Ben Slimane, Sarra; Alsolamy, Majed Qabil

Article

Impact of oil price shocks on Islamic and conventional bank performance : empirical evidence from Saudi Arabia

International Journal of Energy Economics and Policy

Provided in Cooperation with:
International Journal of Energy Economics and Policy (IJEEP)

Reference: Ben Slimane, Sarra/Alsolamy, Majed Qabil (2024). Impact of oil price shocks on Islamic and conventional bank performance : empirical evidence from Saudi Arabia. In: International Journal of Energy Economics and Policy 14 (5), S. 629 - 642.
https://www.econjournals.com/index.php/ijeep/article/download/16693/8224/39442.
doi:10.32479/ijeep.16693.

IJEEP
INTERNATIONAL JOURNAL OF ENERGY ECONOMICS AND POLICY

International Journal of Energy Economics and Policy

ISSN: 2146-4553

available at http: www.econjournals.com

International Journal of Energy Economics and Policy, 2024, 14(5), 629-642.

Impact of Oil Price Shocks on Islamic and Conventional Bank Performance: Empirical Evidence from Saudi Arabia

Sarra Ben Slimane*, Majed Qabil Alsolamy

Faculty of Business Administration, University of Tabuk, Tabuk, Saudi Arabia. *Email: s.benslimane@ut.edu.sa

Received: 06 May 2024 **Accepted:** 22 August 2024 **DOI:** https://doi.org/10.32479/ijeep.16693

ABSTRACT

This paper aims to investigate and compare the effect of oil price shocks on the bank performance at the aggregate level as well as the level of conventional and Islamic banks. The Autoregressive Distributed Lag (ARDL) methodology was adopted to analyze a panel of 10 Saudi banks, including 6 conventional and 4 Islamic banks, between 2006 Q1 and 2022 Q4. The results revealed that oil price shocks have a direct impact on banking performance. A rise (fall) in oil prices led to an increase (decrease) in bank performance through the channel of price-induced bank deposits. Additionally, oil price shocks have asymmetric effects, with positive oil shocks having a greater impact on bank performance than negative shocks. The findings highlighted that conventional banks tend to benefit more from oil price shocks, especially during oil price booms, as they experience higher positive impacts. However, during oil price busts, Islamic banks were more adversely impacted by oil shocks.

Keywords: Bank Performance, Oil Price Shocks, Saudi Arabia, Conventional Banks, Islamic Banks, Autoregressive Distributed Lag Model
JEL Classifications: C22, G12, G21

1. INTRODUCTION

The significant fluctuations in oil prices over the past decades have sparked discussions about their economic and financial effects. Evidence shows that boom-bust oil price cycles have had a significant impact on bank performance in oil-exporting countries (Khandelwal et al., 2016). When oil prices rise, there is an increase in oil revenues, stronger fiscal and external positions, and higher government spending. This is likely to improve corporate profitability and creditworthiness, as well as bank performance (Al-Khazali and Mirzaei, 2017a). Conversely, when oil prices are falling, it is expected to have negative implications for bank performance due to a decline in oil revenues and the weakening of firm balance sheets and creditworthiness (Nusair, 2016). Understanding the link between oil price shocks and bank performance is crucial for evaluating macroeconomic and financial stability and crafting macroprudential policies.

The credit exposure entails that oil price shocks directly affect bank profitability. The direct effect stems from increased oil-induced bank deposits and related lending activities. Also, oil price shocks could indirectly affect bank profitability. High oil prices encourage governments to increase public spending, thereby supporting business activities. This, in turn, affects the performance of banks and companies by increasing lending and encouraging growth in non-oil industries. Additionally, the expectation of oil revenues can boost private sector sentiment, leading to increased domestic demand, bank confidence, lending activities, and improved performance (Hesse and Poghosyan, 2009).

Bank performances are mainly determined by two main factors: Bank-specific and macroeconomic factors. Bank-specific factors include internal factors such as capital adequacy, liquidity, size, risks, and efficiency (Berger, 1995; Bourke, 1989; Molyneux and Thornton, 1992; Short, 1979). Meanwhile, macroeconomic factors are external determinants beyond the control of bank management and represent the economic conditions that impact the operations and achievements of financial institutions. The literature uses different variables to represent various market features, such as ownership status, industry magnitude, and market concentration (Bourke, 1989; Molyneux and Thornton, 1992; Short, 1979). Control variables such as interest rates, inflation, and cyclical output are also used to study bank performance (Huizinga and Demirguc-Kunt, 2000).

Despite the extensive research on the factors that affect bank performance, there is limited knowledge about the impact of oil price shocks on the banking sector in oil-exporting countries. Hesse and Poghosyan (2016) have examined the impact of oil price shocks on bank profitability in oil-exporting MENA countries and found evidence of a positive effect of oil price shocks indirectly through macroeconomic channels. Another study of Al-Khazali and Mirzaei (2017a) considered the effect of oil shocks on (NPLs) in 30 oil-exporting countries. It found a significant negative relationship between the two variables and noted that adverse oil price shocks particularly affected the risk of large banks.

An important question that has not been thoroughly examined in academic literature is how conventional banks and Islamic banks respond to oil price shocks. In Saudi Arabia's banking sector, Islamic banks have been consistently growing in terms of market penetration, assets, deposits, and lending growth. Therefore, it is interesting to compare Islamic banks to conventional banks and explore their specific differences. According to Hesse and Poghosyan (2009), Islamic banks funded through sukuk and Shariah-compliant deposits are expected to be more resilient than conventional banks, which primarily rely on wholesale resources, especially during liquidity shortages after adverse oil price shocks.

Moreover, most studies use linear models, but little attention has been given to the possibility that such shocks might have uneven impacts. While existing research has focused on the positive relationship between bank performance and rising oil prices, it has often ignored the possibility of asymmetric relationships. A drop in oil prices could weaken the economy and impair bank performance. In contrast, it seems unlikely that rising oil prices will stimulate the economy and, as a result, bank performance in oil-exporting countries. Recent empirical studies suggested that macroeconomic variables exhibit non-linear and asymmetric relationships, and findings indicate that ignoring such asymmetry can produce misleading outcomes (Abubakar et al., 2023). Accordingly, the assumption that positive (adverse) oil price shocks improve (weaken) bank performance could be challenged.

Against this backdrop, this study represents an attempt to fill this gap. Three key questions are addressed: Does bank performance depend on oil prices, and if so, is the effect direct or indirect? Do oil price shocks have asymmetric effects? Are there any distinctions between Islamic and conventional banks?.

To assess the impact of oil price shocks on bank performance while considering bank-specific and macroeconomic determinants, we used a bank-level dataset of 10 Saudi Arabian banks from 2006 Q1 to 2022 Q4. We employed panel Autoregressive Distributed Lag (ARDL) regressions to examine both the short and long-run relationships. Given the substantial reliance of oil-exporting nations on oil exports, as well as the volatility of oil prices, it is crucial to investigate the effects of oil price shocks on bank profitability. Economic activity in oil-producing countries is significantly shaped by the oil price cycle, which determines government revenues and expenditures and the level of foreign reserves available to sustain the liquidity of the banking system, as evident recently in Saudi Arabia (Figures 1 and 2).

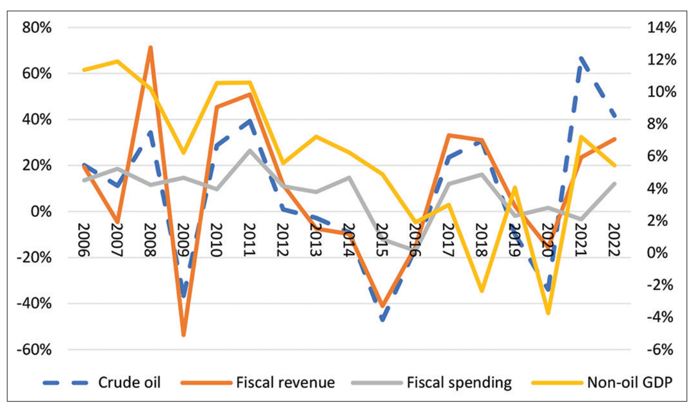
This study makes several contributions to the literature. First, it delves into the impact of oil price shocks on the banking system in the Saudi Arabian economy, a topic that has been overlooked in previous studies. This study aims to fill this gap by analyzing both the direct and indirect effects of oil price shocks and exploring the asymmetric relationship between oil price changes and bank performance. Second, the study compares the effects of oil price shocks on the performance of Islamic and conventional banks. Finally, unlike previous studies that usually resort to general method of moments (GMM) models, we employ the pool mean group (PMG) estimator to estimate the short—and long-run relationships between bank performance and oil price shocks.

The rest of this paper is structured as follows: Section 2 offers an overview of the literature. Section 3 explains the empirical methodology. Section 4 reports and discusses the results. Section 5 concludes.

2. LITERATURE REVIEW

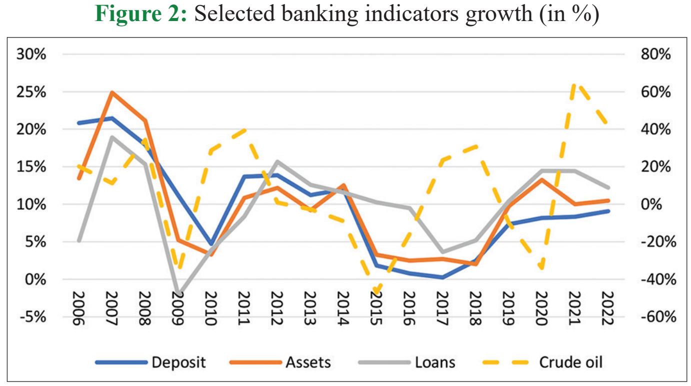
The primary factor influencing the profitability of banks' operations is their performance (Quoc Trung, 2021). Various factors have

Figure 1: Selected macroeconomic indicators growth (in %)



Source: SAMA database

Figure 2: Selected banking indicators growth (in %)



Source: SAMA database

been identified as the main determinants of bank performance. According to the literature, bank performance is influenced by both internal and external factors. External factors are unrelated to bank management but reflect industry specificities and macroeconomic conditions that impact banking performance, whereas internal factors are classified as bank-specific determinants. Furthermore, empirical research has focused on individual countries or cross-countries banking systems. Although the empirical evidence varies significantly due to differences in databases and environments, most studies indicate that internal factors are the leading cause of bank profitability (Athanasoglou et al., 2008).

