The impact of credit risk management on the financial performance of United Arab Emirates commercial banks

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ABSTRACT

The main purpose of this study is to measure up to what extent the independent factors defined by capital adequacy ratio, non-performing loans ratio, cost-income ratio, liquidity ratio, and loans-to-deposits ratio impact the financial performance of sixteen commercial banks operating in the United Arab Emirates using panel data for the period of 2013-2019. The secondary data was collected from banks and examined by applying standard descriptive statistics and the random effect model for hypothesis testing. It is concluded from the regression outcomes that non-performing loans ratio and cost-income ratio have a significant negative impact on commercial banks profitability in the United Arab Emirates, while capital adequacy ratio, liquidity ratio, and loans -to-deposits ratio all have a very weak positive relationship on the return on assets but they are not determinants of bank's profitability due to the insignificant statistical impact on it. It is therefore suggested that to enhance financial performance and minimize the risk of non-performing loans in the future, banks must watch very carefully the loans' performance and analyze thoroughly the clients' credit history and ability to pay back their debts prior to any approval of loan applications. Furthermore, banks should continuously improve their assets utilization, liquidity, and techniques of managing operating costs, improve the impact of capital adequacy, and the use of deposits for lending activities from a weak positive impact to a significant positive impact on their profitability. The researchers recommend that future studies on credit risk management influence on banks' financial performance should consider more independent variables and longer periods of study such as twenty or thirty years to have more accuracy and generalized results.

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Introduction

Commercial banks are the key player in economic development through effective financing of economic activities, and contribute to the stability of their countries' financial systems, as they are the institutions that are able to withstand economic shocks and are the most capable of directing available savings and funds to areas where liquidity deficits and demand for these savings are made through the practice of credit activity (Bessis, 2010), which is one of the main sources of a bank's income, and on the other hand, credit activity involves many risks facing the lender and borrower such as liquidity risk, Market risk, credit risk, capital risk, interest rate risk, exchange rate risk, political risk, and other types of risks. However, the current study will focus on credit risk as one of the most important types of risk faced by banks. In addition, this type of risk is one of the risks that lenders face because of the weak ability of borrowers to pay back their loans which puts the money of savers at risk and therefore banks will face significant losses that may lead to financial distress that negatively affects the economic growth and development. This type of risk cannot be avoided by banks as it is linked to their core activity, which is credit, so banks are constantly trying hard to reduce these risks by developing credit policies that will raise the quality of loans and reduce the volume of non-performing loans, as the higher the credit risk at banks, the greater the probability of financial crises and vice versa. Therefore, banks always seek to reduce these risks by ensuring that borrowers have guarantees and assets that exceed the value of their loans in proportions determined by the bank based on many factors, including

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the instructions of central banks. Furthermore, the bank's ability to manage credit risk is of important for the bank business performance, continuity, and survival since the banks' major source of income is the interest margin gained from lending activities.

The sound management of credit activities in banks and the ability to deal with the risks of these activities significantly affects the profitability and overall performance of these banks (Athanasoglou et al., 2008). Accurate measurement of the size and ability to deal with credit risk reduces the marginal cost of debt and capital and thus reduces the cost of money owed by banks (Basel, 1999). Therefore, good credit risk management (Bhattarai, 2016) keeps banks from reaching financial hardship and unexpected losses, besides poorly performing banks, which are exacerbated by increased credit risk and continued negative effects, may leave their customers to their destiny or reschedule their plans, change their strategies, change their capital structure, or even resort to merging with other better banks on terms that may be difficult for them and may therefore have to do so as a difficult option or a last resort. Therefore, banks that perform poorly because of the inability to manage their credit activity may have to liquidate or merge when they are exposed to financial hardship that turns from temporary to permanent, thus resulting in large losses in debt, part of which eventually turns into bad debt and, as a result, hundreds or thousands of employees lose their jobs and thus negatively affect the economy and development. Accordingly, poor credit risk management in any bank is a main reason behind banks' failures (Kalui, 2015). The link between bank performance and risk management is critical in understanding an empirical analysis of the determinants of bank performance and their impact on risk management practices. It presents available theories and empirical evidence on the link between bank profitability and credit risk management (Ebrahim Almekhlafi et al., 2015).

The reasons for the failure of some banks to manage their monetary mass and their incompetence in managing their credit activity have aroused the interest of researchers to conduct further studies in identifying factors that affect the size of credit risk and thus showing their effect on the United Arab Emirates (UAE) Commercial Banks' financial performance during the period 2013-2019 to participate in the closing of the research gap in this area where there is a few known research papers such as (Al Zaidanin, 2020; Anupam Mehta & Ganga Bhavani, 2017; Abu Lughod, 2015; Zitun, 2012) which have been conducted on the determinants of the banks' profitability in the United Arab Emirates including some risk factors. However, the banking sector in the UAE is one of the most important pillars of the national economy and the most active and open to the outside world due to the volume of financial activities carried out by it, and it is one of the largest banking sectors in the Middle East and North Africa, where the volume of banking assets in 2019 amounted to AED 3,038 billion compared to AED 2,693.8 billion in 2017, and the increase in total deposits was AED 1,870.2 billion in 2019 compared to AED 1,627.3 billion in 2017¹.

The current study attempts to close the gap and identify the risk factors affecting the profitability of banks and the soundness of their financial performance in the UAE due to the importance of the banking sector and the lack of sufficient research studies to highlight the effect of credit risk on banks' financial performance represented by profitability,

The rest of this paper is organized as follows: section 2: literature review and previous studies, section 3: methodology and data, section 4: analysis and results, and section 5: conclusions and recommendations.

This study aims mainly to analyze the impact of credit risk management on the profitability of commercial banks in the UAE, as this analysis will show whether there is a relationship between these two variables. The main issue is credit risk management indicators and profitability. The researchers use Capital Adequacy Ratio (CAR), Non-Performing Loans Ratio (NPLR), Cost Income Ratio (CIR), Liquidity Ratio (LR), and Loans-to-deposits Ratio (LDR) as independent variables to represent credit risk management and return on investment as dependent variables to measure the UAE commercial banks' financial performance. In the event of a relationship, whether positive or negative, the stability or change of this relationship will be tested over time, which will help to delve deeper into the field of research and open the door to more research topics in the future.

One of the contributions of this study is that it fills the research gap on the impact of credit risk management on profitability of UAE commercial banks. Another contribution is that it will provide an important basis for other researchers who wish to do more studies on the relationship of financial risk management to the profitability of banks in their regions, such as the extent to which the geographical variable affects the level of risk and the performance of banks. Practically speaking, the analysis provided in this research and its results will give a guidance to bank managers, policy makers, investors, and bank supervisors. Bank managers can have more focus on managing the credit risk that banks face and pay more attention to the related recourses allocation to improve the performance of these banks. In addition, investors with banks would have a better view on the credit risk management's effect on profitability. Furthermore, banks' supervisors can have further evidence of the impact of credit risk management and an evaluation of whether it is necessary to revoke existing regulations and procedures or impose further regulations.

