1. Introduction

The bank system around the world has witnessed major changes in various banking and financial fields during the past thirty years. These changes first, embodied in the new Banking Law that was adopted in 2007, then, through the horizontal and vertical expansion of electronic services, banking activities, and offerings. Also, adherence to Basel’s international standards had a significant impact on these changes.

Saudi Arabia is home to more than 27% of the GCC’s total banking assets and is the region’s second-largest banking industry in terms of assets and the largest in terms of market capitalization. Having achieved promising profit growth in 2019, the sector entered 2020 ready to capitalize on the opportunities presented by the Kingdom’s ambitious development strategy. Vision 2030 provides a roadmap for the development of financial services in the country and a raft of lending opportunities in key sectors such as infrastructure, health, education, and entertainment (Oxford Business Group, 2020).

Saudi Arabia has one of the oldest banking industries in the region, dating back to the early part of the 20th century. Initially populated by a network of local money exchangers and a small number of foreign banks, the sector rapidly expanded in the years following the Second World War, prompting the authorities to consider the establishment of a central bank. The Saudi Arabian Monetary Authority (SAMA) was created in 1952 by two royal decrees to fill this role, and continues to oversee the banking industry to this day. In the years immediately following its creation SAMA...
The Saudi banking sector has witnessed significant growth as a result of the rapid development and change in the movement and size of capital, technology, and software used in light of the tremendous competition and the diversity of banking and financial services. The financial flow and openness in the markets and adherence to the Basel international standards of control and transparency, which determine the adequacy of the bank’s capital to be at least 8 percent of its risk-weighted assets and a minimum capital adequacy rate of 10.5 percent, are the only guarantee for the continuity of banking efficiency and profitability.

The growth of the Saudi banking sector was reflected positively on the financial sector, which had an impact on investment in basic infrastructure, moving economic activity, organizing the Saudi Capital Market Authority for securities, and spreading financial inclusion among individuals and institutions. The Saudi Central Bank has always encouraged Saudi banks to maintain high levels of capital adequacy, and as of 2019, Saudi banks have maintained an average capital adequacy ratio of around 18% to 20% according to studies, research and reports Issue of Arab Bank Group, Annual Report (Arab Bank Group, 2019).

This rapid development in the banking sector raises the following question: Is solvency a factor in stabilizing the growth of bank profitability in Saudi banks? This question is the essence and the subject of this study. Note that few studies in the literature clarify the relationship between performance and profitability in the Saudi banking sector.

This paper focuses on studying the analysis of the relationship between performance and profitability in eight Saudi banks selected from 13 local and foreign banks in the Kingdom of Saudi Arabia that have full financial data for the period 2005–2019. Note that few studies in the literature clarify the relationship between performance and profitability in the Saudi banking sector.

The paper is organized as: part one presents the introduction; part two presents a brief literature review; part three deals with comparing the performance indicators of Saudi banks with international performance standards (Basel III); part four presents the econometric study, data source, variables analysis, estimation, and interpretation of results. And finally, part five presents the conclusion and recommendations.

2. Literature Review

The issue of determinants of profitability and indicators of efficient use of funds in light of banking risks management and international standards has been covered in abundant studies in developed and developing countries, and Islamic and commercial banks. There are few studies in the literature that explained the analysis of the relationship between performance and profitability in Saudi banks.

Some studies have focused on studying profitability and efficiency in cross-section countries, the most prominent of which is Olson and Zoubi (2011). The study focused on measuring the efficiency and profitability of banks in the Middle East and North Africa (MENA) countries. The study result showed that MENA banks are slightly less cost-efficient than European banks, but similar to banks in developing economies. However, MENA banks score well in terms of profit efficiency relative to banks worldwide. Finally, almost all banks in the MENA region are below optimal size. El-Masry (2016) focused on 169 banks in the Middle East and North Africa region (MENA) during 2014 and examined the impact of credit rating and capital equity on profitability. The result found that a bank’s ROA was positive with credit rating and negative with debt ratio. In the same idea, Sufian (2012) examined the performance of 77 commercial banks from 1997–2008. The result has found that economic growth has a positive and significant impact, while inflation has no significant impact on bank profitability. Dao and Nguyen (2020) had focused on the elements that affect the profitability of commercial banks in Asian developing countries, including banks in Vietnam, Malaysia, and Thailand from 2012 to 2016. The research results found a significant negative relationship between operational risk and banking profitability for Vietnam and Thailand and no significant effect for Malaysia.