Studies dealing with internal factors include variables such as size, efficiency, capital adequacy, and liquidity. Empirical studies on the influence of bank size provide conflicting results. On the one hand, banks with higher asset value tend to have higher profitability due to economies of scale. On the other hand, large banks may experience lower profitability due to inefficiencies, resulting in diseconomies of scale. Some studies have found a positive impact of bank size on profitability (Smirlock, 1985; Pasiouras and Kosmidou, 2007), while others have found a negative impact (Kasman et al., 2010; and Stiroh and Rumble, 2006). Additionally, some studies have found no significant impact of bank size on profits (Athanasoglou et al., 2008).

Moreover, capital adequacy is considered a critical determinant of bank performance. Well-capitalized banks have access to less expensive funding sources (Berger, 1995; Bourke, 1989). Moreover, banks with a higher proportion of equity require less external capital; however, too much equity may reduce profitability because a highly capitalized bank may miss out on profitable trading opportunities. Some studies report that capital ratio positively affects profitability (Berger, 1995; Bourke, 1989). Others, such as Hofmann (2011), indicate a negative and significant relationship between equity to total assets ratio and profitability. The literature also considers bank liquidity. A higher liquidity ratio indicates better liquidity, suggesting that well-managed banks are better performers (Trujillo-Ponce, 2013).

Efficiency is an important variable to consider when studying the determinants of bank performance. Most studies indicate that a lower ratio (indicating better efficiency) leads to greater profitability for the bank (Khediri and Khedhiri, 2009; Sun et al., 2017). However, Molyneux and Thornton (1992) presented different results. They argued that in a regulated industry, high profits earned by banks may be reflected in higher payroll expenses.

External determinants comprise macroeconomic factors beyond the bank's control, reflecting the economic environment impacting bank performance. These factors include GDP growth, inflation, and oil prices. GDP growth is often used to reflect the business cycle, as higher GDP growth tends to increase demand for loans. Hence, a positive relationship between GDP growth and the bank's profitability is expected to be found. This correlation has been confirmed by Huizinga and Demirguc-Kunt (2000) and Kosmidou (2008). Conversely, Homaidi et al. (2020) and Mateev and Bachvarov (2021) found a negative relationship between GDP growth and bank profitability.

According to basic finance principles, operating in a riskier environment should result in a higher return. Inflation tends to have a positive impact on bank performance, as bank income increases more with inflation than costs. When inflation is anticipated, banks can adjust interest rates in advance to offset extra costs. However, failing to predict inflation may lead to increased costs surpassing revenues, ultimately affecting bank performance negatively (Eljelly, 2013). Bourke (1989), Molyneux and Thornton (1992), and Huizinga and Demirguc-Kunt (2000) confirmed the positive effect of inflation. However, Eljelly (2013) suggested that Islamic banks may struggle with inflation anticipation due to their profit-sharing mechanism.

Moreover, oil prices are the primary external element of bank performance, especially for oil-exporting countries with oil-macro-financial solid linkages. According to Hesse and Poghosyan (2009), oil prices impact bank performance through both direct and indirect transmission channels. Directly, the effect stems from oil-induced bank deposits and related loans to business activity. Indirectly, higher oil revenues encourage governments to increase public spending to support business activities, which affects bank and company performance via expanding lending to support the growth of the non-oil sector. Furthermore, anticipating oil revenues boosts the private sector sentiment, which drives up domestic demand, bank confidence, lending activities, and improved performance.

While extensive research has been conducted on the factors that impact bank performance, limited empirical evidence exists on how oil price shocks affect bank performance in oil-exporting countries. Some studies have examined this issue, including those by Hesse and Poghosyan (2009), Kandil and Markovski (2019), Mandal and Datta (2024), El Mahmah and Trabelsi (2021), and Saif-Alyousfi et al. (2021).

Hesse and Poghosyan (2009) investigated the impact of oil price increases on bank performance in 11 MENA oil-exporting countries between 1994 and 2008. Based on country-specific macroeconomic and institutional characteristics, they found that oil price shocks positively and indirectly affected bank profitability, with marginal direct effects. Moreover, investment banks were more affected than Islamic and commercial banks.

Al-Khazali and Mirzaei (2017) explored the impact of oil price shocks on bank non-performing loans in 30 oil-exporting countries from 2000 to 2014. The key results are: (i) oil price shocks have no significant impact on bank non-performing loans, (ii) oil shocks have asymmetric effects on bank non-performing loans.

Khandelwal et al. (2016) examined the relationship between changes in oil prices and the GCC's macroeconomic and financial development. Strong evidence was found regarding the presence of macro-financial linkages. Alzoubi (2018) analyzes the effect of internal factors on the profitability of Islamic and conventional banks in 13 MENA countries from 2006 to 2016. The findings demonstrated that bank size, equity to assets, and deposits to assets considerably boost bank profitability, whereas loans and cash to assets do not affect bank profitability.

Kandil and Markovski (2019) analyze the UAE banks' performance amid oil price shocks using ROE, ROA, and the growth of credit and deposits. The findings demonstrate that negative oil price shocks hurt all performance metrics. Moreover, conventional banks often have superior profitability indicators during bust periods, whereas Islamic banks have stronger loan and deposit growth. In the same vein, El Mahmah and Trabelsi (2021) address the same issue for a sample of GCC banks. The results highlight that oil shocks significantly impact bank performance. Interestingly, Islamic banks are less affected by these fluctuations than conventional banks. Saif-Alyousfi et al. (2018) focused on the impact of oil and gas price shocks on the performance of banks in GCC countries. The research differentiates between shocks' indirect and direct effects. The findings show that oil and gas price shocks directly influence bank productivity via the price-induced lending mechanism.

Moreover, we know little about how bank performance evolved over oil price cycles. Specifically, to what extent is the impact of adverse oil shock merely the opposite of that of the positive shock, or do the impacts differ in size? To the best of our knowledge, only Saif-Alyousfi et al. (2018) have analyzed the asymmetric effects of oil price shocks. They found that oil price increases have a different impact than oil price decreases, with negative shocks having a more pronounced effect than positive ones. Therefore, an extensive investigation using a nonlinear framework was needed into the impact of oil price shocks on bank performance.

3. EMPIRICAL APPROACH

3.1. Model Specification

Building on bank-level studies, particularly Hesse and Poghosyan (2009) and Kandil and Markovski (2019), we will estimate an equation for bank performance using added controls and oil price shocks. Eq (1) explores the direct and indirect effects of oil price shocks.

$$y_{i,t} = \alpha + \beta y_{i,t-1} + \theta OP_t + \gamma X_{i,t} + \delta Z_{i,t} + \omega_i + \varepsilon_{i,t} \tag{1}$$

Where i signifies each Saudi Arabian at the time t. The dependent variable $y_{i,t}$ is the return on assets (ROA), return on equity (ROE), lending growth, or deposit growth. $X_{i,t}$ is a vector of bank-specific control variables: Capital adequacy, size, and liquidity. $Z_{i,t}$ is a vector of macroeconomic variables: Real GDP growth and inflation. OP_t is oil price shock. ω_i is a bank-specific unobserved heterogeneity, and $\varepsilon_{i,t}$ is a random idiosyncratic error.

According to the empirical specification, oil price shocks can directly impact bank performance (coefficient θ), and indirectly (through their effects on macroeconomic variables and, ultimately, coefficient δ. To differentiate between direct and indirect impact, we employ a step-by-step empirical testing approach described by Hesse and Poghosyan (2009).

In the first step, we estimate the specification (I) to examine the direct relationship between oil price shocks and bank performance, as shown in Eq (2):

$$y_{i,t} = \alpha + \beta y_{i,t-1} + \theta OP_t + \gamma X_{i,t} + \omega_i + \varepsilon_{i,t} \tag{2}$$

To account for volatility in bank performance, we consider bank-specific variables alongside oil price shocks. These variables include bank size, capital adequacy, and liquidity. In terms of regression analysis, if the coefficient of correlation of oil price shocks is not statistically significant, we can conclude that oil price shocks do not affect bank performance. However, if the impact of oil price shocks is significant, we proceed with specification (II).

In the second step, we estimate specification (II) to examine indirect effects on bank performance through macroeconomic variables. This results in the following Eq (3).

$$y_{i,t} = \alpha + \beta y_{i,t-1} + \theta OP_t + \gamma X_{i,t} + \delta Z_{i,t} + \omega_i + \varepsilon_{i,t} \tag{3}$$

The model in Eq (3) includes macroeconomic variables as the main indirect transition channels of oil price shocks. Real GDP growth is used to capture cyclical fluctuations, while inflation is included to measure macroeconomic uncertainty. When conducting regression analysis, if the coefficient of correlation of oil price shocks remains statistically significant, we can conclude that oil prices directly impact bank performance. Conversely, if the correlation coefficient is not statistically significant, we can infer that oil price shocks indirectly affect bank performance through the transmission channels associated with the macroeconomic variables.