Literature Review

Theoretical and Conceptual Background

This part of the study reviews theoretical and empirical literature, including a series of broader literature on the relationship between bank performance and risk management practices, and several studies have been conducted on this relationship using traditional profit theory, most of which have been conducted in developed countries and are limited in other countries such as the UAE. The

¹ Central Bank of the UAE annual report, 2019, P44-45

link between bank performance and risk management is particularly important for understanding banks' performance determinants and their impact on risk management practices. Theories and empirical evidence associated with the current study are presented by examining and analyzing the relationship between bank performance and credit risk management and liquidity risk.

Theoretical Background

Credit risk is the risk that a borrower defaults on his debt and does not honor his obligation to pay that debt totally or partially as agreed for any reason (Salas & Saurina, 2002). However, this type of risk is one of the main risks that banks encounter all the time due to the nature of their activities. (Iwedi & Onuegbu, 2014) stressed that banks play an important role in achieving banking stability and contributing to reducing credit risk not only for themselves by examining the feasibility and profitability of their business ventures, but also for the banking system through effective credit risk management and the effective use of funds available to them in different economic sectors. (Das & Ghosh, 2007) concluded in their study about risk and banking in Kenya that risk management has big impact on banks' profitability. (Shafiq & Nasr, 2010) also concluded that credit risk management has significant effect on banks' profitability. Furthermore, (Moti et al., 2012) studied the impact of banking risk factors and the risks of the banking environment in the Gulf region for the period 1998-2008 for forty-three commercial banks, and concluded that bad loan, credit risk, liquidity risk and capital risk are the main factors influencing the performance of banks represented by the return on assets (ROA) of those banks operating in the Gulf Cooperation Council. In a study on the effect of credit risk management on banks by (Catherine, 2020), it was concluded that risk has a negative significant effect on profitability, where profit is the main goal of banks through lending activities and creation. In addition, banks must allocate sufficient resources to increase the ability of credit management to be able to balance between available resources for lending, risk factors, and demand on borrowing. However, the current study is linked to the following theories that explain the theoretical framework of the banks' performance and its determinants:

The Commercial Loan Theory

The commercial loans theory or the so called real bills doctrine theory is the oldest theory of the basic business activities of banks, which states that banks should only grant self-liquidating short-term loans and commercial papers to clients (Hosna & Manzura, 2009), the theory of commercial loans is designed to guide banks and influence them logically and convincingly about the banking lending process and general economic activities. The strong reliance of the principle of this theory and its follow-up is an engine and directed to the display of liquidity to influence all economic activities, so some banks whose liquidity is mainly coming from customer deposits considered that short-term loans are the most appropriate because customer deposits are retractable at any time and that their time nature is short-term. This shows that this theory does not serve banks that maintain good reserves by moving towards supporting developing economies and financing medium- and long-term loans such as industrial and real estate lending and thus creating a gap in economic development that depends on long-term financing of development sectors. Therefore, following this theory is a fundamental requirement to place bank credit in its normal short-term context because this theory is not aware of the relative stability of bank deposits, especially since in the case of withdrawal requests, whether normal or unusual, they will not all be carried out at the same time, so the relative stability of deposits in banks allows them to use them for reasonable periods of time without the high risk of lack of liquidity. Despite the flaws of this theory, many banks around the world apply their basic principle of short-term lending and banking screening and activity evaluation procedures, so researchers and banking thinkers stress that understanding current banking activities and activities depends on understanding and evaluating the history of banks, which is mainly related to understanding the commercial loans theory.

Shiftability Theory

The shiftability theory is the procedure for transferring the bank's assets to a bank that has remarkably high liquidity when there is a scarcity of liquidity (Alshatti, 2014). It came to assume the expansion of banks in the type of their assets by retaining transferable financial assets in the open market such as government securities in addition to maintaining the self-liquidation status of bonds available to those banks associated with assets (Moti, Masinde, & Mugenda, 2012), so this theory did not come to eliminate or replace the commercial loans theory, but came up with more comprehensive principles with regard to banking through the introduction of new types of banking assets as an addition to what came in the commercial loans theory, the shiftability theory assumes that the liquidity of banks depends on the ability of these banks to sell or transfer some of their assets easily to others at predictable prices (Nwaezeaku, 2006). As per (Hosna & Manzura, 2009), the shiftability theory came to guide banks to expand their assets by owning convertible investments as a source of liquidity for those banks rather than focusing on loans, and therefore the theory of transformation significantly affected the direction of banks and their banking activities. Researchers and banking thinkers who are proponents of the shiftability theory have argued that the commercial loans theory has overly focused on the liquidity of commercial loans (Kargi, 2011), yet the shiftability theory is dominated by the main drawback that a bank may be able to cope with its need for liquidity by transferring its assets, but this principle is not true for all banks combined.

The Anticipated Income Theory

This theory was proposed by H.V. Prochanow in 1944 since the practice of extending term loans by the USA commercial banks. In 1949, Prochanow conducted a comprehensive study on loans and bank assets through which he developed a new theory on loans called "Anticipated Income Theory", According to (Soyibo, et al., 2004), the anticipated theory focuses mainly the long-term loans and advances. In a study carried out by (Afriyie & Akotey, 2011), they concluded that regardless of the borrower's character and his

business nature, the Bank plans to repay borrowers their loans through their expected profits and not by monetizing or selling their assets as in the commercial loans theory or by transferring or selling existing loans to other lenders. However, anticipated Income theory assumes that banks should lend to their applicants based on their expected income and not based on the current values of their assets. What is striking about the anticipated Income theory is its view of the future of loans and banking facilities that are being repaid or transferred to liquidity through cash flows or expected profits of the borrower's business and projects (Kolapo, et al. 2012). The anticipated Income theory came in response to the principle of commercial loan theory but did not compete with the shiftability theory or the so-called capacity theory, and the anticipated Income theory did not question the fact that the source of liquidity for any bank is the optional or secondary reserves but came to focus the attention of banks and banking thinkers on the types of loans best suited to the bank.

The Credit Risk Theory

The credit risk theory indicates the risk that the lender will be delayed or defaulting on the installments or interests owed to him or both to the borrower (Dimitrios P. Louzis, et al., 2012), where the risk is that the lender will be exposed to financial distress after which he cannot return deposits to their owners or meet his other obligation due to the loss of capital and interest and the lender's exposure to significant losses resulting from borrowers not paying their obligation to lenders, which is now called non-performing loans. Accordingly, lenders would conduct a credit check and request appropriate loan insurance such as mortgage insurance and request enhanced guarantees for mortgages on the borrower's assets such as personal guarantees or guarantees from third parties. Therefore, the level of risk for borrowers directly affects the cost of loans such as interest, fees, etc.