Some other studies have focused on the determinants of profitability in banks at the national level. The study of Christian et al. (2008) focused on 13 Jordan commercial banks over the period 2005–2013 and examined the influence of bank capital ratio, size, and loans on the profitability of a commercial bank in Jordan. It also evaluates whether returns on Assets (ROA) or returns on equity (ROE) is the better indicator that reflects bank profitability. The study result showed that the capital ratio, size, and loans have an insignificant influence on return on assets (ROA), but not on return on equity (ROE) (except bank size). Regarding ROE, significant negative and positive influence for capital ratio and loans respectively are concluded.

Javaid et al. (2011) investigated the impact of assets customer deposits, loans, and shareholder’s equity on return on assets (ROA). The study focused on the determinants of bank profitability in top banks in Pakistan. The result showed that there is a strong influence on profitability. However, the results showed that higher total assets may not necessarily lead to higher profits due to diseconomies of scales. Also, higher loans contribute towards profitability but their impact is not significant. Equity and Deposits have a significant impact on profitability. Samadi (2012) found that there
was a positive relationship between capital structure and profitability but there was no relationship between operating risk management and capital structure. In his study, Samadi (2012) focused on the impacts of operating risk management and capital structure on the profitability of the banking sector using 17 commercial banks in Iran from 2006–2010. Banna et al. (2017) informed that the Bangladesh bank managers need to understand the impact of efficiency on the performance of their banks to consider technologies that could improve their profit efficiency levels to maximize shareholders’ value or wealth through profit maximization. In their research, Banna et al. (2017) found that crises along with bank size, capital adequacy ratio, return on average equity and interest rate had a significant effect on bank efficiency in Bangladesh over the period 2000 to 2013.

Ozili (2019) examined the impact of financial development on the level of non-performing loans. The results of the study proved that there is a positive link to the level of non-performing loans, which means the non-performing loans increase along with bigger financial development. Le and Ngo (2020) showed that automatic bank services, (ATMS) automated teller machines, and point of sales (POS) terminals can improve bank profitability. The study also showed a negative impact of market power on bank profitability. Further, a positive relationship between capital market development and bank profitability was proved.

Hassan and Bashir (2003) focused on determinants of Islamic banking profitability over the period 1994 to 2001, and the result indicated a strong positive correlation between profitability and the Islamic bank’s performance. Eljelly (2013) examined the determinants of the profitability of Islamic banks in Sudan and found that the internal factors have a significant impact on banks’ profitability which is measured by return on assets (ROA) and return on equity (ROE). Alatatissi and Letza (2018) focused on best practices followed by Islamic banks from 2009 to 2018. The study result showed that the Islamic banks deal in more than 75 countries with annual growth rates of 17.6% between 2009 to 2013 and 19.7% from 2014–2018 and could be used as a model for western banks. Javaid and Alalwi, (2018) examined the major internal and external determinants contributing to the performance and profitability of 9 Islamic Banks in Saudi Arabia from 2000–2013. The study result found that the coefficient of capital adequacy is positive and highly significant, with the performance and profitability ratios measured by return on assets (ROA) and return on equity (ROE). In their research, Qayyum and Noreen (2019) examined ten Pakistan banks over the period 2006–2016. They tried to find, first, the effect of capital structure on the profitability of Islamic and conventional banks; second, determined whether the capital structure of Islamic and conventional banks is the same or not. The results found that the capital structure of both types of banks was similar except for bank size which differed significantly. Moreover, ROA was negatively correlated to the capital structure of both conventional and Islamic banks. In contrast, ROE was positively correlated to the capital structure of both conventional and Islamic banks.