The four regression equations that the analysis comprises include the following:

$$ROA_{i,t} = \alpha + \beta y_{i,t-1} + \theta OP_t + \gamma X_{i,t} + \delta Z_{i,t} + \omega_i + \varepsilon_{i,t} \tag{4}$$

$$ROE_{i,t} = \alpha + \beta y_{i,t-1} + \theta OP_t + \gamma X_{i,t} + \delta Z_{i,t} + \omega_i + \varepsilon_{i,t} \tag{5}$$

$$\text{Lending growth}_{i,t} = \alpha + \beta y_{i,t-1} + \theta OP_t + \gamma X_{i,t} + \delta Z_{i,t} + \omega_i + \varepsilon_{i,t} \tag{6}$$

$$\text{Deposit growth}_{i,t} = \alpha + \beta y_{i,t-1} + \theta OP_t + \gamma X_{i,t} + \delta Z_{i,t} + \omega_i + \varepsilon_{i,t} \tag{7}$$

We adopt the (ARDL) model, as developed by Pesaran et al. (2001), for several reasons: First, it can be used to test relationships between variables that are both I (0) and I (1). Second, it disentangles the short and long-term effects. Third, it addresses the issue of endogeneity. Finally, it enables the testing of both linear and non-linear cointegration relationships.

Using the panel ARDL approach, we defined the symmetric cointegration relationship as follows:

$$\begin{aligned}\Delta Y_{i,t} &= \sum_{k=1}^{p-1} \lambda_{ik} \Delta Y_{i,t-k} + \sum_{k=0}^{q-1} \delta_{ik} \Delta OP_{i,t-k} \\ &+ \sum_{k=0}^{q-1} \theta_{ik} \Delta X_{i,t-k} + \sum_{k=0}^{q-1} \mu_{ik} \Delta Z_{i,t-k} \\ &+ \varphi_i \left(Y_{i,t-1} - \rho_i OP_{i,t} - \alpha_i X_{i,t} - \vartheta_i Z_{i,t} \right) + \omega_i + \varepsilon_{i,t}\end{aligned} \tag{8}$$

Eq. (6) can be written as an error correction representation:

$$\Delta Y_{i,t} = \varphi_i \left(Y_{i,t-1} - \rho_i OP_{i,t} - \alpha_i X_{i,t} - \vartheta_i Z_{i,t} \right) + \sum_{k=1}^{p-1} \lambda_{ik} \Delta Y_{i,t-k} + \sum_{k=0}^{q-1} \delta_{ik} \Delta OP_{i,t-k} + \sum_{k=0}^{q-1} \mu_{ik} \Delta Z_{i,t-k} + \sum_{k=0}^{q-1} \alpha_{ik} \Delta X_{i,t-k} + \omega_i + \varepsilon_{i,t} \quad (9)$$

The error correction parameter φ_i specifies the speed of adjustment. ρ_i, α_i, and ϑ_i indicate the long-run coefficients. λ_{ik}, δ_{ik}, μ_{ik}, and α_{ik} represent the short-term coefficients. It is important to note that using a linear ARDL model to analyze non-linear interactions can result in biased estimations and misleading conclusions. To avoid such an issue, we use a non-linear ARDL (NARDL) model that considers potential long- and short-term nonlinearities (Shin et al., 2014). This methodology involves decomposing oil prices (OP) into positive (+) and negative (-) partial sums of increases and decreases, respectively:

$$OP_t = OP_0 + OP_t^+ + OP_t^- \quad (10)$$

$$OP_t^+ = \sum_{k=1}^{t} \Delta OP_t^+ = \sum_{k=1}^{t} \max(\Delta OP_t, 0) \quad (11)$$

$$OP_t^- = \sum_{k=1}^{t} \Delta OP_t^- = \sum_{k=1}^{t} \min(\Delta OP_t, 0) \quad (12)$$

Following Shin et al. (2014), the asymmetric cointegrating relationship is specified as:

$$\Delta Y_{i,t} = \varphi_i Y_{i,t-1} + \sigma_i Z_{i,t} + \theta_i X_{i,t} + \beta^+ OP_t^+ + \beta^- OP_t^- + \sum_{k=1}^{p-1} \phi_{ik} \Delta Y_{i,t-k} + \sum_{k=0}^{q-1} \alpha_{ik} \Delta Z_{i,t-k} + \sum_{k=0}^{q-1} \vartheta_{ik} \Delta X_{i,t-k} + \sum_{k=0}^{q-1} (\theta_k^+ \Delta OP_{i,t-k}^+ + \theta_k^- \Delta OP_{i,t-k}^-) + \omega_i + \varepsilon_{i,t} \quad (13)$$

$v_t = y_t - \pi^+ OP_t^+ - \pi^- OP_t^-$ is the nonlinear error correction term. $\pi^+ = -\frac{\beta^+}{\varphi}$, $\pi^- = -\frac{\beta^-}{\varphi}$ and $\sigma = -\frac{\rho}{\varphi}$ are the associated asymmetric long-run parameters. $\sum_{k=0}^{q-1} \theta_k^+$ and $\sum_{k=0}^{q-1} \theta_k^-$ represent the degree of the short-term asymmetric dynamics of ΔOP_t.

We have used the pooled mean group (PMG) estimator, as established by Pesaran et al. (1999). The PMG estimator allows for heterogeneity in all short-run coefficients while keeping the long-run coefficients homogeneous. This is particularly relevant because it implies that the long-run relationship between the variables is similar across banks. However, given the wide differences in bank characteristics such as size, liquidity, and capital adequacy, it is acceptable for the short-run adjustment to be bank-specific.

3.2. Data

The data used in this study came from several sources. We used quarterly bank-level data extracted from the Refinitiv Eikon database. We collect macroeconomic variables from the SAMA database. The data span from 2006-Q1 to 2022-Q4, and the period of study is marked by remarkable events, including sharp drops in oil prices, the impact of COVID-19, and the subsequent recovery. The sample comprises 10 Saudi banks (6 conventional and 4 Islamic). All annual data are converted to quarterly data using the linear interpolation method.

We are examining four main bank-level variables: Profitability (ROA and ROE), deposit growth, and lending growth. These factors serve as the primary indicator of bank performance (Kandil and Markovski, 2019). For profitability, we use the return on assets (ROA), which is calculated as the ratio of net income to total assets. Additionally, we are employing return on equity (ROE), which is measured by the ratio of net income to equity. Consistent with many studies, we are also considering lending growth and deposit growth, which are measured by the annual growth rate of gross loans and deposits, respectively. Furthermore, we include capital adequacy, size, and liquidity as bank-specific control variables, represented respectively by the equity-to-total assets ratio, the natural logarithm of total assets, and the liquid assets to deposit. As for macroeconomic control variables, we are incorporating real GDP growth and inflation, which is based on the logarithmic difference of the consumer price index. Regarding the oil price measure, we are using the average annual growth rate as suggested by Hesse and Poghosyan (2016). It is calculated using the annual arithmetic mean of the daily Brent spot prices.

$$oil\ shock_t = \frac{\sum_{i=1}^{365} \left[\log(p_t) - \log(p_{t-1}) \right] * 100}{365} \quad (14)$$

Table 1 details the definitions, sources, and expected coefficients for all variables used in our study.

Table 2 contains the summary statistics for all variables at the aggregate level as well as for conventional and Islamic banks. We may highlight several stylized facts. First, Islamic banks' average deposit growth (0.06) is higher compared to conventional banks' mean of −0.266. This suggests that, on average, Islamic banks have higher deposit growth than conventional banks. In terms of profitability, Islamic and conventional banks both have similar average levels of ROA and ROE. However, conventional banks are more capitalized (14.32%) than Islamic banks (3%). Additionally, the size of conventional banks (12.04%) is larger than that of Islamic banks (8.53%) during the period under consideration. Further, the average oil price shows a positive value, indicating prominent positive oil price shocks. Finally, there is a considerable standard deviation, representing a period of volatile oil prices.

In Table 3, a pairwise correlation matrix for the variables is presented. The main result is that all significant correlations are below 0.3, indicating that multicollinearity is not a major concern. Further, the changes in oil prices are positively correlated with all control variables, suggesting that the oil price may play a key role in macro-financial linkages in Saudi Arabia.[1].