The Liability Management Theory

This theory focuses on the fact that traditional trends in debt and liquidity management at banks are not of any importance given that money can be obtained through short-term debt instruments from the capital market whenever the need to fill the reserve deficit, and that this does not mean that the bank manages only its liabilities and does not focus on managing its assets, but the liability management theory emphasizes on the importance of bank's assets structure in providing it with liquidity (Shafiq & Nasr, 2010), however, this theory has taken another turn in terms of liquidity, suggesting that the bank can use its liabilities for the purposes of providing appropriate liquidity to meet the demand for withdrawals and meet loan applications. In addition, loans alone are not the source of income, but the bank, which cannot provide proper liquidity to meet the demand for loans and banking facilities by its depositors, will inevitably not be able to maintain these depositors for a long time.

Empirical Review and Hypotheses Development

Many researchers studied the factors that affect the financial performance of banks, some of them studied the impact of internal factors on the profitability of banks and others studied external factors such as micro-economic factors and their impact on the financial performance of banks. Nevertheless, other researchers focus on the financial risk management as the most important factor that influences the financial performance and development of the banking sector such as (Ara, Bakaeva, & Sun, 2009) who studied the effect of financial risk management on the Swedish commercial banks and concluded that credit risk management is significantly and positively affecting profitability of banks. On the other hand, (Kithinji, 2010) found that there are no relationships between credit risk management and profitability and liquidity of Kenya's commercial banks. In another study conducted by (Ruziqa, 2013) on the impact of credit and liquidity risks on the financial performance of conventional Indonesian banks, the results of the study showed that there is a negative relationship between credit risk and bank profitability, and that liquidity risks positively affect the financial performance of banks.

A study by (Marshal & Onyekachi, 2014) on the impact of bank credit risk on the performance of five banks in Nigeria during the period 1997 to 2011 showed that the ratio of non-performing loans to total loans and advances and the ratio of loans and advances to total deposits were all positively affecting the financial performance of banks. (Taiwo et al., 2017) studied the impact of credit risk management on the profitability and growth of bank lending in Nigeria from 1998 to 2014. The results showed that non-performing loans do not significantly affect the increase in bank lending and that the ratio of loans to deposits has a significant positive impact on the increase in bank lending.

In a study conducted by (Ogboi & Unuafé, 2013) on six banks in Nigeria during the period of 2005 to 2009 on the impact of credit risk management and capital adequacy on the financial performance of banks, found that the ratio of non-performing loans to total loans and advances and liquidity ratios do not significantly affect the performance of banks, while total loans and advances to total deposits have a significant negative impact on the financial performance of banks, and capital adequacy has a positive effect on the banks' return on assets. (Yimka et al., 2015) studied the impact of credit risk management on the profitability of Nigerian banks, where 10 banks were studied from 2005 to 2010 and the results were that the rate of total non-performing loans and advances to total loans and advances does not significantly affect the banks' profitability. Another study on ten Nigerian Commercial banks conducted by (Oluwafemi et al., 2014) about the impact of credit risk management on the banks' financial performance measured by return on assets (ROA) during the period 2006-2009 concluded that the non-performing loans and liquidity ratios do not have a significant impact on the Nigerian commercial banks' financial performance.

(Alalade et al., 2015) examined the impact of credit risk management on the financial performance of 10 banks in Nigeria during the period of 2006-2010 by examining the relationship between both the reserve rate of non-performing loans and the rate of non-performing loans to measure credit risk on one hand and the rate of return on assets on the other and found that credit risk management has a positive and significant impact on the financial performance of commercial banks in Nigeria. Another study by (Kolapo et al., 2012) on the impact of credit risk performance on the financial performance of 5 commercial banks in Nigeria during the period 2000-2010. It was concluded that the ratio of non-performing loans to loans & advances has a statistically big negative influence on ROA, while the ratio of total loans and advances to total deposits has a significant positive influence on ROA.

In Ethiopia, (Elshaday et al., 2018) investigated the determinants of Ethiopian commercial banks' financial performance during the period of 2007-2016. They used the correlation and random effect model. The conclusion emphasized that capital adequacy has a significant positive impact on the Ethiopian commercial banks financial performance as measured by the return on assets. In addition, non-performing loans and operational cost efficiency have a significant negative effect on banks' return on asset. In Ghana, (Ernest & Fredrick, 2017) studied the effect of credit risk management on the financial performance of six commercial banks and concluded that non-performing loans ratio and loan loss provisions ratio have a significant negative impact on the commercial banks' profitability of Ghana, while capital adequacy ratio had positive relationship with a bank's profitability. (Rajkumar & Hanitha, 2015) evaluated the effect of credit risk management on the profit of two state commercial banks during the period of 2006-2013 in Sri Lanka. They concluded that capital adequacy, asset quality, and liquidity ratios have a significant negative impact on the commercial banks' financial performance in Sri Lanka. In Europe, (Li & Zou, 2014) investigated the relationship between credit risk management and profitability of commercial banks measured by return on assets (ROA) and it was found that the non-performing loan ratio had a negative and significant effect on European banks' profitability, while capital adequacy did not affect profitability. In Kenya, (Nyabicha, 2017) studied the impact of credit risk management during the years of 2008 - 2014 on the profitability of ten commercial banks. The researcher used the statistical random effect model and measured the effect of the capital adequacy ratio and the non-performing loan ratio on the financial performance of Kenyan commercial banks. It was concluded that capital adequacy ratio did not significantly affect the banks' financial performance, while the non-performing loans ratio affected negatively but not significantly the financial performance.

Also, (Muriithi et al., 2016) studied the impact of credit risk management on the financial performance of the commercial banks in Kenya for the period of 2005- 2014, the fixed effects model and generalized method of moments were used. The study found that capital adequacy and asset quality ratios have a negative relationship with the banks' profitability. A study by (Alshatti, 2015) measured the impact of capital adequacy ratio and non-performing loans ratio on the financial performance of the commercial banks in south Africa for the period of 2005-2013, the study used the panel data approach and concluded that the non-performing loans ratio has a statistical significant positive impact on the banks' financial performance measured by ROA and ROE while capital adequacy ratio did not affect the financial performance. In a study conducted by (Ravi, 2012) on the effect of credit risk management on Nepal's commercial banks' financial performance for the period of 2001-2011, conducted on thirty-one banks, it was concluded that capital adequacy ratio has a significant negative relationship with the financial performance of banks in Nepal. (Afriyie & Akotey, 2012) investigated the relationship between the financial performance of banks and credit risk factors represented by the rate of non-performing debt and the rate of capital adequacy, the study was conducted on ten rural banks in Ghana during the period of 2006-2010 and found a statistically significant positive impact of non-performing loans on the profitability of banks in Ghana. In Sweden, (Hosna et al., 2009) evaluated the effect of non-performing loans and capital adequacy as credit risk factors on the Swedish banks' financial performance for the period of 2000-2008. It was concluded that that non-performing loans and capital adequacy ratios have a statistically significant negative relationship with banks' profitability. In Pakistan, (Malik et al., 2016) measured the impact of liquidity ratios on the profitability of 22 private banks in Pakistan measured by ROA. It was concluded that there was no significant effect of liquidity on the ROA of the private banks in Pakistan. (Musyoka, 2017) studied the relationship between capital adequacy and financial performance of 42 Kenyan commercial banks, the study found a statistically significant negative relationship between capital adequacy and financial performance. (Gizaw et al., 2013) studied the impact of credit risk management on the profitability of 8 commercial banks in Ethiopia for twelve years. The study concluded that credit risk factors including non-performing loans, loan loss provisions and capital adequacy had a significant influence on the profitability of the Ethiopian commercial banks.

In Uganda, a study by (Serwadda, 2018) analyzed the relationships between credit risk management and profitability of commercial banks in Uganda and concluded that credit risk management factors have a big influence on the commercial banks' profitability in Uganda. However, non-performing loans have a negative effect of financial performance.

In Jordan, (Alshatti, The Effect of the Liquidity Management on Profitability in the Jordanian commercial banks, 2014) studied the influence of credit risk management on the Jordanian commercial banks' financial performance. The researcher concluded that credit risk management affects banks' profitability in Jordan and non-performing loans ratio had a positive impact on banks' profitability. However, non-performing loans and loan loss provision ratios are main determinants of credit risk management ability. (Li & Zou, 2014) investigated the relationship between credit risk management and the profitability of 47 European commercial banks for the period of 2007-2012 and concluded that non-performing loans ratio had a significant negative relationship with banks' profitability measured by ROA while capital adequacy ratio had a weak positive relationship with bank's profitability in Europe. Another study

by (Juliana, 2017) studied the impact of credit risk management on the profitability of Chinese Banks and concluded that non-performing loans and capital adequacy ratios had significant impacts on the Chinese banks' profitability.

In an analysis study by (Boahene et al., 2012) about the effect of credit risk on banks' profitability in Ghana using the regression statistical model, it was concluded that the credit risk factors including the non-performing loan have a strong positive relationship with the banks' profitability in Ghana.

In light of the above literature and previous studies, the current study seeks to examine the effects of credit risk management on the UAE commercial banks' financial performance for the period of 2013-2019 and investigates the extent to which banks manage their credit risks, the measures that have been taken to control the increase in default rate, and whether UAE commercial banks have met the regulatory capital requirement as per the new Basel Accord, to improve risk reserves to accommodate the effect of the risk factor on the industry. Furthermore, the study will also explore how the financial performance of banks is affected by the high default rate using an appropriate statistical model to measure the relationship between the profitability of UAE commercial banks measured by ROA and the five credit risk measures used by the previous empirical studies mentioned in the current study. Accordingly, the researchers developed the following null hypotheses:

H01: Capital adequacy ratio (CAR) has no significant effect on the UAE commercial banks' Return on Assets (ROA).

H02: Non-performing loans ratio (NPLR) has no significant effect on the UAE commercial banks' Return on Assets (ROA).

H03: Cost-to-income ratio (CIR) has no significant effect on the UAE commercial banks' Return on Assets (ROA).

H04: Liquidity ratio (LR) has no significant effect on the UAE commercial banks' Return on Assets (ROA).

H05: Loans-to-deposit ratio (LDR) has no significant effect on the UAE commercial banks' Return on Assets (ROA).

Research and Methodology

Conceptual framework

The conceptual framework is a blueprint drawn up by the researchers in which they predict the nature of the relationship or the extent of the expected correlation between the independent and the dependent variables to achieve the specified objectives.

It is a pictorial guide to the theory that has been addressed as a model where the researchers show the link between the dependent and independent variables to reveal the relationship between these variables. However, the following conceptual framework of the study is developed from the review of the previous studies and related literature:

Table 1: Conceptual framework of the study

Independent Variables	Prior Expectation	Dependent Variable
Capital adequacy Ratio (CAR) Total Capital / Total Assets	$\beta_1 > 0 \text{ or } < 0$	ROA Return on Assets = Net Income/Total Assets
Non-performing loans ratio (NPLR) Non-performing Loans / Total Loans & Advances	$\beta_2 < 0$	
Cost-income ratio (CIR) Total Operating Cost / Total Operating Income	$\beta_3 < 0$	
Liquidity ratio (LR) Liquid Assets / Total Liabilities	$\beta_4 > 0$	
Loans -to-deposits ratio (LDR) Total Loans & Advances / Total Deposits	$\beta_5 > 0 \text{ or } < 0$	

Source: Researchers' own Conceptualization

Data and research method

The current study uses a pooled time-series and cross-sectional data. The preliminary data was collected from the audited financial reports available and published for the sample of 16 commercial banks operating in the United Arab Emirates (**Table 2**) for the period of 2013 to 2019 consisting of 112 observations, and the secondary data were collected from the Central Bank of the United Arab Emirates' published reports and the Securities and Commodities Authority as well as previous studies and the Internet. This brings the sample size of 13 local commercial banks out of 14, in addition to 3 foreign banks that have published their full financial reports

for the study period of seven years on their web pages. The researchers used a pooled time-series and cross-sectional data from the published balance sheets and income statements in the annual financial reports of these banks to find the effect of credit risk management on the financial performance of commercial banks operating in the UAE by measuring the extent to which there is a relationship between the group of dependent factors and a set of independent variables all described as follows:

Dependent variables

The most typically used measurement of a banks' performance is the profitability which is measured by Return on Assets (ROA) and Return on Equity (ROE). Previous research papers such as (Salike & Ao, 2017; Bougatef, 2017) mostly used ROA and ROE as a proxy for banks' profitability. Return on Assets was used to measure the overall bank's profitability which indicates the bank's ability in making profit out of using the total assets, it has been used by many previous studies such as: (Zampara et al., 2017; Naeem et al., 2017; Singh & Sharma, 2016; Garcia & Guerreiro, 2016; Tobash M. I., 2016). Furthermore, a higher ROA ratio indicates a better financial performance. The return on equity was used as an indicator of the bank's ability in making profit out of utilizing its shareholders' equity (Afolabi & Adawale, 2013; Olalere & Wan, 2016). Therefore, this study uses ROA as a proxy and dependent variables for measuring the profitability where ROA is the main measurement that measures the banks' ability in generating income from their own sources.

Independent variables

The independent variables that are used in the current study to measure the effect of financial risk management on the bank performance are limited within the following variables: -

Capital adequacy Ratio: Capital adequacy (CAR) ratio is an internal measure of total capital to total assets. This ratio indicates whether the bank needs external sources of financing or not, as the higher the capital adequacy ratio, the lower the need for external financing and therefore the lower external financing costs and lower bankruptcy costs and risks (Staikouras CH & Wood, 2003). Capital adequacy ratio according to the Basel criteria amounts to 8% of risk weighted assets and based on the principle of caution: the banking regulatory and supervision agency (BRSA) imposed an additional 4% requirement. This ratio shows the bank's ability to deal with potential losses and bankruptcy risks, so there is a statistical positive relationship between the capital adequacy ratio and banks' profitability (Athanasoglou et al., 2008). The study also predicts a positive relationship between capital and total assets at commercial banks in the United Arab Emirates.

Non-performing loans ratio: This ratio is an important measure of the quality of assets and good composition and validity of the loan portfolio, in addition to the efficiency of the bank's credit risk management. However, a high non-performing loans ratio is a warning indicator to bank management and supervisors and indicates that banks have a weak quality of assets and a high risk. Accordingly, the ratio of non-performing loans to total loans negatively affects the bank's efficiency and return on asset (Boahene et al., 2012). Moreover, the non-performing loan is a loan in which the customer's payments are late (Kauko, 2012). In addition, the International Monetary Fund (IMF) defines a loan as a non-performing loan once the borrower has delayed the payment of interest and principal payments for more than 90 days; or "more than 90 days" worth of interest has been refinanced, capitalized, or delayed by agreement; or payments are less than 90 days overdue but are no longer anticipated" (Akomeah et al., 2020). The researchers expect that non-performing loans affect negatively on the banks' financial performance measured by ROA.

Cost – income ratio: This ratio measures the size of total operating costs to the total volume of operating profits and is used to measure the ability of bank management to control the bank's core activities to improve banking performance and achieve a high level of profitability and measures the efficiency of the bank's management in dealing with the risk factors associated with its core business (Altunbas et al., 2001). The increase in the operating costs to total operating income ratio means a decrease in banking efficiency (Burger & Moormann, 2008). The researchers expect that there is a negative impact of the operating cost into the UAE commercial banks' return on assets.

Liquidity ratio: This ratio is a measure of liquid asset divided by total liability which is an indicator of a bank's management efficiency in managing its liquidity level against liability. However, a low or insufficient liquidity level is one of the main causes of banks' failures. On the other hand, holding a high level of liquid assets gives a negative indicator of weak liquidity management where having a high liquidity ratio causes a high opportunity cost of additional income to the bank. (Heffernan & Fu, 2008) argue that the bank's liquidity positively affects ROA. On the other hand, (Molyneux & Thornton, 1992) indicated that liquidity has a negative effect on a bank's profitability. However, researchers expect that there is a significant statistical effect of liquidity on UAE commercial banks' return on assets.

Loans-to-deposit ratio: The loans-to-deposit ratio indicates the ability of banks to manage their loan portfolios and deposits. It is therefore one of the most important measures of credit management efficiency for lending policy and control and the polarization of deposits from institutions and individuals, and it reflects the level of quality of assets. The higher the loan-to-deposit ratio, the more increase in the level of lending risk and thus reduces the quality of loans or in other words increases the rates of non-performing loans; however, the more the bank can convert deposits into high quality loans, the higher the profit margin from lending interest. Therefore, deposits have a positive effect on the banks' profitability. The researchers expect that there is a negative impact of Loans to Deposits Ratio on the UAE commercial banks' performance measured by ROA.

Model Specification

The researchers used statistical and quantitative methods to analyze the available data through the central tendency measurements including mean, median, maximum, minimum, and standard deviation. In addition, the **Multicollinearity test** was used to observe whether the explanatory variables were highly correlated or not. However, the current study followed many studies like those of (Chowdhury & Rasid, 2017; Brooks, 2014) who used the same structure and context as well by using the panel data regression model and the fixed effects model which was applied on sixteen commercial banks operating in the United Arab Emirates and listed in the UAE Stock Exchanges (Table1) with a total observation of 112 for the period of 2013-2019. Furthermore, the fixed effects model is used by researchers at the time of focusing on a specific set of N entities and the results are restricted to the behavior of these entities (Baltagi, 2020). Others are using the random effects model when the dependent variables are not correlated with the independent variables.

The current study is using the panel data regression model which is a set of data called longitudinal data consisting of time series ($t=1$ to T periods) and cross-sectional data (n cross-sectional units, denoted $i=1$ to N) and a total observation of $n*T$ was also used to calculate the statistical regression for examining the impact of credit risk factors as independent factors on the UAE commercial banks' performance measured by profitability through using ROA as a dependent factor, where the following factors are the credit risk independent factors (figure 1): Capital Adequacy Ratio, Non-performing Loans Ratio, Cost-income Ratio, Liquidity Ratio, and Loans-to-deposits Ratio. The Panel Data Regression model is defined as follow

$$P_{it} = \alpha + \beta X_{it} + \varepsilon_{it} \quad (1)$$

Where, P_{it} is the Profitability measures (ROA and ROE)

α is the intercept

β is the coefficient of independent variables

X_{it} is the independent variable of bank i at time t

ε_{it} is the error term of bank i at time t

Based on the above, the model in equation (1) can be restructured as follows:

$$ROA_{it} = \alpha_0 + \alpha_1 CAR_{it} + \alpha_2 NPL_{it} + \alpha_3 CIR_{it} + \alpha_4 LR_{it} + \alpha_5 LDR_{it} + \varepsilon_{it} \quad (2)$$

Where:

ROA_{it} : Return on Assets of bank i in year t .

CAR_{it} : Capital Adequacy Ratio of bank i in year t

NPL_{it} : Non-Performing Loans Ratio of bank i in year t

CIR_{it} : Cost-income Ratio of bank i in year t

LR_{it} : Liquidity Ratio of bank i in year t

LDR_{it} : Loans-to-deposit Ratio of bank i in year t

α_0 : The intercept

ε_{it} : Error term of bank i in year t

β_1 - β_6 : Coefficients of Independence

The expected coefficients of the independent variables (β_1 - β_6) can be tested in the statistical analysis, where the restrictions in the above equation 2 are based on the economic theory, previous studies, and the following signs: $\beta_1 > 0$ or < 0 , $\beta_2 < 0$, $\beta_3 < 0$, $\beta_4 > 0$, $\beta_5 > 0$ or < 0 .

These signs indicate that an increase in the independent variable will result in a decrease in the dependent variable ($\beta < 0$), an increase ($\beta > 0$), or no effect ($\beta > 0$ or < 0).

Table 2: The sample of the study - Commercial Banks Operating in the UAE

S.N.	National Banks	Foreign Banks
1.	Abu Dhabi Commercial Banks	Bank of Baroda
2.	Invest Bank	HSBC Bank M. E. L.
3.	Al Masraf Bank	Al Khaliji Bank
4.	Commercial Bank of Dubai	
5.	Emirates NBD	
6.	MASHRQ Bank	
7.	Bank of SHARJAH	
8.	Union Arab Bank	
9.	RAK Bank	
10.	Commercial Bank International	
11.	National Bank of Fujairah	
12.	NB of Um Al Quwain	
13.	Emirates Investment Bank	

Source: Central Bank of the United Arab Emirates, May 31, 2020

Results and discussion

Panel Unit Root Test

The current study verified the variables for stationarity with intercept by employing the panel unit root test using Levin-Lin-Chu and Choi meta tests for stationarity. These variables are: Return on Assets Ratio (ROA), Capital Adequacy Ratio (CAR), Non-performing Loans Ratio (NPLR), Cost-income Ratio (CIR), Liquidity Ratio (LR), and Loans-to-Deposits Ratio (LDR). The results of the tests are displayed in Table 3 which shows that ROA, NPLR, CIR, LR, and LDR were stationary at levels. This represents 100%. Only CAR has one of the two tests representing 75% confirming its stationarity at levels. Accordingly, the current study rejects the null hypothesis that the variables are not stationary, which means that the variables are stationary at levels.

Table 3: Panel Unit Root Test Results for the Variables

Unit Root Test for stationarity	Probability					
	ROA	CAR	NPLR	CIR	LR	LDR
Levin-Lin-Chu	0.0000	0.1882	0.0000	0.0000	0.0000	0.0000
Choi meta test	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000

Source: Computation of the statistical data from the banks' annual reports (2013-2019) using GRETL

Descriptive Statistics

The descriptive statistics of the data used in the current study for the period of 2013 to 2019 are presented in Figure 1. The average value of return on assets as stated in Figure 1 was 0.0126 and the minimum amount was up against a maximum rate of 0.0475, which means that each one AED invested as assets by the Banks gives a return of 1.26%, and that the average highest returns achieved by banks because of investing their assets during the study period amounted to approximately 4.75%, and the average of the minimum return was -10.5% within the period of the study. These results show that the average returns on assets that banks in the UAE achieved during the period of 2013-2019 were acceptable as the average inflation rate during the same period of the study was 1.47% in the UAE². This indicates that banks at the time were effective in using their assets to achieve reasonable returns.

The descriptive statistics show that the capital adequacy ratio (CAR) has a mean value of 0.182 with a minimum value of 0.0533 and a maximum value of 0.999. The mean value of CAR shows that banks in the UAE on the average followed the central bank's order concerning the minimum CAR requirements. However, the Central Bank of the UAE requested banks to maintain a minimum CAR of 11.75 per cent in 2017, 12.38 per cent in 2018 and 13 per cent in 2019³ which could be increased up to 13 per cent in 2017, 14.26 per cent in 2018, and 15.50 per cent in 2019 depending on the economic developments and soundness of the banking sector. The average capital adequacy value of 18.2% is an indication that commercial banks in the UAE are capitalizing sufficiently to meet the risk of solvency. In addition, capital adequacy is a sign that UAE banks have enough capital to cover risky assets, but the minimum value indicates that some of the banks have not been able to meet the regulatory requirement during a given year within the study period. The maximum value of CAR indicates that some banks also exaggerated the adequacy of capital, which may have a negative impact on the size of their activities and performance, and the average capital adequacy value of 0.182 means that more than 50% of

² The WDI-World Bank (<https://www.macrotrends.net/countries/ARE/uae/inflation-rate-cpi>)

³ Central Bank of the UAE annual report, 2017, P7-10

the banks used in this study exceeded the minimum capital required for banks of 8% to 13% during the duration of this study as stipulated in the Central Bank.

Similarly, the average value of the non-performing loan ratio (NPLR) was 0.0744 against the minimum value of 0.00068 and the maximum value of 0.570. This means that 7.44 per cent of loans granted by banks during the period under investigation are non-performing loans (NPL) that may become weak, bad, and difficult to recover. However, the NPL average value in the UAE is quite close to the global average of 6.1% ⁴ and is at the second lowest level in the Middle East and North Africa after Saudi Arabia ⁵ and is fair enough to show conservative performance in loan and facility management. This result will be positively influenced by the central bank's new regulation to change the presentation of non-performing loans in the bank's financial reports to catch up with the trends of the International Monetary Fund (IMF) and other international financial bodies.

The NPLR minimum is also considered good, indicating that during a given year some banks had only 0.068% of the loans granted to clients, or the maximum default debt of some banks is remarkably high and may be caused by poor credit analysis and an inadequate macroeconomic environment to expand their lending operations.

Figure 1: Descriptive Statistics of Variables for the period 2013-2019; *Source: Researchers' Calculation using GRETL*

In addition, figure 1 shows that cost-to-income ratio (CIR) has a mean of 0.388 implying that the average operating cost is about 0.388 times the value of operating income which is acceptable as far as this percentage gives room to the non-operational cost to be covered by the bank without losses at the worst-case scenario. The minimum CIR for some banks during the period of 2013-2019 was 0.0823 which is exceptionally low, and the maximum ratio during the same period for some banks was 1.17. The maximum ratio needs to be extensively analyzed under a microscope by those banks who have an exceedingly high value of operating costs compared to the operating income which indicates that the banks who affected the average CIR in the UAE banking sector in terms of their operating cost divided by operating income should take care of their operating expenses and main sources of income. However, even though the overall CIR was affected by some bank's high ratio, the UAE commercial banks' CIR is in a good shape with an operating cost of AED 0.388 compared to AED 1 as income from the main operations which indicates that banks have an efficient operations management. The descriptive results in Figure 1 reveal that the average liquidity ratio (LR) of commercial banks in the United Arab Emirates was 0.283 during the period of 2013-2019, which means that banks have liquid assets of AED 0.283 against AED 1 as liabilities. This is more than two and a half times the minimum required by the Central Bank of the UAE, which is 10% as a regulatory requirement, among the requirements imposed by the Central Bank to keep banks safe and sound. High liquidity usually leads to lower bank profitability because the rise indicates that the cash that was to be used for investment is restricted. Therefore, banks must balance the liquidity target with the profitability target. However, loan-to-deposit ratio has a mean value of 0.878 which means that banks used deposits for financing about 88% of loans granted to the customers. The minimum average of 0.0649 while the maximum average during the same period was 1.21 which also mean that some banks in the UAE financed 100% of the granted loans through deposits and still 21% were financed from other sources. However, in some cases only 6.5% of loans were financed by deposits.

Multicollinearity diagnostic

The researchers used the Variance Inflation Factor (VIF) to measure the correlation level of dependent variables to find if the research data are free from multicollinearity problems. As per Table 4, the Variance Inflation Factor is less than 10 and the tolerance level is

⁴ The Global Economy (<https://www.theglobaleconomy.com/>)

⁵ The Global Economy (<https://www.theglobaleconomy.com/>)

above 0.10 for all the dependent factors (CAR, NPLR, CIR, LR, LDR); this indicates that research data have no collinearity issues (Rajkumar & Hanitha, 2015).

Table 4: Variance Inflation Factor (VIF) - Collinearity

Variable	Variance Inflation Factor	Terence
CAR	1.183	0.845
NPLR	1.029	0.972
CIR	1.236	0.809
LR	1.316	0.760
LDR	1.408	0.710

Source: Researchers' Calculation using GRETL

Fixed-Effects and Random-Effects Models:

The current study used the Fixed-Effects Model (FEM) and the Random-Effects Model (REM) to regress the dependent variable (ROA) on the explanatory variables namely: CAR, NPLR, CIR, LR, and LDR. The results presented in Tables 4 and 5 show that the individual coefficient of the independent variables is different in both models. Accordingly, the researchers employed the correlated random effects-Hausman test to determine which of the two models is a more appropriate panel estimator to use in the current study.

Table 5: Fixed Effects Model: ROA is the dependent variable

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	0.00737141	0.0136620	0.5396	0.5908	
CAR	0.00447533	0.00903454	0.4954	0.6215	
NPLR	-0.120115	0.0238228	-5.042	<0.0001	***
CIR	-0.0369907	0.0118636	-3.118	0.0024	***
LR	0.0168111	0.0126720	1.327	0.1879	
LDR	0.0262108	0.0132352	1.980	0.0507	*

Source: Researchers' Calculation using GRETL

Table 6: Random-Effects Model: ROA is the dependent variable

	<i>Coefficient</i>	<i>Std. Error</i>	<i>z</i>	<i>p-value</i>	
const	0.0162298	0.0104085	1.559	0.1189	
CAR	0.00477703	0.00842410	0.5671	0.5707	
NPLR	-0.144825	0.0193448	-7.487	<0.0001	***
CIR	-0.0279351	0.00880379	-3.173	0.0015	***
LR	0.0168873	0.0110404	1.530	0.1261	
LDR	0.0141204	0.00861821	1.638	0.1013	

Source: Researchers' Calculation using GRETL

Correlated Random Effects - Hausman test

As a result of different coefficients of independent variables shown in Tables 4 and 5, Hausman test (Table 7) is used to determine which model is best suitable with the data sets. The current study uses the Hausman test to determine whether there is a correlation between the unique errors and the regressors or not. In case of a correlation existence, a preference is made for the Fixed Effects Model (FEM); otherwise, the Random Effects Model (REM) would be more appropriate.

Table 7: Results of the Random Effects-Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	4.41566	5	0.491247

Source: Researchers' Calculation using GRETL

Table 7 presents the hypothesis of the Correlated Random Effects-Hausman test result which indicates that the null hypotheses is accepted since the Chi-Sq. statistic is 4.41566 and the probability (p-value) is (0.491247) which is statistically insignificant. This outcome favored the selection of the random-effects model (REM). Therefore, the current study uses the coefficients of the random-effect model shown in Table 8 for further discussions.

Table 8: Summary of Regression Result using the Random-effects model

Variable	Random-effects model (REM)
CONSTANT	0.01622980 (0.1189)
CAR	0.00477703 (0.5707)
NPLR	-0.14482500 (<0.0001) ***
CIR	-0.02793510 (0.0015) ***
LR	0.01688730 (0.1261)
LDR	0.01412040 (0.1013)
Chi-square (5)	90.45
P-value	5.40488e018
S.D. dependent variable	0.017258
S.E. of regression	0.012433
Hannan-Quinn	-651.4404
Durbin-Watson	1.425523

Source: Researchers' Calculation using GRETL ;**Note:** The value in parentheses for variables are P-value, and the value against the regression coefficient.

Discussion

Capital Adequacy Ratio (CAR)

Table 8 shows that capital adequacy ratio has no statistically significant effect on the United Arab Emirates Commercial Banks' financial performance measured by ROA, where the CAR p-value is 0.5707 at 5% level of significant and the regression coefficient is 0.0048. This result means that a 1% increase in CAR causes an extremely low percentage of increase of 0.0048% in ROA but statistically is insignificant. This finding is supporting **H01** that Capital adequacy ratio has no significant effect on the UAE Commercial Banks' financial performance measured by ROA. The result is consistent with the findings of (Li & Zou, 2014) who investigated the impact of credit risk management on the commercial banks' return on assets and found that capital adequacy had no impact on profitability. The findings of the current study also in contrast with (Nyabicha, 2017) who studied the impact of credit risk management during the years 2008 - 2014 on the profitability of ten commercial banks in Kenya and concluded that capital adequacy ratio did not significantly affect banks' financial performance. However, this result is in contradicts with the findings of (Elshaday et al., 2018; Ernest & Fredrick, 2017; Juliana, 2017) who concluded in their studies about the factors that affect profitability of commercial banks that capital adequacy has strong positive impact on the Ethiopian commercial banks' return on assets. Furthermore (Musyoka, 2017; Rajkumar & Hanitha, 2015) concluded that capital adequacy have strong negative relationship with commercial banks' financial. The Capital Adequacy Ratio may not currently have significant impact on the UAE commercial banks' financial performance but if the ratio continues to increase, there is probability of either negatively or positively impact the financial performance of the commercial banks in the long run; this is depending on the asset's quality and utilizations and how much banks will be able to manage their credit risk

Non-performing Loans Ratio (NPLR)

Table 8 shows that non-performing loans ratio of the commercial banks in UAE statistically has strong negative impact on ROA at 5% level of significant with p-value of (0.0001) and regression coefficient value of (-0.14483). This indicate that a decrease in NPL causes an increase in the return on ROA and vice-versa. This indicates that an increase of 1% in non-performing loans decreases the (ROA) by 0.145% which means that the more the NPLR, the less the profitability of commercial banks in UAE. However, a strong financial policy, and an effective management performance of the UAE commercial banks must be reflected positively on their financial performance through managing their credit risk. This result is not consistent with **H02:** Non-performing loans ratio has insignificant effect on the UAE Commercial Banks' financial performance measured by ROA, but congruence with (Serwadda, 2018) who studied the effect of credit risk management on the profitability of commercial banks in Uganda and concluded that non-performing loans have significantly negative effect of banks' financial performance. In addition, (Li & Zou, 2014) evaluated the effect of credit risk management on the profitability of European commercial banks for the period 2007-2012 and found that non-performing loan ratio had significant negative relationship with banks' profitability that measured by ROA. Another study by (Juliana, 2017) studied the relationship between credit risk management and the financial performance of Chinese Banks and concluded that non-performing loans and capital adequacy ratios had significant effect on financial performance of Chinses banks. Furthermore, these results are in contradicting with the findings of (Alshatti, 2014) who measured the effect of credit risk management on the financial performance of Jordanian commercial banks and found that non-performing loans ratio significantly and positively influence the banks' profitability.

Cost-to-income Ratio (CIR)

This ratio statistically has negative impact on ROA in the UAE commercial banks at 5% level of significant during the period 2013-2019 where Table 8 reveal a P-value of (0.0015) and regression coefficient of (-0.02793510). This shows that an increase in 1% in Cost-income Ratio (CIR) is associated with a decrease of 0.145% in profitability measured by ROA and vice-versa which means that the higher the cost-to-income-ratio, the lower the profitability of the UAE Commercial Banks. This result does not support hypothesis **H03** which is the Cost-to-income ratio has no significant effect on the UAE Commercial Banks' financial performance that measured by ROA. However, the result is supported by (Elshaday et al., 2018) who investigated the determinants of Ethiopian commercial banks' financial performance during years 2007-2016 and concluded that the operational cost efficiency has significant negative effect on banks' ROA. In addition, (Rajkumar & Hanitha, 2015) found significant negative relationship between cost-to-income ratio and profitability of state commercial banks in Sri Lanka. It is therefore especially important to the UAE commercial banks to manage their direct and main activities to keep the CIR as low as possible through improving the management efficiency of the operation costs to increase their profitability.

Liquidity Ratio (LR)

Table 8 indicates that there is statistically insignificant positive impact of liquidity ratio on the return on assets of the Commercial Banks in the United Arab Emirates (UAE) at 5% level of significant where the P-value is 0.1261) and the regression coefficient is (0.0169). This result is in consistent with hypothesis **H04** that Liquidity ratio has no significant effect on the UAE Commercial Banks' financial performance measured by ROA. However, the statistical result is showing insignificant and very weak positive prelateship between liquidity and return on assets, the result indicates that 1% increase in liquidity ratio would increase the return on assets by 0.017% which is not consistent with the fact that high liquidity ratio means that banks have big value of non-working assets in their custody, which means weak assets utilization and lower profitability. This result is matching with the findings of (Malik et al., 2016; Oluwafemi et al., 2014) who concluded in his study about the determinants of profitability in commercial banks that there is no significant impact of liquidity ratio on the banks financial performance, and contradicted with (Elshaday et al. 2018), and (Rajkumar and Hanitha 2015) who found that liquidity ratio has statistically significant negatively impact on banks' financial performance. Furthermore (Ruziqa, 2013) concluded in a study of the credit and liquidity risks impact on the financial performance of conventional Indonesian banks, the findings were: liquidity risks positively affect the financial performance of banks.

Loan-to-deposit ratio (LDR)

Table 8 revealed that loans to deposits ratio has a statistically insignificant positive influence on the ROA at 5% level of significance where P-value is 0.1013 and the regression coefficient is 0.01412. This means that an increase of 1% in loan-to-deposit ratio would increase the return on assets by 0.014% which is a very weak relationship. The result is consistent with the prior expectation of **H05** where Loans-to-deposit ratio has no significant effect on the UAE Commercial Banks' financial performance that is measured by ROA. This result is supported by the finding of (Al Zaidanin, 2020) who investigated Jordanian commercial banks' financial performance using CAMEL approach and concluded that loans to customers deposits ratio have no significant relationships at 5% level of significant with the profitability. In the other hand, the findings of a different two studies on the effect of banks' credit risk on the performance of five banks in Nigeria by (Marshal & Onyekachi, 2014; Kolapo et al., 2012) concluded that the ratio of loans and advances to total deposits positively affect the financial performance of the banks in Nigeria which does not match with the findings of this study. In addition, another study by (Ogboi & Unuafae, 2013) on the impact of credit risk management on the Nigerian commercial banks' financial performance concluded that total loans and advances to total deposits have statistically significant negative effect on the financial performance of banks measured by ROA.

Conclusions

The current study investigated the impact of credit risk management on the financial performance of sixteen commercial banks operating in the United Arab Emirates (UAE) for the period of 2013-2019 by applying the Random Effects Model (REM). The Capital Adequacy Ratio, Non-Performing Loans Ratio, Cost-Income Ratio, Liquidity Ratio, and Loans-to-deposits Ratio are used in the current study as financial credit risk measures and Return on Assets is used as a financial performance indicator. It is found that non-performing loan ratio and cost-to-income ratio have strong negative relationships with the return on assets of the UAE commercial banks, whereas capital adequacy ratio, liquidity ratio, and loans-to-deposits ratio do not have significant relationships with the return on assets of the UAE commercial banks, although the statistical test shows a positive but insignificant impact of these factors on ROA. The main conclusion of the current study revealed that the non-performing loans and operating costs are the main influencers on the UAE commercial banks' financial performance. However, non-performing loans are the most significant determinant of the ROA in UAE commercial banks with the highest coefficient compared to the other financial credit risk measures. Accordingly, banks who can improve their lending policy and apply credit scoring on all loans and facilities applications would improve their financial performance and vise-versa. Furthermore, operating cost is also a major driver of the banks' financial performance where banks who can manage the cost of their operating activities can improve their financial performance. It was also concluded that capital adequacy, availability of liquid assets, and the use of deposits for lending and advances must be taken care of by banks regulators, policy makers, and lending authorities to enhance the effect of these measures on the banking financial performance as all these variables have a positive effect on financial performance but one that is insignificant.

As per the current study's findings and conclusions, the researchers recommend that banks should monitor and conduct deep analyses of all loans and advances applications including the credit history before credit approvals are granted to applicants to reduce the non-performing loans to as low as possible in the future by focusing more and more on the ability of borrowers to pay back their loans. It is crucial to make this practice as a culture by banks to achieve higher profitability and enhance its risk management performance. In addition, banks must continuously review their level of resource utilization and manage them effectively and efficiently to reduce the operating costs. It is also recommended that banks must study the levels of their capital adequacy, liquidity, and the use of deposits for lending activities to find out in which levels these factors could be positive determinants of banks' financial performance as it was found that they have a weak positive impact on banks' profitability. Furthermore, the researchers recommend that future studies should consider more explanatory variables and a longer period of study such as twenty or thirty years to have more accuracy in the determination level of commercial banks' profitability and to make their results more generalized as the current study analyzed five independent factors for 7 years due to unavailability of data for a long period and for the time factor.

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