By examining the determinants of profitability in ten commercial banks in Vietnam during the period 2008–2018, Phan et al. (2020) indicated that Capital compliance requirement according to Basel II’s is challenging for small commercial banks such as major banks in Vietnam. Nguyen and Nguyen (2020) investigated the determinants of the financial performance of 1343 Vietnamese companies categorized into six different industries listed on the Vietnamese Stock Exchange over four years from 2014 to 2017. They evaluated the financial performance by three different ratios: return on assets (ROA), return on equity (ROE), and return on sales (ROS). The main research results from these companies during the given period indicated that firm size, adequacy ratio, financial leverage, liquidity, and solvency have a positive impact on ROA but a negative effect on ROE except liquidity which has a positive effect on both ROA and ROE.

Some studies were interested in the relationship between bank profitability and capital adequacy in Saudi banks. Almazari and Almumani (2012) measured the profitability efficiency of the Saudi national banks for 2006–2010. The result showed that there is a positive correlation relationship between the profitability ratios measured by (ROA) return on assets and (ROE) return on equity and operational efficiency, assets management, and total assets as bank size. Other work elaborated by Almazari (2013) focused on examining the relationship between capital adequacy and profitability over the period 2007–2011 in nine Saudi commercial banks. He found that there is a negative relationship between capital adequacy, income ratio, and bank size with profitability ratios measured by return on assets (ROA) and return on equity (ROE). In comparing profitability between Saudi versus Jordanian banks by using the internal factors for estimations, Almazari (2014) indicated that the profitability (represented by return on assets (ROA)) of Saudi banks surpassed the profitability of the Jordanian banks. This implies that Saudi banks are more profitable than Jordanian’s as well they utilize resources more efficiently.


This part of the study is concerned with studying the reality of bank performance ratios and comparing them with international standards (Basel III) (see Figure 1).

There are currently four Saudi Islamic banks: Al Rajhi Bank, Al-Inma Bank, Al Jazeera Bank, and Al Balad Bank. Saudi Arabia plays a leading role in Islamic banking at the
Figure 1: In the Performance of Capital Adequacy Ratios (CAR); Share Capital and Basel (III) Standards International in 8 Saudi Banks
Arab and international level, where Islamic banks represent one of the most important networks of Islamic banks in any country with a dual banking mother.

As part of its statutory responsibilities for supervision and oversight of the banking system, in 1992 the Saudi Central Bank (SAMA) applied the risk-based capital adequacy ratio (Basel I) issued by the Basel Banking Supervision Committee (BCBS) to Saudi banks. In 2008, the Monetary Institution applied the Capital Adequacy Standard (Basel II), also issued by the Basel Committee, which set operational risk capital requirements and capital requirements that were more sensitive to market risk and credit. The standard added to the foregoing the concept of strengthening supervisory review under Pillar II and increasing transparency under Pillar III.

In the wake of the global financial crisis in 2007 and its implications for a number of global financial markets and institutions, the Basel Committee strengthened global supervisory standards to address the weaknesses that emerged through lessons learned from the crisis.

These standards are aimed at creating a robust and flexible global banking system that prevents future financial crises. For this purpose, the Basel Committee on Banking Supervision issued the Basel 2.5 standard in 2009 and Basel III in 2010. While Basel 2.5 addressed the additional risks associated with surfactants, re-stability, and derivatives activities, Basel III deals with improving the quality and size of capital, enhancing bank liquidity, and restricting leverage.

Since 2011, the Monetary Agency has been implementing and following up the key elements of the Basel III framework within the schedule approved by the Basel Committee on Banking Supervision.