4. EMPIRICAL RESULTS AND DISCUSSION

4.1. Preliminary Data Analysis

We first used Pesaran's CD test (2004) to check for cross-sectional dependence. The test is relevant as Saudi Banks are susceptible to

1. Correlation matrix for Islamic and conventional banks are available upon request.

Table 1: Variables definitions

Variables	Measurements	Sources	Expected sign
Dependent variables			
Return on assets	Net income to total assets ratio	Refinitiv Eikon database	
Return on equity	Net income to equity ratio		
lending growth	The lending growth rate		
Deposit growth.	The deposit growth rate		
Independent variables			
Capital adequacy	Equity capital to total assets ratio	Refinitiv Eikon database	±
Liquidity	Liquid assets to deposits ratio		+
Size	Natural log of total assets		+
Oil price shock	The Brent oil price changes		+
GDP growth	Annual growth rate of GDP	SAMA database	+
Inflation	Consumer price index		±

GDP: Gross domestic product

Table 2: Descriptive statistics

Variables	Entire banks				Conventional banks				Islamic banks			
	Mean	Min	Max	SD	Mean	Min	Max	SD	Mean	Min	Max	SD
Lending growth	0.10	−0.54	2.33	0.27	0.16	−0.13	1.37	0.38	0.06	−0.54	2.33	0.18
Deposit growth	−0.09	−3.37	2.00	0.50	−0.26	−3.37	0.56	0.75	0.06	−2.78	2.00	0.17
ROA	0.46	−2.84	3.61	0.46	0.45	−2.82	0.92	0.25	0.48	−1.78	3.64	0.39
ROE	3.29	−14.2	13.9	2.03	3.32	−14.24	8.15	1.82	3.21	−9.53	13.92	2.29
Liquidity	0.62	0.02	0.88	0.09	0.61	0.40	0.71	0.06	0.64	0.02	0.88	0.10
Capital adequacy	15.85	8.26	94.37	3.43	14.32	8.26	21.28	2.14	3.00	0.10	11.66	4.27
Size	10.64	9.33	13.78	3.66	12.04	10.59	13.77	0.59	8.53	9.33	13.54	2.12
Oil price	2.25	−15.58	8.10	4.30	2.25	−15.58	8.10	4.30	2.25	−15.58	8.10	4.30
Inflation	0.87	−0.70	5.70	1.10	0.87	−0.70	5.70	1.10	0.87	−0.70	5.70	1.10
GDP growth	4.17	−10.60	13.37	4.15	4.17	−10.60	13.37	4.15	4.17	−10.60	13.37	4.15

Source: Author calculation

Table 3: Pairwise correlations

Variables	1	2	3	4	5	6	7	8	9	10
ROA	1									
ROE	0.764***	1								
Lending growth	0.062***	0.032***	1							
Deposit growth	0.089***	0.056*	0.356***	1						
Oil price shocks	0.264***	0.248***	0.231***	0.208***	1					
Bank size	0.003	0.242***	0.023***	0.111	0.068***	1				
Capital adequacy	0.194***	0.162	0.198**	0.102	0.055*	0.059*	1			
Liquidity	0.161***	0.088**	0.012**	0.173**	0.074*	0.044	0.125***	1		
Inflation	0.098***	0.108***	0.128***	0.108***	0.374***	0.111***	-0.009	0.154***	1	
GDP growth	0.202***	0.205***	0.105***	0.056***	0.293***	0.187***	0.0123***	−0.057	0.239***	1

***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

common shocks due to their industry links. The results in Table 4 show that the null hypothesis was rejected at the 1% significance level for all variables.

Table 5 reports the results of the CIPS panel unit root tests. The findings imply that the unit root null hypothesis cannot be rejected. Accordingly, we found that all variables are integrated of order 1.

After performing a panel unit root analysis, the next step is to test the presence of a cointegration relationship between interest variables. To do this, we use Westerlund's (2007) panel error correction cointegration test, which can handle cross-sectionally dependent variables. The results of the Westerlund cointegration tests for all specifications are reported in Table 6. The null hypothesis of no cointegration relationship can be rejected at the 1% level of significance in both the linear and non-linear specifications.

Table 4: Results of cross-sectional dependence

Variables	CD statistic	P-value
ROA	3.10***	(0.002)
ROE	4.45***	(0.000)
Lending growth	6.08***	(0.000)
Deposit growth	3.56***	(0.000)
Oil prices	50.20***	(0.003)
Size	35.81***	(0.003)
Capital adequacy	7.29***	(0.000)
Liquidity	10.95***	(0.000)
Inflation	50.20***	(0.000)
GDP growth	50.20***	(0.000)

Null hypothesis: Cross-section independence

In the next step, we estimated the short—and long-run effects. Table 7 shows the results of eight models for four bank performance indicators (ROA, ROE, lending growth, and deposit growth). The models vary depending on whether we include only bank-specific control variables (specification I)

Table 5: CIPS unit root tests result

Variables	Level				First difference			
	Lag length (q)							
	q=1	q=2	q=3	q=4	q=1	q=2	q=3	q=4
Model with individual-specific intercepts								
ROA	−1.753	−1.911	−2.155	−2.245	−8.469	−6.237	−5.805	−4.328
ROE	−1.294	−1.346	−1.606	−1.856	−7.683	−5.169	−4.357	−5.561
Lending growth	−2.096	−1.778	−1.337	−1.597	−6.541	−4.928	−3.984	−5.583
Deposit growth	−1.357	−2.036	−1.960	−1.616	−6.088	−5.709	−4.521	−6.464
Oil prices	−1.055	−1.438	−1.901	−1.831	−5.524	−4.239	−4.083	−5.776
Size	−1.941	−1.830	−1.683	−1.906	−3.091	−3.671	−4.790	−5.019
Capital adequacy	−1.495	−2.153	−2.066	−1.944	−5.520	−2.902	−4.072	−3.701
Liquidity	−1.611	−1.857	−1.636	−1.779	−4.546	−3.870	−5.997	−4.662
Inflation	−1.713	−1.878	−1.996	−1.878	−9.033	−4.403	−5.205	−6.366
GDP growth	−1.823	−1.769	−2.290	−2.134	−5.494	4.923	−4.114	−4.719
Model with individual linear trends								
ROA	−2.016	−2.593	−2.537	−2.464	−8.689	−6.587	−6.075	−4.508
ROE	−1.988	−2.197	−2.617	−2.381	−7.903	−5.519	−4.627	−5.741
Lending growth	−2.223	−2.098	−1.947	−1.967	−6.761	−5.278	−4.254	−5.763
Deposit growth	−2.246	−2.356	−2.371	−1.986	−6.308	−6.059	−4.791	−6.644
Oil prices	−1.888	−1.758	−2.311	−2.201	−5.744	−4.589	−4.353	−5.956
Size	−2.144	−2.159	−2.093	−2.276	−3.311	−4.021	−5.06	−5.199
Capital adequacy	−2.217	−2.473	−2.476	−2.314	−5.74	−3.252	−4.342	−3.881
Liquidity	−2.522	−2.177	−2.046	−2.149	−4.766	4.22	−6.267	−4.842
Inflation	−2.366	−2.198	−2.421	−2.248	−9.253	−4.753	−5.475	−6.546
GDP growth	−2.422	−2.089	−2.115	−2.504	−5.714	−4.273	−4.384	−4.899

Critical values are compared with the CIPS critical values listed in Tables IIb and IIc from Pesaran (2007)

Table 6: Results of panel cointegration test

Dependent variable	ROA				ROE			
	Linear model		Non-linear model		Linear model		Nonlinear model	
	Statistic	P-value	Statistic	P-value	Statistic	P-value	Statistic	P-value
G_t	−4.458	(0.000)	−4.059	(0.000)	−5.704	(0.000)	−3.698	(0.000)
G_a	−25.321	(0.000)	−21.910	(0.000)	−24.151	(0.000)	−30.381	(0.000)
P_t	−14.910	(0.000)	−12.377	(0.000)	−9.919	(0.000)	−12.324	(0.000)
P_a	−29.087	(0.000)	−22.384	(0.000)	−17.936	(0.000)	−26.498	(0.000)
Dependent variable	**Lending growth**				**Deposit growth**			
	Linear model		**Nonlinear model**		**Linear model**		**Nonlinear model**	
	Statistic	**P-value**	**Statistic**	**P-value**	**Statistic**	**P-value**	**Statistic**	**P-value**
G_t	−5.489	(0.000)	−5.686	(0.000)	−4.788	(0.000)	−4.700	(0.000)
G_a	−26.161	(0.000)	−22.211	(0.000)	−23.297	(0.000)	−15.796	(0.000)
P_t	−17.346	(0.000)	−17.545	(0.000)	−16.311	(0.000)	−14.682	(0.000)
P_a	−30.717	(0.000)	−27.734	(0.000)	−26.581	(0.000)	−21.863	(0.000)

H0: No cointegration.

or both bank-specific and macroeconomic control variables (specification II).

The long-run estimates for specification (I) show that the impact of oil price shock is positive and statistically significant for all models. This suggests that oil prices are indeed related to bank performance in the Saudi Arabian economy, which heavily relies on the oil sector. Higher oil prices generate windfall oil revenues, along with high government spending. This, in turn, boosts the banking system's liquidity, improves banks' lending capacities, and enhances their overall performance. Conversely, lower oil prices result in government revenues, leading to decrease in government deposits and limiting banks' lending capacities.

The results indicate that a one standard deviation increase in oil price changes results in a 0.034 (0.008 × 4.30) point increase in ROA, which represents 7.4% of the mean ROA. A similar pattern is observed for ROE, with a one standard deviation increase in oil price changes being associated with a 0.21 point rise in ROE, equivalent to 6.4% of the mean ROE. The impact of oil price shocks on lending and deposit growth is also significant, leading to a 0.038 increase in credits and a 0.004 increase in deposits. These changes represent 10% and 4.7% of the mean lending growth and deposit growth, respectively.

Our results align with recent studies suggesting that there is a positive relationship between oil price shocks and bank performance (El Mahmah and Trabelsi, 2021; Hesse and Poghosyan, 2016; Kandil and Markovski, 2019).

We include a set of macroeconomic variables to differentiate between the direct and indirect effects of oil price shocks. The

Table 7: Linear ARDL estimation

Specification	Dependent variable							
	ROA		ROE		Lending growth		Deposit growth	
	I	II	I	II	I	II	I	II
Long-run estimates								
Oil prices	0.008*** (0.000)	0.011*** (0.000)	0.049***(0.000)	0.003*** (0.003)	0.009*** (0.000)	0.004*** (0.001)	0.001*** (0.026)	0.002*** (0.017)
Capital adequacy	0.067 (0.399)	0.080 (0.464)	0.002 (0.799)	0.038 (0.103)	0.017 (0.992)	0.001 (0.166)	0.003 (0.295)	0.001 (0.654)
Liquidity	0.246* (0.084)	0.012*** (0.000)	0.030* (0.060)	0.052** (0.010)	0.004*** (0.003)	0.004* (0.071)	0.002 (0.889)	0.020* (0.045)
Size	0.085*** (0.002)	0.027** (0.363)	0.011*** (0.000)	0.005* (0.072)	0.009** (0.020)	0.007* (0.062)	0.001* (0.101)	0.005*** (0.001)
Inflation		−0.012*** (0.000)		−0.007*** (0.000)		−0.001 (0.279)		0.001 (0.109)
GDP growth		0.002 (0.430)		0.003 (0.372)		0.006 (0.794)		0.007 (0.573)
Short-run estimates								
Error correction	−0.61*** (0.000)	−0.57*** (0.005)	−0.476* (0.000)	−0.37*** (0.015)	−1.061** (0.000)	−1.60*** (0.002)	−0.291*** (0.000)	−1.588** (0.000)
$(\Delta ROA)_{t-1}$	−0.13*** (0.000)	−0.052 (0.699)						
$(\Delta ROE)_{t-1}$			−0.18*** (0.000)	−0.289** (0.016)				
$(\Delta \text{Lending growth})_{t-1}$					−0.488** (0.034)	−0.008** (0.014)		
$(\Delta \text{Deposit growth})_{t-1}$							−0.057*** (0.000)	−0.422** (0.033)
$(\Delta \text{Oil prices})_{t-1}$	0.062* (0.096)	0.009 (0.179)	0.003 (0.164)	0.011*** (0.005)	−0.012 (0.576)	0.010 (0.109)	0.003 (0.658)	0.051 (0.251)
$(\Delta \text{Capital adequacy})_{t-1}$	−0.057 (0.116)	−0.049 (0.291)	−0.250 (0.166)	−0.322 (0.261)	−0.265 (0.218)	0.674 (0.145)	0.336* (0.087)	0.055* (0.060)
$(\Delta \text{Liquidity})_{t-1}$	−0.010*** (0.005)	−0.008* (0.079)	−0.079*** (0.001)	−0.111** (0.019)	−0.966 (0.232)	0.400** (0.017)	0.158 (0.210)	0.074 (0.665)
$(\Delta \text{Size})_{t-1}$	−0.001 (0.910)	−0.003 (0.804)	−0.015 (0.799)	−0.006 (0.209)	−0.483 (0.430)	0.492** (0.028)	0.592 (0.354)	0.693 (0.446)
$(\Delta \text{Inflation})_{t-1}$		−0.059*** (0.002)		−0.002* (0.053)		−0.006* (0.048)		−0.001* (0.051)
$(\Delta \text{gdp growth})_{t-1}$		0.002** (0.043)		0.002** (0.014)		0.001** (0.021)		0.003** (0.013)
Constant	−0.006*** (0.000)	−0.006** (0.037)	−0.045** (0.001)	0.054* (0.081)	0.013*** (0.000)	0.036** (0.027)	0.055 (0.000)	0.071 (0.000)

ARDL: Autoregressive distributed lag

empirical results for specification (II) show that the impact of oil price changes remains positive and significant for all models. This suggests that oil price shocks have a direct impact on the performance of the banking sector in Saudi Arabia, as they influence bank deposits and lending activities to support growth in the non-oil sector. This differs from the findings of Hesse and Poghosyan (2009), who found that oil price shocks have an indirect effect on bank profitability, channeled through macroeconomic variables.

Among macroeconomic variables, we found that inflation has a negative and significant impact only on ROA and ROE. This implies that bank profitability in Saudi Arabia decreases in times of high inflation. Rising inflation leads to higher nominal interest rates, which could potentially reduce credit demand and consequently lower bank capacities for lending and profitability (El Mahmah and Trabelsi, 2021). However, the impact of GDP growth on bank performance is found to be insignificant.

Regarding the impact of bank-specific factors, we found a positive and significant effect of liquidity and size on profitability (ROA, ROE), lending, and deposit growth, which is consistent with previous research. However, the impact of capital adequacy is not significant at a 5% level. These findings remained consistent across all four models. As a result, larger and more liquid banks are better able to take advantage of oil price booms, which improves their performance.

Regarding the short-term estimations, the error correction coefficients are significant and negative, indicating the presence of a long-term co-integration relationship between the variables. However, in almost all cases, the coefficients of lagged changes in oil prices are not statistically significant. According to Khandelwal et al. (2016), in the short-run, oil prices may not have a significant impact due to the influence of macroeconomic variables such as growth rate. This finding implies that oil price shocks are more likely to have a long-term impact rather than a short-term one. Additionally, factors such as capital adequacy and size do not appear to influence bank performance, whereas liquidity is found to have a negative and significant influence on bank profitability; it is, however, not consistent with our expectations. The impact of inflation remains negative and significant at a 10% level. In comparison, GDP growth has a positive and significant impact at a 5% level, indicating that bank performance improves during periods of economic growth.

As a next step, we analyze the asymmetric effects of oil price shocks by estimating the nonlinear ARDL (NARDL) model to assess the impact of positive and negative oil price shocks. To check the presence of asymmetric effects of oil shocks, we rely on two main tests. The first test involved the cointegration test of Westerlund (2007). The result indicates that nonlinear long-run relationships exist among variables (Table 3). The second test is the Wald test for the validity of short and long-term asymmetries (Shin et al., 2014). According to the Wald statistic, the null hypothesis is rejected for both short- and long-run coefficients (Table 8). The results indicate a valid asymmetric effect of oil price shocks in the short and long run. Therefore, the NARDL model, which allows

Table 8: Testing asymmetries

Specification	ROA		ROE		Lending growth		Deposit growth	
	I	II	I	II	I	II	I	II
Panel A: Long-term asymmetries								
W_{LR} test	1.81*	2.81**	1.55**	1.89***	0.05***	0.08*	1.43*	1.98***
H_0=No long-run asymmetry	(0.095)	(0.002)	(0.015)	(0.000)	(0.008)	(0.058)	(0.062)	(0.038)
Panel B: Short-term asymmetries								
W_{SR} test	0.88***	0.03*	0.99***	1.15*	1.54***	1.75**	0.58**	0.79*
H_0=No Short-run asymmetry	(0.000)	(0.052)	(0.102)	(0.064)	(0.001)	(0.024)	(0.014)	(0.074)

for short— and long-term asymmetry, is the best way to model the relationship between oil prices and bank performance.

Table 9 reports the impact of both positive and negative oil price shocks. The coefficients of correlation are statistically significant in all models, indicating that oil shocks have significant effects. Positive oil shocks positively affect bank performance, while negative shocks have a negative impact. Furthermore, oil price shocks have asymmetric effects on bank performance. Specifically, positive oil shocks have a greater impact on bank performance compared to negative shocks. For instance, a positive oil price shock leads to a positive and statistically significant effect of 0.09 on ROA, while a negative oil price shock results in a negative impact of 0.006 on ROA.

Saudi Arabian banks benefit from favorable conditions following oil price increases, likely due to the increased government spending, improved liquidity, and enhanced creditworthiness of private firms and borrowers. On the other hand, when oil prices decrease, bank performance is adversely affected, albeit to a lesser extent. This may be attributed to the deterioration of firm balance sheet positions and creditworthiness. As oil is a crucial source of liquidity, banks may need to reduce lending. It is inferred that a drop in oil prices has an adverse effect on bank performance, exacerbated by a slowdown in GDP growth.

The banking system can leverage the excess liquidity accumulated during oil price booms to alleviate the adverse effects during oil price busts. This finding aligns with banking literature, which suggests that bank lending is procyclical. Therefore, banking lending behavior and its impacts on bank performance are potentially asymmetric as well (Ibrahim, 2019). The results support previous findings in the literature and confirm the asymmetric effects of oil price shocks (Al-Khazali and Mirzaei, 2017a; Ibrahim, 2019; Saif-Alyousfi et al., 2021). Nonetheless, the study argues that positive oil price shocks have a greater impact on bank performance compared to negative shocks, in contrast to some earlier research, such as Al-Khazali and Mirzaei (2017) and Saif-Alyousfi et al. (2021).

To distinguish between the direct and indirect effects of oil price changes on bank performance, we include both inflation and GDP growth in the specification (II) of each model. Empirical results show that GDP and inflation are found to be significant and positive. Furthermore, the coefficients of oil shocks remain statistically significant in all models, implying that positive and negative oil price shocks have a direct bearing on bank performance.

We find several interesting results regarding bank-specific control variables. Apart from reaffirming the positive impact of size and liquidity, the results provide support for the relevance of capitalization. More particularly, capital adequacy enters positively and statistically in all models. Well-capitalized banks tend to have higher loan portfolio quality, indicating that costly capital equity may force banks to allocate funds to more profitable projects, which may lead to improved performance.

This section examines the influence of bank types on their performance by comparing Islamic banks (IBs) and conventional banks (CBs) in response to oil price shocks. Table 10 presents the results for both short—and long–term relationships for Islamic banks (IBs), while Table 11 displays the results for conventional banks (CBs). This analysis thoroughly assesses the sign and significance of coefficients to understand the differential responses to oil shocks.

Our analysis revealed that several variables have significant long–term effects on the bank performance of both IBs and CBs. Notably, we found positive coefficients of oil price shocks for both IBs and CBs, pointing to similar characteristics and potential links to policies and the regulatory framework (Esmaeil et al., 2020). Furthermore, empirical results indicate that oil price changes have a positive and significant impact on bank performance, even when macroeconomic variables are considered. This implies a direct effect of oil price shocks on the performance of all banks in Saudi Arabia. Our findings validate previous research highlighting the influence of oil prices on bank performance across various bank types.

Additionally, the results indicate a significant difference in the impact of oil price shocks on the performance of IBs and CBs. More specifically, oil price shocks have a more pronounced effect on the performance of CBs compared to IBs. This result suggests that the significant impact of oil price shocks is mainly channeled through CBs. It highlights how conventional banks can improve their financial performance and lending capabilities by attracting deposits and taking advantage of favorable economic conditions following an increase in oil prices. These results align with the previous study of Saif-Alyousfi et al. (2021), suggesting that conventional banks benefit more from oil price shocks. However, they contradict the results of Hesse and Poghosyan (2016), which concluded that oil price changes do not have a significant impact on IBs and CBs.

Moreover, the study found that liquidity and size have a positive effect on CBs but not on IBs. Regarding capital adequacy, a negative

Table 9: Panel Non-linear ARDL estimation

Specification	Dependent variable							
	ROA		ROE		Lending growth		Deposit growth	
	I	II	I	II	I	II	I	II
long-run estimates								
Oil prices^{+}	0.099*** (0.000)	0.076** (0.033)	0.096*** (0.002)	0.083** (0.017)	0.085*** (0.006)	0.048***(0.008)	0.002***(0.001)	0.001** (0.038)
Oil prices^{-}	−0.006***(0.010)	−0.018*** (0.000)	−0.045*** (0.010)	−0.069 (0.028)	−0.007*** (0.000)	−0.030**(0.021)	−0.008 (0.016)	−0.004*** (0.004)
Capital adequacy	0.056** (0.032)	0.030*** (0.002)	0.139*** (0.000)	0.050*** (0.000)	0.076** (0.048)	0.011** (0.043)	0.002* (0.097)	0.262*** (0.000)
Liquidity	0.012 (0.620)	0.037 (0.327)	0.044 (0.979)	0.049*** (0.008)	0.0171*** (0.000)	0.044***(0.000)	0.126** (0.019)	0.028** (0.029)
Size	0.002*** (0.001)	0.010 (0.338)	0.008* (0.061)	0.019* (0.054)	0.002*** (0.005)	0.279***(0.000)	0.010***(0.000)	0.016*** (0.000)
Inflation		0.027* (0.058)		0.005*** (0.007)		0.003** (0.036)		0.007*** (0.000)
GDP growth		0.012*** (0.000)		0.0671** (0.021)		0.006** (0.011)		0.006*** (0.000)
Short−run estimates								
Error correction	−0.592*** (0.000)	−0.478** (0.036)	−0.454*** (0.000)	−0.389** (0.015)	−0.633** (0.025)	−0.617**(0.015)	−1.675***(0.000)	−1.273***(0.006)
$(\Delta ROA)_{t-1}$	−0.139***(0.004)	−0.117 (0.455)						
$(\Delta ROE)_{t-1}$			−0.195*** (0.000)	−0.293** (0.050)				
$(\Delta Loangr)_{t-1}$					−0.522** (0.036)	−0.002**(0.035)		
$(\Delta Depositgr)_{t-1}$							−0.250***(0.001)	−0.362** (0.040)
$(\Delta Oilprices)_{t-1}^{+}$	0.011 (0.066)	0.0587*** (0.000)	0.007 (0.012)	0.030*** (0.001)	0.013 (0.259)	0.009 (0.398)	0.030 (0.478)	0.103 (0.748)
$(\Delta Oilprices)_{t-1}^{-}$	−0.001 (0.869)	−0.034 (0.412)	−0.003 (0.346)	−0.009* (0.080)	−0.098 (0.221)	−0.009 (0.280)	−0.013 (0.281)	−0.034 (0.298)
$(\Delta Capitalisation)_{t-1}$	−0.056 (0.150)	−0.0463* (0.079)	−0.292** (0.013)	−0.249** (0.046)	−0.314* (0.069)	−0.615***(0.007)	−0.317**(0.019)	−0.040** (0.020)
$(\Delta Liquidity)_{t-1}$	−0.012*** (0.002)	−0.011* (0.052)	−0.102*** (0.003)	−0.054 *** (0.000)	−0.939 (0.287)	−0.066 (0.279)	−0.037 (0.632)	0.208 (0.472)
$(\Delta Size)_{t-1}$	−0.013 (0.908)	−0.00 (0.804)	−0.004 (0.202)	−0.018 (0.480)	−0.608 (0.346)	−0.034 (0.537)	0.478** (0.035)	0.691 (0.412)
$(\Delta Inflation)_{t-1}$		−0.013** (0.014)		−0.025***(0.010)		−0.0019*(0.092)		−0.001* (0.051)
$(\Delta gdpGrowth)_{t-1}$		0.006** (0.035)		0.020*** (0.003)		0.009***(0.004)		0.003* (0.053)
Constant	0.518*** (0.000)	0.219** (0.020)	0.269*** (0.000)	0.197** (0.015)	0.213** (0.018)	0.120** (0.022)	0.365***(0.000)	0.398*** (0.008)

ARDL: Autoregressive distributed lag

relationship was found between ROE and capital adequacy for IBs, whereas a positive and significant relationship was found for CBs. This finding aligns with finance theory, indicating that capital is a high−cost financing mode that decreases bank profits. Hence, IBs should avoid excessively strengthening their capital base as it could negatively impact long-term profitability.

We found that GDP growth has a positive and significant impact on CBs and IBs. In contrast, inflation has a negative and significant impact on bank performance in IBs but does not influence bank performance in CBs. Some studies on Islamic banking have found this relationship (Muda et al., 2013; Zeitun, 2012). This can be attributed to the fact that anticipating inflation is difficult for IBs due to the profit-sharing mechanism, which exposes banks to the effect of inflation. Conversely, CBs can adjust interest rates accordingly, leading to increased revenues surpassing costs.

While most of the variables significantly impact all four performance indicators in the long run for both IBs and CBs, the impact in the short run is not significant except for oil price and liquidity. These two determinants have generated positive and negative impacts on ROE for CBs.

The coefficients of the error correction term (ECT) are both negative and significant. This suggests that in the presence of shocks, both CBs and IBs can return to equilibrium. Additionally, the adjustment speed of CBs to equilibrium in the presence of shock is higher than that for IBs. This implies that IBs may have a greater potential for sustainable performance compared to CBs. However, these findings contradict the results of Esmaeil et al. (2020), who concluded that the sustainable profit of IBs is higher than that of CBs in GCC countries.

Tables 12 and 13 present the impact of positive and negative oil price shocks on the performance of CBs and IBs, respectively. Based on the long-term estimates, the coefficients of oil price shocks are statistically significant for all models. The estimated coefficients for an increase in oil prices are positive, while the opposite is true for a decrease in oil prices.

In addition, the fluctuations in oil prices have an asymmetric effect on CBs and IBs. Specifically, increases in oil prices have a notably more positive impact on the performance of CBs than IBs. Conversely, a decrease in oil prices has a higher negative impact on the performance of IBs than CBs. These findings are in line with those of Saif-Alyousfi et al. (2021).

In Saudi Arabia, CBs benefit the most from positive oil price shocks, while IBs are generally more vulnerable to adverse oil price shocks. This suggests that when oil prices fall, CBs are able to adjust their costs more effectively than IBs. This may be due to the distinct business models of these two bank types. CBs are primarily engaged in lending, while IBs focus on investment activities. The lending activities of CBs tend to expand rapidly when oil prices rise, leading to potential overextension in their lending activities. Consequently, when the cycle turns, oil prices decline, and the economy slows down, it negatively affects corporate performance, resulting in a bad performance for CBs. On the other hand, as IBs

Table 10: Linear ARDL estimation for conventional banks

Specification	Dependent variable							
	ROA		ROE		Lending growth		Deposit growth	
	I	II	I	II	I	II	I	II
Long-run estimates								
Oil prices	0.095*** (0.000)	0.084*** (0.000)	0.055** (0.013)	0.076*** (0.000)	0.069*** (0.009)	0.083*** (0.000)	0.061* (0.069)	0.067** (0.025)
Capitalisation	0.006 (0.938)	0.004 (0.591)	0.006 (0.410)	0051*** (0.000)	0.103*** (0.004)	0.932*** (0.000)	0.014** (0.024)	0.003** (0.016)
Liquidity	0.019 (0.399)	0.042* (0.097)	0.038*** (0.000)	−0.014 (0.215)	0.085** (0.048)	0.804*** (0.000)	0.012* (0.054)	0.017** (0.028)
Size	0.008*** (0.001)	0.009*** (0.000)	0.014*** (0.000)	0.011*** (0.000)	0.012 (0.776)	0.105*** (0.000)	0.119** (0.018)	0.013* (0.072)
Inflation		0.002 (0.239)		0.007 (0.177)		−0.005 (0.420)		−0.029 (0.010)
GDP Growth		0.008*** (0.002)		0.006*** (0.000)		0.013*** (0.000)		0.027*** (0.005)
Short-run estimates								
Error correction	−0.806*** (0.001)	−0.734** (0.012)	−0.757*** (0.000)	−0.591** (0.021)	−0.442*** (0.003)	−0.407*** (0.008)	−1.536*** (0.000)	−1.518*** (0.000)
$(\Delta ROA)_{t-1}$	−0.083*** (0.003)	−0.070** (0.018)						
$(\Delta ROE)_{t-1}$			−0.189*** (0.000)	−0.116** (0.017)				
$(\Delta \text{Lending growth})_{t-1}$					−0.052** (0.027)	−0.138** (0.036)		
$(\Delta \text{Deposit growth})_{t-1}$							−0.071*** (0.003)	−0.02*** (0.000)
$(\Delta \text{Oil prices})_{t-1}$	0.003 (0.647)	0.006 (0.565)	0.005 (0.168)	0.057 (0.522)	0.012 (0.691)	0.004 (0.410)	0.012 (0.302)	0.046 (0.312)
$(\Delta \text{Capitalisation})_{t-1}$	0.007 (0.726)	0.040 (0.234)	0.219 (0.309)	0.013 (0.887)	−0.167 (0.211)	0.339 (0.715)	0.455 (0.317)	0.849 (0.315)
$(\Delta \text{Liquidity})_{t-1}$	−0.010 (0.129)	−0.009 (0.114)	−0.045 (0.240)	−0.063 (0.187)	−0.331 (0.194)	−0.454 (0.352)	0.211 (0.432)	0.326 (0.166)
$(\Delta \text{Size})_{t-1}$	0.017 (0.352)	0.027 (0.491)	0.058 (0.259)	0.195 (0.317)	0.239 (0.501)	0.397 (0.322)	0.308 (0.228)	0.249 (0.413)
$(\Delta \text{Inflation})_{t-1}$		0.002 (0.318)		0.001 (0.316)		0.002 (0.120)		−0.003 (0.223)
$(\Delta \text{gdp growth})_{t-1}$		0.007 (0.709)		0.001 (0.229)		0.001 (0.303)		0.006 (0.321)
Constant	0.233** (0.015)	0.495** (0.019)	0.764** (0.017)	0.654*** (0.003)	0.557*** (0.001)	0.673*** (0.002)	0.683*** (0.000)	0.527*** (0.000)

ARDL: Autoregressive distributed lag

Table 11: Linear ARDL estimation for islamic banks

Specification	Dependent variable							
	ROA		ROE		Lending growth		Deposit growth	
	I	II	I	II	I	II	I	II
long-run estimates								
Oil prices	0.088** (0.011)	0.019*** (0.000)	0.008*** (0.003)	0.013*** (0.000)	0.009*** (0.000)	0.005*** (0.009)	0.002** (0.017)	0.003** (0.020)
Capitalisation	−0.001 (0.878)	0.002 (0.721)	0.258*** (0.000)	−0.310*** (0.000)	0.021* (0.096)	0.003 (0.464)	0.063* (0.061)	0.062** (0.049)
Liquidity	0.068* (0.086)	0.023 (0.535)	0.028 (0.327)	0.032 (0.225)	0.004 (0.354)	0.011*** (0.007)	−0.010 (0.532)	−0.015 (0.327)
Size	0.052 (0.261)	0.002 (0.426)	0.003 (0.301)	0.001 (0.593)	0.005 (0.303)	0.001** (0.012)	0.003 (0.113)	0.004 (0.121)
Inflation		−0.003 (0.109)		−0.003 (0.047)		−0.006 (0.705)		−0.008 (0.338)
GDP growth		0.001*** (0.000)		0.007*** (0.009)		0.009*** (0.005)		0.006*** (0.086)
Short-run estimates								
Error correction	−0.599*** (0.000)	−0.578*** (0.001)	−0.539*** (0.000)	−0.533*** (0.000)	−1.022*** (0.050)	−1.005*** (0.003)	−1.214*** (0.001)	−1.125*** (0.003)
$(\Delta ROA)_{t-1}$	−0.175*** (0.014)	−0.213*** (0.000)						
$(\Delta ROE)_{t-1}$			−0.212*** (0.000)	−0.218*** (0.000)				
$(\Delta \text{Lending growth}_{t-1}$					−0.794** (0.019)	−0.018** (0.041)		
$(\Delta \text{Deposit growth})_{t-1}$							−0.024*** (0.005)	−0.015*** (0.009)
$(\Delta \text{Oil prices})_{t-1}$	0.085 (0.213)	0.003 (0.401)	0.006** (0.043)	0.005** (0.014)	0.001 (0.845)	0.013 (0.272)	0.007 (0.908)	0.021 (0.330)
$(\Delta \text{Capitalisation})_{t-1}$	−0.073 (0.251)	−0.073 (0.259)	−0.367 (0.240)	−0.334 (0.352)	−0.318 (0.359)	−0.536 (0.301)	−0.815 (0.123)	−0.739 (0.207)
$(\Delta \text{Liquidity})_{t-1}$	−0.059 (0.142)	−0.001 (0.179)	−0.078*** (0.002)	−0.069* (0.072)	−0.332 (0.137)	−0.045 (0.837)	−0.143 (0.253)	−0.142 (0.104)
$(\Delta \text{Size})_{t-1}$	−0.077 (0.555)	−0.007 (0.804)	−0.047 (0.448)	−0.018 (0.418)	−0.986 (0.263)	−0.075 (0.746)	−0.179 (0.221)	−0.208 (0.171)
$(\Delta \text{Inflation})_{t-1}$		−0.001 (0.125)		−0.002 (0.283)		−0.003 (0.269)		−0.002 (0.310)
$(\Delta \text{gdp growth})_{t-1}$		0.006 (0.055)		0.001 (0.320)		0.003 (0.365)		0.001 (0.203)
Constant	0.529*** (0.001)	0.426** (0.014)	0.357*** (0.009)	0.594*** (0.003)	0.962*** (0.008)	0.878** (0.043)	0. 933*** (0.001)	0.993*** (0.004)

ARDL: Autoregressive distributed lag

Table 12: Panel non-linear ARDL estimation for conventional banks

Specification	Dependent variable							
	ROA		ROE		Lending growth		Deposit growth	
	I	II	I	II	I	II	I	II
long-run estimates								
Oilprices+	0.038*** (0.007)	0.022*** (0.000)	0.031 (0.006)	0.035*** (0.000)	0.041*** (0.002)	0.053*** (0.000)	0.077*** (0.007)	0.089* (0.075)
Oilprices−	−0.005* (0.073)	−0.001*** (0.004)	−0.002** (0.014)	−0.003*** (0.001)	−0.003*** (0.009)	−0.046* (0.063)	−0.019** (0.043)	−0.003** (0.017)
Capitalisation	0.006 (0.705)	0.002 (0.129)	0.027 (0.049)	0.228*** (0.000)	0.218** (0.015)	0.015*** (0.000)	0.002 (0.540)	0.084** (0.046)
Liquidity	−0.002 (0.263)	−0.001 (0.443)	−0.221*** (0.000)	−0.115*** (0.000)	−0.161*** (0.000)	−0.026* (0.092)	−0.007 (0.418)	−0.019 (0.861)
Size	0.008 (0.308)	0.004 (0.490)	0.044*** (0.000)	0.075*** (0.000)	0.041** (0.013)	0.036*** (0.000)	0.011*** (0.009)	0.004 (0.254)
Inflation		−0.002 (0.151)		−0.004*** (0.000)		−0.028** (0.029)		−0.003*** (0.000)
GDP growth		0.003** (0.037)		0.008*** (0.000)		0.005* (0.087)		0.006** (0.014)
Short-run estimates								
Error correction	−0.701*** (0.004)	−0.735*** (0.005)	−0.616*** (0.000)	−0.788*** (0.000)	−0.861*** (0.000)	−0.875*** (0.000)	−1.522*** (0.000)	−1.492*** (0.002)
$(\Delta ROA)_{t-1}$	−0.067** (0.014)	−0.053* (0.052)						
$(\Delta ROE)_{t-1}$			−0.101*** (0.001)	−0.132*** (0.000)				
$(\Delta Lending\ growth)_{t-1}$					−0.063** (0.028)	−0.051** (0.024)		
$(\Delta Deposit\ growth)_{t-1}$							−0.082*** (0.000)	−0.043*** (0.002)
$(\Delta Oilprices)_{t-1}^{+}$	0.007 (0.951)	0.002 (0.943)	0.006 (0.325)	0.002 (0.895)	0.019 (0.286)	0.038 (0.572)	0.128 (0.249)	0.026** (0.041)
$(\Delta Oilprices)_{t-1}^{-}$	−0.003 (0.861)	−0.006 (0.794)	−0.005 (0.473)	−0.014 (0.528)	−0.004 (0.604)	−0.006 (0.726)	−0.137 (0.386)	−0.107 (0.288)
$(\Delta Capitalisation)_{t-1}$	0.035 (0.074)	0.011 (0.655)	0.276 (0.527)	0.372 (0.236)	0.057 (0.292)	0.213*** (0.000)	0.271 (0.194)	0.072 (0.367)
$(\Delta Liquidity)_{t-1}$	−0.015** (0.017)	−0.007*** (0.008)	−0.024 (0.509)	−0.104 (0.189)	−0.236 (0.731)	−0.336 (0.168)	−0.351 (0.307)	−0.057 (0.238)
$(\Delta Size)_{t-1}$	0.011 (0.535)	0.038 (0.340)	0.115 (0.118)	0.090 (0.214)	0.230 (0.462)	0.211 (0.638)	0.389 (0.274)	0.613 (0.232)
$(\Delta Inflation)_{t-1}$		−0.003 (0.222)		−0.001 (0.214)		−0.005 (0.427)		−0.004 (0.434)
$(\Delta gdp\ growth)_{t-1}$		0.008 (0.886)		0.005* (0.057)		0.001 (0.272)		0.003 (0.353)
Constant	0.711*** (0.001)	0.827*** (0.000)	0.963*** (0.008)	0.681*** (0.004)	0.804** (0.016)	0.716** (0.047)	0.813*** (0.006)	0.882** (0.042)

ARDL: Autoregressive distributed lag

Table 13: Panel non-linear ARDL estimation for islamic banks

Specification	Dependent variable							
	ROA		ROE		Lending growth		Deposit growth	
	I	II	I	II	I	II	I	II
Long-run estimates								
Oilprices+	0.017*** (0.002)	0.003*** (0.000)	0.012*** (0.000)	0.019*** (0.000)	0.017*** (0.000)	0.059*** (0.009)	0.030** (0.032)	0.009** (0.048)
Oilprices−	−0.011** (0.014)	−0.002*** (0.000)	−0.009*** (0.000)	−0.016*** (0.000)	−0.004*** (0.000)	−0.011** (0.035)	−0.002** (0.025)	−0.001* (0.051)
Capitalisation	0.001 (0.988)	0.005 (0.449)	−0.222*** (0.000)	−0.261*** (0.000)	0.008 (0.992)	0.002 (0.976)	0.065* (0.083)	0.063* (0.073)
Liquidity	0.084** (0.035)	0.004 (0.378)	0.042 (0.113)	0.037 (0.149)	−0.020*** (0.000)	−0.015*** (0.001)	−0.010 (0.552)	−0.012 (0.479)
Size	−0.002 (0.125)	−0.001 (0.184)	−0.010* (0.067)	−0.012** (0.042)	−0.005** (0.020)	−0.007*** (0.001)	−0.003 (0.425)	−0.003 (0.401)
Inflation		−0.005 (0.138)		−0.003** (0.050)		−0.002 (0.335)		−0.001 (0.262)
GDP growth		0.001*** (0.002)		0.007*** (0.008)		0.001*** (0.003)		0.002*** (0.001)
Short−run estimates								
Error correction	−0.583*** (0.000)	−0.519*** (0.003)	−0.574*** (0.000)	−0.552*** (0.000)	−1.094*** (0.000)	−1.646*** (0.008)	−1.254*** (0.000)	−1.437*** (0.002)
$(\Delta ROA)_{t-1}$	−0.187*** (0.015)	−0.239*** (0.000)						
$(\Delta ROE)_{t-1}$			−0.205*** (0.000)	−0.220*** (0.000)				
$(\Delta Lending\ growth)_{t-1}$					−0.079** (0.032)	−0.074** (0.038)		
$(\Delta Deposit\ growth)_{t-1}$							−0.031*** (0.000)	−0.027*** (0.000)
$(\Delta Oilprices)_{t-1}^{+}$	0.021 (0.000)	0.001 (0.005)	0.005 (0.526)	0.008 (0.296)	0.011 (0.296)	0.031 (0.298)	0.032 (0.447)	0.044 (0.420)
$(\Delta Oilprices)_{t-1}^{-}$	−0.005 (0.543)	−0.009 (0.494)	−0.001 (0.536)	−0.007 (0.903)	−0.027 (0.283)	−0.016 (0.249)	−0.014 (0.402)	−0.009 (0.606)
$(\Delta Capitalisation)_{t-1}$	−0.077 (0.276)	−0.071 (0.251)	−0.377 (0.308)	−0.307 (0.411)	−0.592 (0.332)	−0.448 (0.352)	−0.056*** (0.017)	−0.043*** (0.008)
$(\Delta Liquidity)_{t-1}$	−0.009 (0.102)	−0.008*** (0.000)	−0.096*** (0.004)	−0.077* (0.054)	−0.971 (0.203)	−0.211 (0.197)	−0.171 (0.106)	0.016* (0.051)
$(\Delta Size)_{t-1}$	−0.007 (0.593)	−0.007 (0.579)	−0.036 (0.586)	−0.043 (0.516)	−0.607 (0.200)	−0.094 (0.295)	0.166 (0.259)	0.186 (0.217)
$(\Delta Inflation)_{t-1}$		−0.004** (0.016)		−0.004*** (0.003)		−0.001* (0.063)		−0.002* (0.097)
$(\Delta gdp\ growth)_{t-1}$		0.006* (0.091)		0.001 (0.493)		0.007 (0.313)		0.001 (0.212)
Constant	0.781*** (0.000)	0.738*** (0.002)	0.893*** (0.000)	0.976*** (0.000)	0.932** (0.018)	0.716** (0.047)	0.964*** (0.006)	0.763*** (0.007)

ARDL: Autoregressive distributed lag

are engaged in investment activities, with the drop in oil prices, which results in a decline in corporate performance, banks in this group suffer more than CBs.

5. CONCLUSION

This paper investigates and compares the effect of oil price shocks on bank performance at the aggregate level as well as the level of conventional and Islamic banks. The autoregressive distributed lag (ARDL) methodology was adopted to analyze a panel of 10 Saudi banks, including 6 conventional and 4 Islamic banks, between 2006 Q1 and 2022 Q4.

Based on ARDL model estimates, we found that the impact of oil price shocks is positive and statistically significant across all models. This indicates that there is a strong relationship between oil prices and bank performance in the Saudi Arabian economy, which is heavily dependent on the oil sector. In terms of short-term estimations, the coefficients of lagged changes in oil prices are generally not statistically significant across all cases. This finding implies that oil price shocks are more likely to have a long-term impact rather than a short-term one.

The results from specification (II) indicate that the effects of oil price shocks are consistently positive and significant across all models. This indicates that oil price shocks directly affect the performance of the Saudi Arabian banking sector by influencing both bank deposits and lending activities, thus supporting growth in the non-oil sector.

Moreover, we found positive coefficients of oil price shocks for both Islamic banks (IBs) and conventional banks (CBs), suggesting similar characteristics and potential links to policies and the regulatory framework. Additionally, the impact of oil price shocks on the performance of CBs is more significant compared to IBs, implying that the significant impact of oil price shocks is primarily transmitted through CBs.

According to the NARDL model estimates, positive oil shocks have a positive effect on bank performance, while negative shocks have a negative impact. Additionally, positive oil shocks have a greater impact on bank performance compared to negative shocks. Moreover, oil price shocks have an asymmetric effect on CBs and IBs. Specifically, increases in oil prices have a notably more positive impact on the performance of CBs than IBs. Conversely, a decrease in oil prices has a higher negative impact on the performance of IBs than CBs. In Saudi Arabia, it is observed that CBs benefit the most from positive oil price shocks, while IBs are generally more vulnerable to adverse oil price shocks.

Our findings have several policy implications. First, the development of the oil market should be closely supervised as it provides an early warning signal of financial stability. Furthermore, monitoring oil prices is easier than using traditional measures of the business cycle. Second, the implementation of efficient macro-prudential policy measures, such as setting up countercyclical capital and liquidity buffers, is encouraged. Banks can use the capital buffers they build up during booms to make loans during busts. Tying bank capitalization to fluctuations in oil prices may help in moderating procyclical bank lending. Third, policymakers are invited to recognize the asymmetric effects of oil price shocks and their heterogeneous impact across banks. Fourth, due to the direct impact of oil price shocks on bank performance, regulators should establish new control mechanisms to limit excessive lending during periods of high oil prices, thus preventing lending reduction during periods of low oil prices.

REFERENCES

Abubakar, A.B., Muhammad, M., Mensah, S. (2023), Response of fiscal efforts to oil price dynamics. Resources Policy, 81, 103353.

Al-Khazali, O.M., Mirzaei, A. (2017a), The impact of oil price movements on bank non-performing loans: Global evidence from oil-exporting countries. Emerging Markets Review, 31, 193-208.

Al-Khazali, O.M., Mirzaei, A. (2017b), The impact of oil price movements on bank non-performing loans: Global evidence from oil-exporting countries. Emerging Markets Review, 31, 193-208.

Alzoubi, T. (2018), Determinants of bank profitability: Islamic versus conventional banks. Banks and Bank Systems, 13(3), 106-113.

Athanasoglou, P.P., Brissimis, S.N., Delis, M.D. (2008), Bank-specific, industry-specific, and macroeconomic determinants of bank profitability. Journal of International Financial Markets, Institutions and Money, 18(2), 121-136.

Berger, A.N. (1995), The relationship between capital and earnings in banking. Journal of Money, Credit and Banking, 27(2), 432.

Bourke, P. (1989), Concentration and other determinants of bank profitability in Europe, North America and Australia. Journal of Banking and Finance, 13(1), 65-79.

El Mahmah, A., Trabelsi, M. (2021), Banks' Performance Amid Oil Price Shocks: Empirical Evidence from GCC Countries, 2002-2017. In: 27th Annual Conference. Presented at the Sustainable Development Goals and External Shocks in the MENA Region, Economic Research Forum.

Eljelly, A.M.A. (2013), Internal and external determinants of profitability of Islamic banks in Sudan: Evidence from panel data. Afro-Asian Journal of Finance and Accounting, 3(3), 222.

Esmaeil, J., Rjoub, H., Wong, W.K. (2020), Do oil price shocks and other factors create bigger impacts on islamic banks than conventional banks? Energies, 13(12), 3106.

Hesse, H., Poghosyan, T. (2009), Oil prices and bank profitability: Evidence from major oil-exporting countries in the Middle East and North Africa. IMF Working Papers, 9(220), 1.

Hesse, H., Poghosyan, T. (2016), Oil prices and bank profitability: Evidence from major oil-exporting countries in the Middle East and North Africa. Financial Deepening and Post-Crisis Development in Emerging Markets. New York: Palgrave Macmillan US. p. 247-270. Available from: https://link.springer.com/10.1057/978-1-137-52246-7_12 [Last accessed on 2024 March 05].

Hoffmann, P.S. (2011). Determinants of the Profitability of the US Banking Industry. International Journal of Business and Social Science, 2, 255-269.

Homaidi, E.A.A., Almaqtari, F.A., Yahya, A.T., Khaled, A.S.D. (2020), Internal and external determinants of listed commercial banks' profitability in India: Dynamic GMM approach. International Journal of Monetary Economics and Finance, 13(1), 34.

Huizinga, H., Demirguc-Kunt, A. (2000), Financial Structure and Bank Profitability. Policy Research Working Papers. The World Bank. Available from: https://elibrary.worldbank.org/doi/book/10.1596/1813-9450-2430 [Last accessed on 2023 Nov 23].

Ibrahim, M.H. (2019), