Assessing the Impact of COVID-19 on the Saudi Bank's Performance: A Panel Analysis

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Abstract

The primary objective of this study is to assess the performance of Saudi banks over a specified period, which is from 2015 to 2021. The chosen methodology for this analysis is panel data regression. Panel data combines cross-sectional and time-series data, making it suitable for examining trends and relationships over time among different entities (in this case, banks). The study uses annual financial data for the 10 selected banks over the seven-year period, from 2015 to 2021.

The study finds a marginally negative association between COVID-19 and the performance indicators ROA and ROE. This suggests that the COVID-19 pandemic had a slightly adverse impact on the profitability and equity returns of the Saudi banks included in the analysis. The study employs a dummy variable, likely called "COVID," to account for the impact of the COVID-19 pandemic. The results indicate that there is a statistically significant but weakly negative association between return on equity (ROE) and credit risk (CR). The study finds that credit risk and liquidity risk are both insignificant when analyzing return on assets (ROA). These findings provide valuable insights into how external factors like a pandemic and internal

factors like credit risk can affect the financial performance of banks. The study's results offer regulatory authorities in Saudi Arabia a valuable resource for making informed decisions regarding the financial performance and stability of the banking sector during a crisis. By incorporating these findings into their policies and oversight activities, regulatory bodies can contribute to a healthier and more robust banking system that benefits both the financial institutions and the broader economy.

Keywords: COVID-19, Credit Risk, Liquidity Risk, Financial Performance, Panel Data.

1. Introduction

The new coronavirus disease (COVID-19) outbreak occurred at the end of 2019 and in the first few months of 2020. As a result, the pandemic has caused significant losses for stock markets all across the world (Alawi et al.2022). Since the Covid-19 epidemic first emerged, numerous measures, including social isolation and lockdown, have been implemented to stop its spread. These efforts have an impact on all sectors, but especially those that depend on social interactions. (Radwan et al. 2022).

Overall, the COVID-19 pandemic's unexpected emergence and the protective measures implemented to stop it from spreading have had an effect on the world economy, not just Saudi Arabia. The Saudi government assessed the problem right away and took serious preventative measures to safeguard its population after the first case of COVID-19. Test results showed that the number of defaulters rose during the pandemic. In 2020, almost 45% of credit was observed to be in default (Bouaguel.W 2022).

The enormity of the epidemiological impact on the banking sector was observed following the release of Saudi Arabia's financial figures for the first quarter of 2020. While overall loans had a growth rate of 4.9% despite larger financial losses, the banking industry saw an average increase of 93.3% in predicted credit losses, which

led to government grants of SAR 1.12 billion as a result of the Saudi Arabian Monetary Agency's assistance actions IFM (2022).

Banks and economic growth are closely linked due to the financial services they offer. Therefore, stability and economic progress depend on the banking industry being profitable and having adequate capital (Ramzan and Gulden 2019). The banking system is one of the most crucial pillars of any economic and social development as it is the primary and fundamental terminal for collecting savings from individuals, institutions, and businesses and directing them towards allowing loans and credit facilities of various kinds. The success of any economy depends greatly on the effectiveness and efficiency of its banking and financial system (Gatev, Scheuermann, 2009).

Since the efficiency of the bank and the extent to which it achieves the goal depend on its financial success, sound and effective risk management enhances financial performance, which is particularly important today. In addition, it examines its assets and highlights the benefits and drawbacks of financial performance over a specific period of time (Ishaqet al, 2021).

Banks in general, and commercial banks in particular, are essential for the economy because they provide liquidity and inject the necessary funds to turn the wheel of economic activity. This is because studying financial risks has recently emerged as one of the most crucial issues at the local and global levels. Policy makers and regulatory agencies have given liquidity management a lot of attention as an important focus in banking activities. The risks associated with liquidity management and those associated with the overall financial performance of banks have also received attention. A liquidity problem occurs when a bank does not have enough cash on hand when depositors are prepared to withdraw their money, and banks discover discrepancies between the sides of assets and liabilities. Supplying money to all banks (Isaac et al, 2021).

There are many risks that the banking industry must deal with, such as credit risk (where borrowers fail to repay their loans as they mature), liquidity risk (where depositors may suddenly withdraw their money), interest rate risk (volatile interest rates), and operational risk (where the bank's systems fail). However, among these risks, credit and liquidity risks stand out as being the most significant because they can directly contribute to the instability and failure of banks Ghenimi et al (2017).

The 57th annual report of the SAMA in 2020 discussed the unusual circumstances that the entire world experienced in 2020 as well as the difficulties that the world is currently facing. The world economy was impacted by the COVID-19 epidemic. As a component of the world economy, Saudi Arabia's economy declined by 4.1 percent in 2020. The main cause of this was Saudi Arabia's decreased oil production, which caused the oil industry to drop by 6.7 percent. Due to the execution of preventative measures intended to stop the spread of the Corona virus, the non-oil sector also had a contraction of 2.3 percent, and this had a variable influence on most of the major economic activities. However, due to the coordination of efforts amongst multiple government agencies in combating the pandemic, the Saudi economy displayed extraordinary resilience in confronting these effects.

Due to the significance of credit risk and liquidity risk in ensuring the stability and security of the bank, this study set out to investigate and highlight the difficulties surrounding financial risks in terms of their forms, definitions, and methods of measurement. Additionally, we attempted to estimate the effect of COVID-19 on the financial performance of Saudi banks.

The structure of this article is as follows. Works relating to financial risk, crises, and their effects on financial stability are discussed in Section 2. The empirical framework and data collection strategy are presented in Section 3. The empirical results are presented in Section 4. The Summary of Results is presented in Section 5. Finally, Section 6 concludes the findings of the study.

2. Literature Review

(Ghouse et al, 2023) looked at how the KSE Meezan Index (KMI 30) performed after five waves of daily, freshly confirmed Covid-19 cases. From February 2020 to June 2022, the KMI 30 stock prices and confirmed registered cases of Covid-19 are calculated using daily data. Covid-19 waves are used to divide the data into five segments. The influence of Covid-19 on each wave is captured by the asymmetric GJR-GARCH, and the spillover effects of Covid-19 on KMI are observed using the E-GARCH. The spillover modeling demonstrates that Covid-19 has an adverse asymmetric impact during each wave, although the impact lessens with each succeeding wave. The final spillover model, which is based on all available data, demonstrates that Covid-19 has a significant negative impact on KMI 30's performance over the course of the provided period. The conditional variance forecast value for the following 60 days shows a progressive decrease in the conditional variance of KMI 30 caused by Covid-19.

The goal of the study by Rizwan et al (2022) is to analyze how systemic risks have changed in dual banking systems and to identify whether conventional and Islamic banks' systemic risk profiles have changed as a result of the COVID-19 pandemic. The sample spans the period from November 2015 to November 2020 and consists of ten nations, where the Islamic banking industry plays an important role. Several variables included in this empirical analysis were generated from sample bank market prices. As a potential set of determinants, they used bank-specific and macroeconomic variables along with abnormal returns of a bank (Jensen's alpha), market-specific risk exposures (systematic risk), and bank-specific risk exposures (idiosyncratic risk) estimated from a standard capital asset pricing model (CAPM), extended CAPM (Fama and French, 1993). For the inter-temporal (before and during the COVID-19 pandemic) and banking model (traditional or Islamic) differential analysis, they used intercept and slope dummies in the regression analysis. The empirical findings point to a large rise in systemic risk during the first half of 2020

in the sample nations, which was followed by the restoration of coverage during the second half. Additionally, Islamic banks were impacted significantly less than traditional banks.

By comparing the stock performance of 426 banks from 48 different countries between December 31, 2019, and March 31, 2020, Mirzaei et al (2022) assess how Islamic banks fared against their conventional counterparts during the COVID-19 crisis' initial stage. They estimate three different iterations of the efficiency using the two primary DEA model types (CRS and VRS). After adjusting for a wide range of bank- and country-level variables, they discover that IBs are better able to safeguard their profitability during periods of crisis than CBs and that stock returns of Islamic banks were approximately 10–13% greater compared to those of conventional banks. As a result, the observed greater stock returns for IBs can be attributed to their efficiency levels prior to the crisis.

The study of (Siddique et al 2022) to identify the impact of credit risk management and the determinants of the bank on the financial performance of commercial banks in South Asia. The credit risk measures used in this study were non-performing loans and ROA was taken as a measure of return on assets and ROE as a measure of return on equity. Secondary data was collected from 19 commercial banks (10 commercial banks for 10 years from 2009 to 2018). The research used the GMM method, where the results indicated that non-performing loans and liquidity negatively correlate with the financial performance of Asian commercial banks.

The goal of this study is to determine how credit risk management and bank determinants affect the financial performance of commercial banks in South Asia (Siddique et al 2022). Non-performing loans, return on assets, return on equity, and return on assets were the credit risk indicators employed in this study. Commercial banks provided secondary data (10 commercial banks for 10 years, 2009 to 2018). Non-performing loans and liquidity are negatively correlated with the financial

performance of Asian commercial banks, according to research using the GMM approach.

In order to demonstrate the severity of the influence of the global financial crisis on the 2008 financial performance of Islamic banks, Alim et al (2021) examined the profitability of Islamic banks in the GCC region during that time. The sample of the study is 30 banks for the period 2005-2011. The study discovered that there was a structural change both before and after the global financial crisis. According to the study, which was based on the reliable POOLED model, Islamic banks in the GCC were indirectly impacted by the crisis despite their strong resistance in fending off its direct effects. The findings also indicated that bank liquidity has no impact on bank profitability, which is in line with Ben Naceur and Kandil's (2008) findings. This is because GCC banks' cash reserves are not a concern because there was no shortage of liquidity in assets throughout the study period. The findings also revealed a negatively skewed link between bank profitability and credit risk that was statistically significant.

In order to test the study's primary hypothesis, which states that there is a correlation between liquidity risk and financial performance of the sample of conventional banks included in the study, the authors (Ishaq et al, 2021) used the data panel method (aggregation, fixed effects, and random effects). Two dependent variables representing the financial performance of banks were identified, namely the return on equity and the equity to total assets. The study was conducted on a sample of conventional banks operating in the Saudi financial markets during the period from 2002 to 2019, where the data was obtained through the annual reports of the banks under study. The study came to the crucial conclusion that the financial performance of the surveyed institutions is significantly negatively impacted by liquidity risk.

(Huong et al, 2021) investigated how liquidity risk affected the financial performance of banks in South Asian nations. Using the Generalized Moment Method (SGMM),
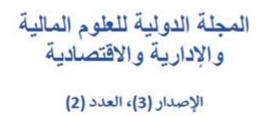
the study examined data collected from 171 banks located in 9 different countries between 2004 and 2016. The findings demonstrated that liquidity risk affects banks' financial performance positively because most banks with strong financial results typically have significant levels of liquidity risk. Liquidity risk has an adverse effect on financial performance during periods of financial crisis. This implies that banks will try to boost liquidity and improve profitability during the crisis, which will raise financial expenses and decrease bank efficiency.

An analytical analysis on Bahrain's commercial and investment banking is presented in the study of (Oudat and BJA 2021). The primary goal of this research was to determine how risk management affects banks' financial performance. The descriptive analytical methodology and multiple linear regression analysis are the methods employed in this study to assess the viability of the research hypotheses. Data for the study was obtained from the annual reports of the 10 commercial banks that were listed on the Bahraini market between 2015 and 2019. Capital risk, liquidity risk, and exchange rate risk were defined as the independent factors of financial risk, while the return on equity variable was established as the dependent variable to reflect financial performance. A number of significant findings were identified by the study, including the existence of a statistically significant relationship between capital, risk, exchange rate risk, and financial performance as measured by return on equity. The study also discovered a statistically significant relationship between liquidity risk and return on equity.

Ramzan and Gulden (2019) studied the analysis of how credit risk affects bank performance. They collected secondary information from 26 commercial banks in Turkey between 2005 and 2017. To compare banks based on ownership structures, three secondary data were adopted: state-owned banks, privately owned banks, and international banks. Two distinct profitability indicators were examined using a linear regression model. Non-performing loans were utilized as indications of credit risk, whereas return on equity and return on assets were used to measure financial

performance. The findings demonstrated that there is a negative correlation between credit risk and both return on equity and return on assets.

The purpose of the study of Rudhani and Balaj (2019) aimed to examine the effects of liquidity risk on the six-year performance of Kosovo's banks. The analysis was based on a linear regression of 9 Kosovo-based banks that were active between 2010 and 2015. Indicators of liquidity risk include the bank's capacity to absorb liquidity shocks, manage a spike in short-term demand for liquidity, and manage liquidity risk in the presence of illiquid assets. Financial performance is determined by return on equity and return on assets. The findings showed that the financial performance of banks and their capacity to absorb liquidity shocks are positively correlated. The higher the banks' capacity to withstand shocks to liquidity, the better their financial performance. Additionally, there is a statistically significant positive correlation between the bank's financial success and its ability to manage risks in the presence of illiquid assets and short-term liquidity problems. This shows that banks perform better financially, the more they are able to tolerate liquidity problems.

3. Methodology and Data

3.1. Empirical Methodology

Panel data regression analysis is a statistical technique used to estimate relationships between variables in a panel dataset. In this context, the researchers are likely trying to identify factors that influence the performance of these Saudi banks over time. The regression analysis might involve dependent variables (e.g., bank performance metrics) and independent variables (e.g., economic indicators) to model these relationships. The researchers are considering both fixed effects and random effects models in their analysis.. Before choosing and analysing the study hypotheses using multiple regression analysis, we will first perform a descriptive analysis and a correlation analysis between the variables.

Using the fixed effect or random estimating technique (based on the Hausman test), the panel data is utilized to investigate the relationship between the Covid-19 and the performance of the banks.

3.1.1. Regression Model

Our models are as follows:

$$ROA_{it} = b_0 + b_1\, CR_{it} + b_2\, LR_{it} + b_3\, COVID_{it} + b_4\, SZ_{it} + b_5\, GDP_{it} + \varepsilon_{it}$$

$$ROE_{it} = b_0 + b_1\, CR_{it} + b_2\, LR_{it} + b_3\, COVID_{it} + b_4\, SZ_{it} + b_5\, GDP_{it} + \varepsilon_{it}$$

Where the first dependent variable, ROA_{it} represents the return on assets; The second dependent variable, called ROE_{it}, displays the return on equity; The independent variable for credit risk is CR_{it}; LR_{it} stands for independent variable liquidity risk; SZ_{it} stands for bank size; GDP_{it} represents the GDP growth rate; The independent variable is the Coronavirus (Covid-19); the estimated coefficients of the independent and control variables are ($b_1 ... b_5$); b_0 is the model's intercept; and ε_{it} it denotes the error terms for those variables.

3.2 Data Description

The total number of views in this study is 70 because it is based on secondary data from 10 commercial banks that were listed on the Saudi market in the Kingdom of Saudi Arabia between 2015 and 2021.

Table (1) shows the study's variables and how they were measured. To get the data, we used the World Bank, and public annual reports.

Table (1): variables definition and sources

Variable Code	Variable Name	Description of the variable	Source
ROA	Return on assets	Net Profit / Total Assets	annual reports
ROE	Return on Equity	Net Profit / Total Shareholders' Equity	annual reports
CR	Credit Risk	Non-performing Loans/Total Loans	annual reports
LR	Liquidity Risk	Cash and cash equivalents / total assets	annual reports
COVID	COVID-19	A dummy variable that takes the value 1 for Covid-19 period, and 0 otherwise	Own calculation
SZ	Bank size	Natural logarithm of a bank total assets	annual reports
GDP	GDP growth rate	GDPGR% = (GDPn-GDPn−1/GDP n−1) Yearly percentage change in the gross domestic Product	World Bank— WDI

Notes: Period 2015-2021, 70 annualy observations.

3.2.1. Dependent Variables

The financial performance of banks was evaluated using return on assets and return on equity based on (Siddique et al 2022), (Alim et al 2021) and (Qamruzzaman 2014).

3.2.1.1. Return on Assets ROA_{it}

The return on assets provides insight into how well management is utilizing its resources to produce profit (Qamruzzaman 2014). We calculated return on assets by dividing net profit by total assets, which is similar to (Siddique et al 2022), (Dunyoh et al 2022), (Huong et al 2021), (Rudhani and Balaj 2019), (Qamruzzaman 2014).

3.2.1.2. Return on Equity ROE_{it}

Return on equity, a measure of a company's profitability that reveals how much profit a company makes by investing the funds of shareholders, (Alim et al 2021). To calculate it, we divided net profit by total shareholders' equity as follows (Siddique

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et al 2022), (Dunyoh et al 2022), (Huong et al 2021), (Rudhani and Balaj 2019), (Qamruzzaman 2014).

3.2.2. Independent Variables

3.2.2.1. Credit Risk CR_{it}

We determined credit risk by dividing non-performing loans by the total amount of loans, in proportion to (Siddique et al 2022), (Dunyoh et al 2022), (Huong et al 2021), (Mardiana et al 2018).

3.2.2.2. Liquidity Risk LR_{it}

A bank's liquidity is its capacity to finance asset growth and meet deadlines without suffering losses. (Amara and Najar 2021). We calculated liquidity risk by dividing cash and cash equivalents by total assets according to Huong et al (2021), Amara and Najar (2021), Rudhani and Balaj (2019), Alim. W et al (2021).

3.2.2.3. Covid-19 ($COVID_{it}$)

A dummy variable that takes the value 1 for the Covid-19 period, and 0 otherwise.

3.2.2.4. Bank Size SZ_{it}

Total assets' natural logarithm was employed relative to Chen and Shen (2018), Amara and Najar (2021), Siddique.A et al (2022), Alim. W et al (2021), Dunyoh. M et al (2022).

3.2.2.5. GDP Growth Rate GDP_{it}

We measured DGP by yearly percentage change in the gross domestic product relative to Yuan et al. (2022).

3.3 Descriptive Analysis

We conducted a descriptive analysis before conducting a statistical analysis. According to the mean, median, standard deviation, and highest and lowest values of

the variable over the three time periods of the entire period (2015-2021), the period prior to the Covid pandemic (2015-2019), and the pandemic period (2020-2021), Table (2) displays descriptive statistics of profitability indicators of the overall performance and of independent variables of the banking sector of Saudi Arabia. In order to evaluate banks' risk and financial performance, we added the most recent two periods.

Table (2): Descriptive statistics
Source: Authors' calculation

	N	Mean	Median	Min	Max	Standard deviation
During the period 2015-2021						
ROA	70	0.01518	0.0153761	-0.0150753	0.026582	0.0065185
ROE	70	0.1045997	0.1064561	-0.0821011	0.219082	0.0484659
CR	70	0.00741	0.0068894	0.0012675	0.0292014	0.0046344
LR	70	0.13082	0.120548	0.057157	0.2535079	0.0523956
COVID	70	0.28571	0	0	1	0.4550158
SZ	70	8.2310	8.240737	7.709443	8.961017	0.289382
GDP	70	1	1.7	-4.1	4.1	2.598216
During the period 2015-2019						
ROA	50	0.0161062	0.0155328	0.0059946	0.026582	0.0047458
ROE	50	0.1131718	0.1111797	0.0170958	0.1984411	0.0374619
CR	50	0.0065168	0.0064516	0.0012675	0.0216106	0.003585
LR	50	0.1411851	0.1323467	0.0706681	0.2535079	0.0508339
During the period 2020-2021						
ROA	20	0.0128901	0.0142663	-0.0150753	0.0264485	0.0094047
ROE	20	0.0831693	0.075473	-0.0821011	0.2190828	0.0650716
CR	20	0.0096528	0.0081476	0.002708	0.0292014	0.0061203
LR	20	0.1049218	0.0841251	0.057157	0.2455535	0.048133

Descriptive statistics 2015-2021

The bank's return on assets averages 1.51%, and its return on equity averages 10.45%. On the other hand, credit risk (CR) has a mean and median value of 0.007 and 0.006 as external factors. Liquidity risk (LR) has a mean and median value of

0.13 and 0.12, a COVID mean value of 0.28, and The mean and median values of the bank size (SZ) are 8.23 and 8.24, respectively, and the mean and median values of the GDP growth rate are 1 and 1.7, respectively.

According to Table 2, the return on assets (ROA) for the dependent variable had a mean value of 0.0151, a median value of 0.0153, and a standard deviation of (0.006). The highest return on assets value was equal to (0.026) in 2018 and the lowest value was equal to (-0.015) in 2021.

The return on equity (ROE) dependent variable had a mean value of 0.104, a median value of 0.106, and a standard deviation of (0.048), with the maximum return on equity equal to (0.219) in 2021 and the lowest value equal to (-0.082) in 2020.
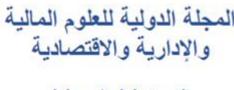
The credit risk (CR) attained a mean value of (0.007), a median value of (0.006), and a standard deviation of (0.004) as external factors, although the credit risk's maximum value was equal to (0.029) and its lowest value was equal to (0.001). The liquidity risk (LR) reached a mean value of (0.13), a median value of (0.12), and a standard deviation of (0.052), with the maximum liquidity risk value being equal to (0.253) in 2015 and the lowest value being equal to (0.057) in 2021.The mean value of the covid-19 (COVID) was (0.285), while the standard deviation was (0.455).

Finally, the controlling variables; the size of the bank (SZ), had a mean value of (8.23), a median value of (8.24), and a standard deviation of (0.289), with the maximum value of the bank's size being equal to (8.96) in 2021 and the lowest value being equal to (7.70) in 2015. Additionally, the median and mean of GDP growth rates are (1) and (1.7), respectively. The GDP's highest and lowest values are (4.1) and (-4.1), respectively, and the standard deviation is 2.59.

Descriptive statistics during the "pre-pandemic" and "pandemic periods

Table 2 indicates in obvious that, prior to the pandemic, the return on assets of Al Rajhi Bank reached a mean value of (0.016) in 2017 and the maximum equal to

(0.026). The return on assets during the pandemic had a mean value of (0.012) in 2021 and a highest value of (0.026) in 2020. As a result, we observe that the return on assets (ROA) was slightly lower than it had been before to the pandemic.

The return on equity during the pre-pandemic period reached a mean value of 0.113 and an equal peak value of 0.198. It reached a mean value of (0.083) during the epidemic and a maximum of (0.219) in 2021. Thus, we noticed a drop in the average during the period of the pandemic, but the highest number was in 2021, which can be explained by the fact that this year marked the beginning of the breakthrough of the Covid-19 crisis.

The mean credit risk during the pre-pandemic period was 0.006, and the greatest credit risk value was equal to (0.021) in 2019 at SABB, however during the pandemic period, the highest credit risk value was (0.029) in 2020, and the mean credit risk value was 0.009. So, during the Covid-19 period, we observe an increase in credit risk.
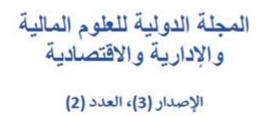
Before the pandemic, the liquidity risk had a mean value of 0.141 and a maximum value of (0.253) at Bank Albilad in 2015. It had a mean value of 0.104 during the pandemic and reached its greatest equivalent value of 0.24 at the Bank Saudi Fransi in 2021. We saw a drop in the liquidity risk ratio during the epidemic. This suggests that during the Covid-19 crisis, liquid assets have declined.

4. Results

4.1. The Jarque-Bera Test

To check whether the variables in a linear regression have a normal distribution, apply the Jarque-Bera test.

We assume:

H0 variables follow a normal distribution.

H1 variants do not follow a normal distribution.

With the exception of the variable of bank size, we determined that the typical Jarque-Bera test's level of significance for Saudi banks was less than 5%. For the normal distribution, we therefore reject the null hypothesis H0, with the exception of the banks' SIZE. This indicates that the majority of variables lack a normal distribution.

4.2. The Shapiro-Wilk Test

It is a statistical test in which the null hypothesis is that the studied sample belongs to a population distributed normally according to the studied variable.

This test's null hypothesis H0 assumes that variable x has a normal distribution. For the majority of the variables for Saudi banks in our analysis, the level of significance of W has a value of p 0.05. With the exception of the banks' SIZE and ROE, the null hypothesis for a normal distribution of our variables is rejected.

4.3. The Shapiro Francia Test

This test's null hypothesis H0 assumes that variable x has a normal distribution.

The significance level of W' for the variables in our study has a p-value less than 0.05. As a result, the null hypothesis regarding the variables' normal distribution was rejected, with the exception of the bank's size.

Table (4): Normal distribution tests
Source: Authors' calculation.

	JB		Shapiro-Wilk (w)	Shapiro-Francia(w')
	Skewness	Kurtosis		
ROE	0.0242 (0.0067)	0.0092	0.96630 (0.05630)	0.95783 (0.02086)
ROA	0.0000 (0.0000)	0.0001	0.90565 (0.00007)	0.89531 (0.00007)
CR	0.0000 (0.0000)	0.0000	0.79590 (0.0000)	0.78618 (0.00001)
LR	0.0111 (0.0435)	0.6010	0.92342 (0.00037)	0.93021 (0.00131)
COVID	0.0019 (0.0002)	0.0003	0.96395 (0.04150)	1.00000 (1.00000)
SZ	0.2547 (0.2021)	0.1828	0.97166 (0.11315)	0.97574 (0.16635)
GDP	0.0083 (0.0357)	0.5968	0.93358 (0.00110)	0.93412 (0.00188)

4.4. The Breusch–Pagan Test

Additionally, the Breusch-Pagan test or LM test is used to evaluate the heteroscedasticity test.

The findings imply that there is no heteroskedasticity in the ROA case (p-value= 0.2268> 5%). Results show that there is heteroskedasticity in the case of ROE (p-value = 0.0000 5%), which can be fixed by employing robust standard errors.

4.5. The Multicollinearity Test

All predictor variables have a variance inflation factor (VIF) of 1.28, which is less than 5. Thus, there are low correlations between independent variables. (Table 5).

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Table (5): Multicollinearity test
Source: Authors' calculation

Test Vif		
Variable	**Vif**	**1/Vif**
CR	1.45	0.687723
LR	1.42	0.702195
COVID	1.33	0.754021
SZ	1.13	0.881816
GDP	1.05	0.951566
Mean Vif	1.28	

4.6. Correlation Analysis

The Pearson's correlation coefficients between the independent variables and the dependent variables employed in this study, such as ROA and ROE, are shown in Table 3. Below the diagonal is a representation of the Pearson's correlation coefficients.

According to Table 6, there is a positive correlation between return on equity and bank size. COVID-19 and credit risk have a negative relationship with ROE. As can be seen in the matrix, SZ are positively correlated with ROA. Finally, Covid is inversely correlated with both credit risk and liquidity risk. The association between GDP, Credit Risk, and Covid is negative.

Table (6): the Pearson's correlation coefficients

	ROE	**ROA**	**CR**	**LR**	**COVID**	**SZ**	**GDP**
ROE	1.0000						
ROA	0.4150*	1.0000					
CR	-0.4211*	-0.0400	1.0000				
LR	0.1224	0.1904	-0.2057	1.0000			
COVID	-0.2817*	-0.2245	0.3079*	-0.3149*	1.0000		
SZ	0.3031*	0.3447*	0.0460	-0.0068	0.2106	1.0000	
GDP	0.2349	-0.1232	-0.5175*	0.1191	-0.3555*	-0.0709	1.0000

**Significativité à 5%.

4.7. Empirical Analysis

To determine how financial risks affect a sample of commercial banks operating in Saudi Arabia, we estimate our base model using the fixed and random effects (RE) approach and the statistical analysis program. Our analysis starts by examining Saudi Bank's annual bank performance from 2015 to 2021.

Table (7): Estimating the effect of COVID-19 on bank performance

The effect of variables	Panel A : Random – Effect Regression for ROA Model		Panel B : Fixed – Effect Regression for ROE Model (Robustness of the obtained estimates[1])	
	coefficient	P-value	coefficient	P-value
CR	-0.0958712	(0.575)	-4.213022	(0.001)**
LR	0.0090755	(0.542)	-0.3307709	(0.053) *
COVID	-0.0050426	(0.003)**	-0.0192878	(0.097) *
SZ	0.0082076	(0.012)**	-0.0790592	(0.356)
GDP	-0.0006685	(0.029) **	-0.0005368	(0.771)
Constant	-0.0507377	(0.059)*	0.8358947	(0.249)
Rho	0.5120078		0.74640581	
F–statistic	16.65		19.73	
Prob (F-statistic)	(0.0052) **		(0.0001) ***	

Note: ***, **, and * refer to significance at thresholds of 1%, 5%, and 10%, respectively.

4.7.1. Return on Assets (ROA)

The findings of the random effect regression for ROA are summarized in this section. At a significance level of 0.7227, which is higher than the 5% level of significance, the Hausman test is significant. Therefore, it is believed that the random model is adequate for the ROA model in this study.

According to the R value of 0.5120, 51.20 percent of the variation in the ROA can be attributed to independent factors (credit risk, liquidity risk, and COVID-19) and control variables (bank size and GDP). When using F-statistics and the 5% level of

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[1] the fixed effect with robust.

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significance for ROA, the coefficient values of all independent variables are all statistically significant.

The findings show that an increase in bank size by one unit will result in an increase in return on assets of 0.0082. The p-value in the case of Bank size is equal to 0.012. This suggests that the return on assets of Saudi banks is statistically influenced by the size of the bank. This result is in line with Ramzan and Gulden's (2019) findings. They discovered a substantial and positive correlation between bank size (SIZE) and return on assets. (Table 8).
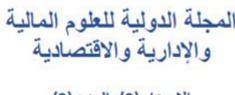
At the 5% level of significance, a regression coefficient of -0.0006 shows a negative and statistically significant association between GDP and return on assets (ROA). This suggests that a unit increase in GDP will cause a 0.0006 percent decrease in return on assets. This result is in line with the findings of Chew, H. Y. (2019). They discovered that the GDP and ROA have a weakly negative association. (Table 8)

According to the credit risk regression coefficient of -0.0958, the return on assets will decline by 0.0958 for every unit rise in credit risk. The credit risk has a p-value of 0.575. This result is more than the significance level of 0.05, indicating that the impact of credit risk on return on assets is negligible. The results of this study support the findings of (Harb et al. 2022), which showed that credit risk proxies had a negligible impact on ROA. (Table 7).

Liquidity risk and return on assets have a 0.009 correlation. Accordingly, for every unit rise in liquidity risk, the return on assets will increase by 0.009. Liquidity risk has a p-value of 0.542, which indicates that at a significance level of 0.05, it is insignificant in terms of determining return on assets. This finding agrees with those of (Bhatt and Verghese 2018). They discovered that the correlation between the liquidity ratio and return on assets is negligibly positive. (Table 8).

For the correlation between Covid-19 and return on total assets, the regression coefficient is -0.005. The covid-19 p-value is less than 0.05, which shows that covid-

19 has a significant negative influence on the return on assets of Saudi banks. Our findings agree with (Karim and Afrin, 2023). Additionally, this result supports the conclusions of (Demirhan and Sakin, 2021). (Table 8).

4.7.2. Return on Equity (ROE)

Table 7 below provides a summary of the fixed-effect regression model for return on equity (ROE). As a result, the fixed-effect model for the null hypothesis has been accepted because the Hausman test shows that it is significant at 0.0273, which is less than the 5 percent. Therefore, it is believed that the fixed model is suitable for the ROE model in this study. Credit risk, liquidity risk, covid-19, and control variables such as bank size, and GDP together account for 74.64 percent of the variation in return on equity, according to the R value of 0.7464. At a 1% level of significance for ROE, all independent variable coefficient values are statistically significant in F-statistics.

At the 5% level of significance, a regression coefficient of -4.213 reveals a negative and statistically significant correlation between credit risk and return on equity (ROE). This shows that a 4.213 percent loss in return on equity will occur for every unit increase in credit risk. This result is in line with that of Ramzan and Gulden (2019), who discovered a detrimental and statistically significant correlation between credit risk (NPL/TL) and ROE. (Table 7).

According to the results, at the 10% level of statistical significance, liquid assets over total assets (LR) have a negative (-0.33) and statistically significant influence on returns on equity. Accordingly, the ROE will increase by 0.33 for every unit increase in the liquidity risk. The results of this analysis corroborate those of Qurban et al. (2021), who discovered that the ROE will decline by 7.465 for every unit rise in the liquidity ratio (LIQASST). (Table 7).

With a regression coefficient of -0.0192, it can be seen that there is a significant negative relationship between covid-19 and return on equity (ROE) at the 10% level

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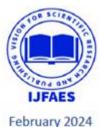المجلة الدولية للعلوم المالية والإدارية والاقتصادية

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of significance. This suggests that covid-19 has a negative impact on return on equity. This result agrees with (Karim and Afrin, 2023). They discovered that COVID-19 significantly reduces profitability. This also supports the finding of Demirhan and Sakin (2021), who found that the COVID variable has detrimental effects on ROE and ROA in a sample of manufacturing enterprises. (Table 8).

The coefficient of -0.079 shows that the size of the bank has a negative and statistically negligible influence at the 5% level of significance. This shows that a bank's profitability (ROE) is not much impacted by its size. The results of this investigation corroborate those of Dunyoh et al. (2022). They discover that, at the 5% level of significance, the size of the bank has a favorable and statistically insignificant effect. (Table 7).

The return on assets will decrease by -0.0005 percent for every unit of GDP growth. When taken into account at the 5% level of significance, the GDP has a minor effect on the return on equity of Saudi banks, as shown by the p-value of 0.771. This result supports with the findings of Dunyoh et al (2022). According to their analysis, the GDP impact is negligible at 0.05, the level of significance. Further, (Ramzan and Gulden 2019) discovered that the impact of GDP growth rate on ROE is statistically insignificant. (Table 7).

5. Summary of Findings

In practical terms, this finding implies that the pandemic Covid-19 did affect Both return on equity (ROE) and return on assets (ROA). A modest negative correlation beetween ROA and COVID-19 indicates that, on average, the banks' ability to generate profits from their assets slightly declined during the pandemic. A modest negative correlation beetween ROE and COVID-19 due to various factors, such as decreased economic activity, increased loan defaults, or changes in interest rates, all of which could have been influenced by the pandemic.

It is discovered that credit risk and the proportion of liquid assets to total assets increase, the ROE of the banks tends to decrease. However, The finding indicates that variations in credit risk and liquidity risk are not strongly associated with changes in ROA for the studied banks. In other words, fluctuations in credit risk and liquidity risk may not have a substantial effect on the banks' ability to generate returns from their assets.

The study suggests that as bank size increases, there is a positive impact on return on assets (ROA). In other words, larger banks tend to have higher ROA. This finding indicates that larger banks, on average, are more efficient at generating profits from their total assets. The study reveals that the size of a bank does not have a statistically significant impact on return on equity (ROE). This means that the size of a bank does not determine its ability to generate returns for its shareholders.

The study's results suggest that, for Saudi banks, the return on assets (ROA) is notably influenced by changes in the GDP growth rate, while the return on equity (ROE) is not significantly impacted by variations in GDP growth. These findings provide insights into how economic conditions can affect the financial performance of banks, with ROA being more sensitive to such fluctuations than ROE.

6. Conclusion

The current study empirically investigates the relationship between Covid-19, financial risks and Saudi banks' financial performance in commercial banks listed in the Saudi financial market, where financial performance refers to the return on assets and return on equity, while the risks in this research refer to liquidity risk and credit risk. Dummy variables are often used in regression analysis to represent categorical data, in this case, to distinguish between the pre-pandemic and pandemic periods. A dummy variable with a value of 1 during the Covid-19 era and a value of 0 otherwise. We used bank size and GDP as a control variables.

For a study sample that included 10 Saudis from the years 2015 to 2021, the researcher used secondary data. To examine the effect of COVID-19 on the financial performance of banks, it also adopted the multiple linear regression model.

The results of the study imply that there may be a negative correlation between the Covid epidemic and the financial performance indicators (return on assets and return on equity) in the Saudi banking industry. It is concluded that Covid-19 has a detrimental effect on the financial performance of Saudi banks. We also discovered that credit risk and liquidity risk had a significant impact on return on equity. Although they have no impact on the return on assets. The size of the bank (gross domestic product growth rate) and the return on assets are statistically significantly correlated in a favorable (negative) manner. While there is no relationship between the return on equity and the size of the bank or the GDP growth rate.

In summary, the study suggests that the COVID-19 pandemic had a slightly negative association with the profitability (ROA and ROE) of Saudi banks. Additionally, it highlights that there is a weakly negative statistically significant association between ROE and credit risk, while credit risk and liquidity risk do not have a significant impact on ROA in the studied period. These findings provide valuable insights into how external factors like a pandemic and internal factors like credit risk can affect the financial performance of banks.

The study in general showed that the Covid crisis and the financial risks surrounding the banking institutions of the sample of banks under study had an impact on financial performance, which strengthens the significance of monitoring financial risks in the future.

These findings provide valuable insights into how external factors like a pandemic and internal factors like credit risk can affect the financial performance of banks. The study's results offer regulatory authorities in Saudi Arabia a valuable resource for making informed decisions regarding the financial performance and stability of
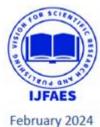
the banking sector during crisis. By incorporating these findings into their policies and oversight activities, regulatory bodies can contribute to a healthier and more robust banking system that benefits both the financial institutions and the broader economy.

Future research can use this model to compare commercial and Islamic banks since the study is only applicable to commercial banks and other factors can be included.
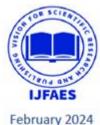
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