This included the leverage rate in 2011, liquidity ratios in 2012, and capital adequacy ratios as of 2013. Saudi banks have gradually applied the Basel III accord since January 2016.

Through studying and analyzing the financial system and development curves for indicators of financial efficiency of Saudi banks and comparing those with international standards (Basel III), the most important characteristics and features can be found:

1. Share Capital is lower than Basel (III) standards in three Saudi banks (NCB, Alarabi Bank, and French Saudi Bank) for the period 2005–2019. Here, the financial position of these banks is not good, given that these banks cannot pay their financial obligations towards depositors in the event of bankruptcy. The capital and Basel (III) curves of these banks converged at the end of the study period, showing that the Board of Directors of these banks are doing well to correct the financial position in the solvency of capital.

2. The curves also show that Bank Albilad is committed throughout the study period to work within the standard set for capital adequacy, which makes it the least exposed to banking risks and has more opportunities to improve profitability.

3. The solvency position of SABB Bank and Samba Bank complied with the international Basel 3 standard after 2015. As for Al-Rajhi Bank and Riyad Bank, their position differs as they fluctuate around the standard. During the last six years, Riyad Bank has achieved high financial solvency, unlike Al-Rajhi Bank, which shows financial liabilities higher than the capital adequacy.

Other ratios like Current Ratios and utilization ratios given in graphs 2 and 3 can justify this situation of bank performance analysis in Saudi Arabia.

Referring to Figure 2, the performing current ratios (CUR) in the eight Saudi banks, the object of this study, the statistics of this ratio, and its curve evolution prove that banks have enough resources to meet their short-term obligations because they have an excess of liquidity. That is, the current ratio (CUR) is nearly 2 times, which is an acceptable financial position.

Through Figure 3 of the funds utilization curve in the eight banks under study, the fluctuations of this indicator can be divided into two periods. The first period, from 2005 to 2010, shows high fluctuations in the use of funds from 30% to 130%. As for the second period, it showed relative stability in the utilization rate from 65% to 95% from 2011 to 2019. This stability indicates the commitment of Saudi banks to the central bank’s monetary policies, which set the employment ratio between 85% to 90%.

Through the analysis of previous studies as well as by identifying the basic indicators of financial solvency and performance in the Saudi bank’s sector, we can establish a theoretical model diagram (Figure 4) for determinants of profitability which can be examined in the econometric study in next part.

Therefore, based on the literature review and the descriptive analysis of Saudi banks, the hypotheses that will be examined in this study are as follows:

**H1:** As per the conceptual model, performance ratios have an expected positive effect on Profitability.

**H2:** The risk management ratios have an expected negative effect on Profitability.

These hypotheses will be examined in detail in the next paragraph through the standard study.

4. **Econometric Study**

Several studies have examined the effect of internal and external determinants on a bank’s profitability (Bonin et al.,
This paper examines the effects of bank performance ratios and bank risk management ratios on the profitability of Saudi banks. Our empirical case study is based on the technic of panel feasible generalized least square (PFGLS) as explained in the original work of Bai et al. (2021).

The general econometric form of the model is a linear regression as follow:

\[
\text{Profitability Ratios} = F(\text{Bank Performance Ratios, Bank Risk Management Ratios})
\]

4.1. Data Source and Variables Descriptions

Most modeling of empirical studies uses as a proxy both profitability variables: Return on Assets and Return on Equity (ROA, ROE). According to the literature review, there
are many determinants of bank profitability such as the level of liquidity, provisioning policy, capital adequacy, expense management, and bank size. Other studies distinguish between internal, external, macroeconomic conditions, and the legal environment where the financial institution operates (Sufian & Chong, 2008; Petria et al., 2015). Table 1 lists the variables used to proxy profitability and its determinants. We also include the notation and the expected effect of the determinants according to the literature. Table 2 presents the summary statistics of the dependent and the explanatory variables:

**Dependent Variable**

Two dependent variables are used to measure the profitability ratios:

- Return on Assets (ROA) This ratio indicates how much net income is generated per pound of assets and is expressed as follows:
  \[
  \text{ROA} = \frac{\text{Net Income}}{\text{Total Assets}}
  \]

- Return on Equity (ROE) is the rate of return to shareholders or the percentage return on each pound of equity invested in the bank, and is expressed as follows?
  \[
  \text{ROE} = \frac{\text{Net Income}}{\text{Total Equity}}
  \]

**Explanatory Variables**

There are five main explanatory variables used in this study to explain bank profitability. The discerption, international standard, and their relative Hypothesized relationship with the profitability of these variables are presented as follows:

- The current ratio (CUR) is a liquidity ratio that measures whether a bank has enough resources to meet its short-term obligations. It compares a bank’s current assets to its current liabilities:
  \[
  (1) \quad \text{If Standard} \leq \text{CUR} \Rightarrow \text{Positive effect on Profitability (+) sign,}
  \]
  \[
  (2) \quad \text{If Standard} > \text{CUR} \Rightarrow \text{Negative effect on Profitability (–) sign.}
  \]
  The current ratio is expressed as follows:
  \[
  \text{CUR} = \frac{\text{Current Assets}}{\text{Current Liabilities}}
  \]

- Capital adequacy ratio (CAR): A ratio that can indicate a bank’s ability to maintain equity capital sufficient to pay depositors whenever they demand their money and still have enough funds to increase the bank’s assets through additional lending. The international CAR standard is 10.5%. If the Capital adequacy ratio is less than 10.5%, it has a negative effect on profitability, and vice versa it has a positive effect. CAR is expressed as:
  \[
  \text{CAR} = \frac{\text{Total equity}}{\text{Total assets}}
  \]

- The employment ratios (UZR) measure the ratios of the money that was used for different uses of the bank. It has an expected positive effect on the Profitability (+) sign. The Saudi Central Bank has set
### Table 1: Panel Unit Root Test

<table>
<thead>
<tr>
<th>Variables</th>
<th>Tests (methods)</th>
<th>Individual Intercept</th>
<th>Individual Intercept and Trend</th>
<th>Stationarity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LLC</td>
<td>IPS</td>
<td>ADF-Fisher</td>
<td>Integ. Order</td>
</tr>
<tr>
<td>ROA</td>
<td>Level</td>
<td>–6.19177 (0.0000)</td>
<td>–4.93035 (0.0000)</td>
<td>–24.869 (0.0000)</td>
</tr>
<tr>
<td></td>
<td>First difference</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>ROE</td>
<td>Level</td>
<td>–5.62041 (0.0000)</td>
<td>–4.17034 (0.0000)</td>
<td>–2.26671 (0.0117)</td>
</tr>
<tr>
<td></td>
<td>First difference</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>CUR</td>
<td>Level</td>
<td>2.77146 0.9972</td>
<td>1.10213 0.8648</td>
<td>6.52895 1.0000</td>
</tr>
<tr>
<td></td>
<td>First difference</td>
<td>–4.28979 0.0000</td>
<td>–7.37622 0.0000</td>
<td>–9.28726 0.0000</td>
</tr>
<tr>
<td>CAR</td>
<td>Level</td>
<td>1.15452 0.8759</td>
<td>0.31610 0.6240</td>
<td>1.26106 0.8964</td>
</tr>
<tr>
<td></td>
<td>First difference</td>
<td>–9.22936 0.0000</td>
<td>–7.86130 0.0000</td>
<td>–8.41476 0.0000</td>
</tr>
<tr>
<td>UZR</td>
<td>Level</td>
<td>–16.0603 0.0000</td>
<td>–7.53875 0.0000</td>
<td>–2.64629 0.0041</td>
</tr>
<tr>
<td></td>
<td>First difference</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>BADTT</td>
<td>Level</td>
<td>–2.03672 0.0208</td>
<td>–1.30242 0.0964</td>
<td>–2.67868 0.0037</td>
</tr>
<tr>
<td></td>
<td>First difference</td>
<td>–7.39216 0.0000</td>
<td>–5.55683 0.0000</td>
<td>–5.75850 0.0000</td>
</tr>
<tr>
<td>CRISK</td>
<td>Level</td>
<td>–14.7015 0.0000</td>
<td>–7.15078 0.0000</td>
<td>–2.76004 0.0029</td>
</tr>
<tr>
<td></td>
<td>First difference</td>
<td>–</td>
<td>–</td>
<td>–</td>
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</table>

Notes: Numbers within the parenthesis indicate the p-value, if plus-value more than 5% the variable is stationary. I(0) mean integrated into the level, I(1) integrated into the first level. The significance acquired at 1%.

- Credit risk (CRISK) which has an expected negative effect on Profitability (−) sign, is very important for banks because it helps them to improve their activities and serve clients in good ways. It refers to the management strategy of borrowing and controlling the bad debts to repay loans at the due date of payment, and controlling Return on Equity (ROE) and Return on Asset (ROA), Non-Performing (NPL), and Capital Adequacy Ratio (CAR) as credit risk management indicators.

- The bad debts (BADTT) ratio for a bank means that the bank cannot repay loans from customers at the due date of payment, and such loans are recorded as a loss. Bad debts have an expected negative effect on the profitability (−) sign. It is expressed as:

\[
\text{BADTT} = \frac{\text{Non-Performing Loans}}{\text{Total Loans}}
\]

- this ratio between 85% and 90% as a standard and is expressed as:

\[
\text{UZR} = \frac{\text{Total Loans}}{\text{Total Deposits}}
\]
4.2. Panel Unit Root and Cointegration Test

In this analysis, to ensure robustness for the common components of bank profitability, bank performance, and risk management of the banks, the same specific test should be performed especially, the unit root test and cointegration test. Several unit root tests, including method assuming common unit root process (LLC; Breitung) and method assuming individual unit root process (IPS; ADF; PP) were employed. In this study, we use only the following - LLC, IPS, and ADF tests (Table 1).

According to the Panel Unit Root Test results in Table 1, some of the variables are I(0) such as ROA, ROE, UZR, and CRISK, while other variables, CUR, CAR, and BADTT are I(1). In this case, it is possible to use Kao Cointegration Test. According to this test, $t$-Statistic equal $(-4.371185)$ and Prob. $P$-value equal $(0.0000)$, and it is clear that $P$-value $< 0.05$, thus we reject the null hypothesis (no cointegration), which means that there is a long run associated relationship between studied variables. For this reason, we move to the appropriate model of estimation.

4.3. The Estimated Model

Due to the literature review analyzed in part two, we selected the appropriate model and method of estimation and showed the main variables which could explain determinants of banks’ profitability. Panel feasible generalized least square (PFGLS) was used. It is known that the panel feasible (FGLS) estimator is more efficient than the ordinary least squares (OLS) when there are heteroskedasticity, serial, and cross-sectional correlations (Bai et al., 2021).

To analyze the relationship impact of performance variables on the profitability of Saudi Banks we estimate an econometric model given by the following form:

$$\pi_{i} = \alpha + \sum_{j} \beta_{j} X_{ji} + \sum_{k} \beta_{k} Y_{ki} + \epsilon_{i}$$  \hspace{1cm} (1)

Where, $\pi_{i}$ is the Profitability Ratios, which is measured by one of the two proxies of profitability – ROE or ROA ratios. CUR is the current ratio and measure the Liquidity Ratios. CAR is the Capital Adequacy Ratios. UZR Utilization Ratios. $X_{ji}$ is credit risk management variables (i.e. Bad Debts. (BADTT), and credit risk (CRISK)), and they represent the control variables in the model. $\alpha$ is the intercept. $\beta_{j}$ are the coefficients of performance variables elasticity and $\gamma_{k}$ are the coefficients of risk management variables elasticity and. And finally, the error $\epsilon$.

The large form of equation (1) can be written:

$$\pi_{i} = \alpha + \beta_{1} \text{CUR}_{i} + \beta_{2} \text{CAR}_{i} + \beta_{3} \text{UZR}_{i} + \gamma_{1} \text{BADTT}_{i} + \gamma_{2} \text{CRISK}_{i} + \epsilon_{i}$$  \hspace{1cm} (2)

The estimation results of this linear model using the performed and appropriate methods of estimation were summarized in Table 2.

4.4. Estimation Results

Table 2 summarizes the main specifications and estimation results. Two Estimation Methods were adopted: M1, panel ordinary least square (POLs), and M2, panel feasible generalized least square (PFGLS). It is known that the panel least square method (POLs) represents the best estimator under natural conditions. But, if there are errors in the hypothesis required for the estimation by the method of OLS, Bai et al. (2021) concluded that the feasible GLS estimator (FGLS) is more efficient than the ordinary least squares (OLS) in the presence of heteroskedasticity, serial, and cross-sectional correlations.

The result given by M1 for both ROA and ROE shows the significance of the independent variables, but we cannot rely on these results because $R^{2} (0.204, 0.260)$ and DW $(0.620, 0.463)$ indicate imbalances represented by autocorrelation and heteroscedasticity coming from fixed and random effects related to cross-section and periods data set.

The model (M2) estimates a feasible GLS specification robust methods which correct both cross-section heteroskedasticity and contemporaneous correlation. To compare which specification - the fixed or random effect - is suitable for the studied case, the Hausman test was used (Hausman, 1978). The Hausman test consists of the rejection of the null hypothesis if the prob-value less than 0.05. The Hausman test result given in Table 5 shows that ROA and ROE are $5.5328 (0.3544)$ and $4.48511 (0.4819)$, and this result proves the existence of random effects.

By testing the joint significance of the fixed effects estimates in least-squares specifications, the Fixed Effects tests consist of the rejection of the null hypothesis if the prob-value is less than 0.05. Here, the statistic values of cross-section $F$ and its associated $p$-values are given in Table 2, which are $(6.5241 (0.000), 27.96 (0.000), 3.1723 (0.0043), 35.41 (0.000))$. This result strongly rejects the null hypothesis that the cross-section effects and period effects are redundant.

Table 2 reports, also, the empirical regression results of the variables used in the study:

Capital adequacy ratio (CAR) portrays a negative and statistically significant relationship with both return on assets (ROA) and return on equity (ROE) in all estimation methods. This finding implies that listed banking firms in Saudi Arabia will increase their profitability if they reduce their ability to maintain equity capital sufficient to pay depositors whenever they demand their money and still have enough funds to increase the bank’s assets through additional lending. Moreover, it was found that the banking system that has surplus capital and high solvency has less profitability,
which indicates that the banking system with a high level of solvency and capital (greater than Basel III requirement) operates less efficiently and with great caution and thus will have less opportunity to invest in opportunities that are likely to be profitable, and this explains the inverse relationship between the solvency and capital and profitability in Saudi banks. This finding is consistent with prior studies by Le and Ngo (2020) who showed the negative impact of adequacy power on bank profitability, implying that competition improves bank profitability.

According to the specified method of estimation PFGLS (robust), the current ratio (CUR) or the liquidity ratio causes a statistically significant negative influence upon bank profitability ratios for both return on assets (ROA) and return on equity (ROE). The coefficient of liquidity ratio is negative at 0.0256 and statistically significant at 1% significance level on return on assets (ROA), and it is negative at 0.094 and statistically significant at 10% significance level on return on equity (ROE). This suggests that profitable listed banking firms in Saudi Arabia must hold more current assets to enable them to repay their current liabilities. As asserted by Curak et al. (2012), profitability is influenced by solvency risk and liquidity risk.

The employment ratios (UZR) are statistically positive and significant at a 1% significance level and directly related to profitability ratios. The ratios of the money that were used for different uses of the bank are an important ratio for increasing profitability. The increase of 0.11% of return on assets and 0.69% of return on equity is a result of an increase in employment ratios of 1%. This shows that the large banks tend to increase the employment ratios spread. This is in agreement with the assertion made by Ben Naceur and Goaied (2008) and Saona (2016), who showed a positive impact of the ratio of total loans to total assets on bank profitability.

The study further finds that the bad debt ratio and credit risk are also significant and have a negative impact on profitability. Thus, managers of listed banks

<table>
<thead>
<tr>
<th>Table 2: Estimation Results</th>
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<tbody>
<tr>
<td>Endogenous Variables</td>
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<tr>
<td>Estimation Methods</td>
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<tr>
<td>Exogenous Variables</td>
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<tr>
<td>CUR</td>
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<td>CAR</td>
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<td>UZR</td>
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<td>BADTT</td>
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<td>CRISK</td>
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<td>Obs</td>
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<tr>
<td>$R^2$</td>
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<td>$F$-statistic</td>
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<td>DW</td>
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**Specification Test Perfuming Suitable Method of Estimation**

|                             |                          |                          |                           |                           |
| Redundant Fixed Effects Tests | 6.5241 (0.0000)          | 27.96 (0.0000)           | 3.1723 (0.0043)           | 35.41(0.0000)             |
| Hausman test                | 5.532896 (0.3544)        |                           | 4.48511 (0.4819)          |                           |
| Cross-section Heteroskedasticity LR Test | Likelihood ratio 80.78 (0.0000) | Likelihood ratio 37.46 (0.000) |
| Panel Period heteroskedasticity | Likelihood ratio 103.38 (0.0000) | Likelihood ratio 117.475 (0.000) |

**Residual Cross-Section Dependence Test**

| Breusch-Pagan LM            | 153.287 (0.000)           | 202.37 (0.0000)          | 23.3015 (0.0000)          |
| Pesaran scaled LM           | 16.743 (0.000)            |                           |                           |

The probability value for rejection of the null hypothesis is employed at the 0.05 level (**p-value < 0.05; ***p-value < 0.001).
in Saudi Arabia should ensure less risk to match their current liabilities and increase performance and profitability. Increasing non-performing loans have a detrimental effect on the profitability of banks in Saudi Arabia. In this light, bankers should enhance their quality of management of non-performing loans to improve their activities and serve clients in good ways. As mentioned by Petria et al. (2015), credit and liquidity risk, management efficiency, the diversification of business, the market concentration/competition, and economic growth influence bank profitability as measured by ROA and ROE.

In summary, managers of listed banks in Saudi Arabia should institute prudent monetary policies to overcome liquidity crises and enhance their profitability. They must work on the quality of current assets and current liabilities in compliance with the optimum commitment to Basel international standards because it guarantees the fulfillment of short-term obligations to avoid banking risks.

5. Conclusion

This paper examines the determinants of Saudi banking sector profitability from 2005 and 2019 using a feasible panel model. According to the results obtained, it was found that the profitability of the banks was affected by capital adequacy and liquidity management risks in the Saudi banking sector. It was also found that the profitability of Saudi banks is negatively affected by increasing the Capital adequacy ratio (CAR) and current ratio (CUR), and positively by the employment ratios (UZR). The study also found that managing banking risks represented by the bad debts ratio (BADTT) and Credit risk (CRISK) was an important negative effect on the profitability of banks. According to our results, the profitability of the Saudi banking sector is influenced by bank performance ratio and risk management factors. These results clearly show that Saudi banks have an excess of liquidity and an increase in the capital adequacy ratio that exceeds international standards (Basel III) sometimes, which has an impact on the profitability. This impact is at the microeconomic level. As for the macroeconomic level, it is clear from the inflationary condition the economy suffers because of the increase in the money supply.

References


