at the end of 2020 comparing with 1832.18 million (US$) at the end of 2019. On the other hand, the growth of credit facilities was 5.9% at the end of 2020 comparing to 3.1% at the end of 2019 (Central bank of Jordan, 2021). The increasing of loans has come to keep the economic growth in one aspect and to meet the higher demand for loans from households and firms from the other aspect as well as the Central Bank of Jordan asked commercial banks to postpone individuals' installments for several months for mitigating the negative impact of COVID-19, which exacerbated the problem of bad debts. Therefore, this study is considered one of the important studies in Jordan, where Jordan is a small country and has a weak economy as well as the effect of COVID-19 on its banking sector will be worst comparing with its neighbors (Gulf countries). By conducting this study on commercial banks in Jordan, its results can be generalized to countries of similar size and economy, especially countries in the MENA region.

The significance of this study comes from the importance of understanding the factors affecting non-performing loans ratio for Jordanian banks. Non-performing loans ratio is a major concern for banks, not only in Jordan but also for all banks all over the world, because of its bad effect on banks' performance and the whole economy. Furthermore, COVID-19 leads to increase the non-performing loans ratio for almost all banks in Jordan. Banks' managers, portfolio managers, policy makers, and regulatory authorities could benefit from the results of this study in making decisions and establish polices that reduce the negative impact of non-performing loans on banks' profitability, liquidity, and efficiency. So, this study is an attempt to examine both macroeconomic and bank-specific factors affecting non-performing loans ratio for all Jordanian

banks listed in the Amman stock exchange over the period (2010-2020) taking into account the effect of COVID-19.

The issue of non-performing loans is considered a problem for banks' managers, policy makers, and regulatory bodies since it leads to decrease bank's profitability and liquidity as well as it is deepened because of COVID-19. Despite that, there is no common factors affecting this issue among researchers; some researchers examine macroeconomic factors, while others examine macro and microeconomic factors, furthermore, some studies use factors different from others and obtain different results. So, this study comes to examine the effect of macroeconomic and bank-specific factors affecting non-performing loans ratio for Jordanian banks by answering the following question:

What are the determinants of non-performing loans for all commercial banks listed in the Amman stock exchange over the period (2010-2020)?

The rest of this study is organized as follows: Section 2 reviews the empirical literature concerning the determinants of non-performing loans and the contribution of this study, while data collection, sample, variables, hypotheses, and the model are described in Section 3. Section 4 provides the results. The results are discussed in Section 5, and the last section concludes the results and provides recommendations and further research.

2. Literature review

There are many studies carried out in developed countries and emerging markets examine the factors affecting non-performing loans (e.g., Abid et al, 2014; Akinlo and Emmanuel, 2014; Ciukaj and Kil, 2020). This topic has attracted the interests of many researchers, policy makers, and firm's managers because of its impact on firms and the whole economy. The previous research about the determinants of non-performing loans can be classified into two groups: the first group is the empirical studies investigative the impact of macroeconomic factors on non-performing loans, while the other is the empirical studies examining the impact of macroeconomic and bank-specific factors.

2.1. The macroeconomic determinants of non-performing loans

Akinlo and Emmanuel (2014) examine the macroeconomic determinants of non-performing loans in the context of Nigeria. The results report that non-performing loans ratio is negatively affected by economic growth,

and stock market index, however, it is positively affected by unemployment rate, credit to private sector, and exchange rate. Mazreku et al. (2018) find a positive relationship between non-performing loans and unemployment rate, while non-performing loans ratio is negatively affected by economic growth and inflation rate. In another related study, Zainol et al. (2018) explore the factors affecting non-performing loans in the context of Malaysia and find a negative relationship between economic growth and non-performing loans, while non-performing loans ratio is positively affected by income distribution and lending rate. In a recent study, Hada et al. (2020) find that exchange rate, unemployment rate, and inflation rate have a positive effect on non-performing loans. In another recent study, Khan et al. (2020) find that return on assets and efficiency have a negative effect on non-performing loans.

2.2. The macroeconomic and bank-specific determinants of non-performing loans

Louzis et al. (2012) find that economic growth, solvency ratio, and profitability have a negative effect on non-performing loans, while it is positively affected by unemployment rate, previous non-performing loans, and lending rate. Curak et al. (2013) examine the factors influencing non-performing loans ratio in Europe by using panel data regression analysis. The results reports that non-performing loans ratio is negatively affected by economic growth, bank's size, and return on assets, while positively affected by inflation rate, interest rate, previous non-performing loans, and solvency. Makri et al. (2014) use panel data to identify the macroeconomics and microeconomic determinants of non-performing loans and find that non-performing loans ratio is positively affected by previous non-performing loans, and unemployment rate, while profitability and economic growth have a negative effect on non-performing loans. Abid et al. (2014) examine the macroeconomic and microeconomics determinants of non-performing loans in the context of Tunisia by using panel data. The results show that non-performing loans ratio is negatively affected by previous non-performing loans ratio, growth in the GDP, solvency ratio, and return of equity, while positively affected by inflation rate, real lending rate, and inefficiency ratio. Morakinyo and Sibanda (2016) find that non-performing loans ratio is negatively affected by return on assets and capital adequacy ratio, while positively affected by exchange rate, money supply, total bank credit,

lending rate, and corruption. Rajha (2017) find that non-performing loans ratio is negatively affected by economic growth and inflation, while positively affected by previous non-performing loans, ratio of loans to total assets, and the financial crisis (2007-2008).

In a recent study, Kjosevski et al. (2019) find that non-performing loans ratio is negatively affected by economic growth, loans growth, profitability, and inflation rate, while positively affected by solvency ratio, unemployment rate, and exchange rate. In another recent study, Kumar and Kishore (2019) find that previous non-performing loans ratio has a positive effect on non-performing loans ratio, while liquidity has a negative effect on non-performing loans ratio. In more recent study, Ciukaj and Kil (2020) find that the GDP, return on assets, and bank's size have a negative effect on non-performing loans ratio, while unemployment rate, house price index, and interest rate have a positive effect on non-performing loans ratio. In another more recent study, Haroon et al. (2020) examine the determinants of non-performing loans in Pakistan and find a positive relationship between inflation rate and non-performing loans, while non-performing loans ratio is negatively affected by economic growth, exchange rate, profitability, and bank's size.

This study contributes to the literature by reducing the dearth in the previous empirical research about the determinants of non-performing loans by examining the macroeconomic and bank-specific factors of non-performing loans ratio in the context of Jordan. This study takes all commercial banks listed in the Amman Stock Exchange over the period (2010-2020). To the best of authors' knowledge, this is the first study have conducted in Jordan takes into consideration the effect of COVID-19 on non-performing loans. Furthermore, there is no above mentioned previous study examines the effect of COVID-19 on non-performing loans. Examining the effect of COVID-19 on non-performing loans is a significant because the increasing of bad loans to a great degree could lead to bank's credit default, meaning bank's inability to meet its short–term obligations. Bank's managers could rely on the results of the current study in adopting credit policies to deal with non-performing loans to avoid financial instability, as well as policy makers and regulatory authorities can also benefit from this study in developing polices to reduce the negative effect of non-performing loans on the performance of banking sector and the whole economy. Furthermore, governments adopt policies

and procedures to mitigate the effect of COVID-19 on the banking sector, in general, and on non-performing loans, in particular.

3. Data and Methodology

The data used for determining the factors affecting non-performing loans is derived from two main sources: data relates to bank-specific variables (return on assets, non-performing loans ratio, and the previous non-performing loans ratio), is collected from the audited financial statements for listed banks, which available at the Amman Stock Exchange website (www.ase.com.jo), as well as stock market index is also obtained from the same site. On the other hand, gross domestic product (GDP) is obtained from the World Bank. This study uses balanced panel data OLS multiple regression analysis to examine the determinants of non-performing loans for 13 listed commercial banks. Variables measurement and sources are illustrated in Table 1.

Table 1: Variables Measurements

Variable	Symbol	Measurement	Source
Non-Performing Loans Ratio	NPLs	Non-performing loans/Total loans	Amman Stock Exchange
Return of Assets	ROA	Net income/Total assets	Amman Stock Exchange
Stock Market Index	LNSMI	LN Stock market index	Amman Stock Exchange
Previous non-performing loans	NPLs t-1	Non-performing loans/Total loans	Amman Stock Exchange
Gross Domestic Product	LNGDP	LNGDP	World Bank
COVID-19	DUM1	0 for years 2010-2019 and 1 for 2020	

To determine the factors affecting non-performing loans, the following hypothesis is structured:

Ho: return on assets, stock market index, previous non-performing loans, Gross Domestic Product and COVID-19 have no significant effect on non-performing loans for all Jordanian commercial banks.

This study is based on the following regression model to examine the determinants of non-performing loans and to test the above hypotheses:

$$LNNPLsi, t = \beta 0 + \beta 1 ROAi, t + \beta 2 LNNPLsi, t - 1 + \beta 3 LNGDPt + \beta 4 LNSMIt + \beta 5 DUMi, t + Ei, t$$
(1)

Where, LNNPLs: natural logarithm of non-performing loans; ROA: return on assets; LNNPLs,t-1: natural logarithm of the previous non-performing loans; LNGDP: natural logarithm of gross domestic product; LNSMI: natural logarithm of stock market index; DUM: dummy variable for COVID-19; i, t: firm and time, respectively; E: error term; B0: intercept; B1…B6: partial slope coefficients.

4. Empirical Results

The descriptive statistics for independent variables and the dependent one are illustrated in Table 2.

Table 2: Summary Statistics

Variable	Mean	Standard Deviation
LNNPL	1.8981	0.4573
ROA	0.0837	0.0366
LNNPLt-1	1.8812	0.4562
LNGDP	24.1707	0.1239
LNSMI	7.6133	0.0943

Note: the number of observations is 143

Table 2 reports that the mean value of the natural logarithm of the ratio of non-performing loans to the total loans is 1.898 and its standard deviation of 0.457. The return on assets has a mean value of 0.083 and standard deviation of 0.036 implying that all banks vary slightly concerning their profitability through the period of the study (2010-2020). The mean value of the natural logarithm of the previous ratio of non-performing loans to the total loans is 1.881 and its standard deviation of 0.456. The natural logarithm of the gross domestic product (GDP) has a mean value of 24.170 and standard deviation of 0.123. Finally, the mean value of the natural logarithm of the stock market index is 7.613 and standard

deviation of 0.094 indicating that a slight variation of the stock market index from year to another through the period of the study (2010-2020).

Variance inflation factor (VIF) is used to detect Multicollinearity as shown in Table 3.

Table 3: Multicollinearity

Variable	VIF	1/VIF
LNGDP	4.92	0.2033
DUM	3.64	0.2743
LNSMI	2.45	0.4077
ROA	1.25	0.8030
LNNPLt-1	1.11	0.9025
Mean VIF	2.67	

It can be seen from the results of Table 3 that the values of variance inflation factor (VIF) for all explanatory variables are less than (10 or 5), meaning that there is no existence of Multicollinearity (Gujarati & Porter, 2010; Wooldridge, 2013).

Hausman test is applied to determine which model is most suitable for data analysis (random effect model or fixed effect model). So, the result of this test is illustrated in Table 4.

Table 4: Hausman Test

Variable	Coefficients			
	(b)	(B)	(b-B)	Sqrt (diag (v_b-v_B))
	fe	re	Difference	S.E.
ROA	-2.7118	-2.1474	-0.5643	0.3753
LNNPLt-1	0.5261	0.7485	-0.2223	0.0386
LNGDP	-1.5635	-1.0973	-0.4662	
LNSMI	-1.0066	-0.7915	-0.2151	
DUM	0.3864	0.2986	0.0877	
b= consistent under Ho and Ha; obtained from xtreg				
B= inconsistent under Ha, efficient under Ho; obtained from xtreg				
Test: Ho: difference in coefficients not systematic				
chi2 (5) = (b-B) ' [(v_b-v_B)^(-1)] (b-B) = 47.25				
Prob>chi2 = 0.0000				

It can be noticed from the results of Hausman test that the fixed effect is the best model because the probability value (0.0000) is too much less than the significance level (0.05), so, the alternative hypothesis is accepted (Gujarati & Porter, 2010; Wooldridge, 2013).

The results of fixed effect regression model are illustrated in Table 5.

Table 5: Fixed Effect Regression Results

Fixed-effects (within) regression					Number of observations	= 143
Group variable: firm1					Number of groups	= 13
R-sq: within = 0.5507 between = 0.8922 overall = 0.6865					Observations per group: min = 11 avg = 11.0 max = 11	
corr (u_i, xb) = 0.4577					F (5,125)	= 30.64
					Prob > F	= 0.0000
LNNPL	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
ROA	-2.7118	0.7455	-3.64	0.000	-4.1874	-1.2362
LNNPLt-1	0.5261	0.0622	8.45	0.000	0.4028	0.6494
LNGDP	-1.5635	0.3559	-4.39	0.000	-2.2681	-0.8590
LNSMI	-1.0066	0.3253	-2.09	0.002	-1.6505	-0.3626
DUM	0.3864	0.1303	2.96	0.004	0.1284	0.6445
_cons	46.5566	10.1191	4.60	0.000	26.5295	66.5837
sigma_u	0.1606					
sigma_e	0.2300	(fraction of variance due u_i)				
roh	0.3277					
F test that all u_i=0:	F (12, 125) = 3.29	Prob > F = 0.0004				

Table 5 reports that return on assets has a negatively significant effect on the non-performing loans ratio, indicating that the greater the return on assets, the less the non-performing loans ratio. The partial slope coefficient of return on assets of -2.71, meaning that when return on assets increasing by 1 percent, holding all other independent variables constant, the non-performing loans ratio will decrease by 2.71, on average. It can be noticed that the return on assets variable is the dominant factor affecting the ratio of non-performing loans, where its coefficient is the highest among the other variables. Efficient bank with high profitability usually has good management that tries to invest in less risky loans, so bad loans will be low comparing to inefficient one, however, low profitable bank that tries to increase its profits by granting risky loans, resulting in increasing the

ratio of non-performing loans (Curak et al., 2013; Khan et al., 2020). This result is consistent with (Abid et al., 2014; Ciukaj and Kil, 2020; Curak et al., 2013; Haroon et al., 2020; Kjosevski et al., 2019; Louzis et al., 2012; Makri et al., 2014; Khan et al., 2020).

The current non-performing loans ratio is positively significantly affected by the previous non-performing loans, implying that the higher the non-performing loans ratio in the previous year, the higher the current non-performing loans ratio. This result is consistent with (Curak et al., 2013; Kumar and Kishore 2019; Louzis et al., 2012; Makri et al., 2014), while inconsistent with (Abid et al., 2014). The economic growth has a negatively significant effect on non-performing loans ratio, meaning that the grater the gross domestic product, the lower the non-performing loans ratio. The higher the economic growth during the expansion stage leads to increase firms' revenues and profitability as well as peoples' income, therefore, their ability to repay banks' loan will be increased, resulting in decreasing bad loans, while during recession, economic growth will decline and firms' profitability and households' income will be declined and then their ability to repay loans will be decreased, which results in increasing non-performing loans. This result is consistent with (Abid et al., 2014; Akinlo and Emmanuel, 2014; Ciukaj and Kil, 2020; Curak et al., 2013; Haroon et al., 2020; Kjosevski et al., 2019; Louzis et al., 2012; Makri et al., 2014; Khan et al., 2020).

There is a negative association between stock market index and non-performing loans ratio, implying that the higher the stock market index, the lower the ratio of non-performing loans. The development and the enhancement of stock market index has a positive effect on economic growth, leading to increase the income of firms and individuals, and then increase their ability to repay loans, resulting in declining the amount of bad loans (Akinlo and Emmanuel, 2014). This result is consistent with Akinlo and Emmanuel, 2014. Finally, COVID-19 crisis has a positive and significant effect on non-performing loans ratio, indicating that COVID-19 leads to increase non-performing loans ratio. As a result of COVID-19, many individuals have lost their jobs and have become unable to meet their liabilities and the salary of some people have been reduced resulting in increasing the ratio of non-performing loans, furthermore, the profits of many firms have been reduced or even have suffered from losses as well as some of them have become out of the market, which results in

increasing the amount of non-performing loans. The value of the coefficient of determination (R^2) of 0.6865 indicating that about 69% of the variability in non-performing loans ratio for all conventional banks listed in the Amman Stock Exchange through the period of the study is explained by independent variables and about 31% of variability is explained by external factors not included in the regression model.

5. Conclusion

The problem of non-performing loans is one of the most important issues for all banks because of its negative impact on bank's profitability, efficiency, stability, and bankruptcy. Because the importance of this issue, this study comes to determine the factors affecting non-performing ratio for Jordanian banks taking into account the impact of COVID-19. Balanced panel data is used for data analysis. The results report that non-performing loans ratio is negatively affected by return on assets, gross domestic product (GDP) and stock market index, while positively affected by previous non-performing loans ratio and COVID-19.

6. Policy implications and limitations

Bank's mangers could increase banks' profitability because of its positive impact in decreasing the problem of non-performing ratio and policy makers could enhance economic growth because of its positive impact on non-performing loans ratio. In addition, regulatory authorities can develop polices to enhance stock market index. Furthermore, government should adopt policies and regulations in order to reduce the severity effect of COVID-19 on banks.

One of the limitations of this study is excluded exchange rate, as independent variable, because it is fixed for the whole period of study, where the Jordanian dinar is tied with the US dollar. On the other hand, the current study takes into consideration the effect of COVID-19 for only one year (2020).

Finally, this study recommends future research to examine the effect of more macroeconomic and bank-specific variables on non-performing loans ratio as well as examine a group of countries like MENA region.

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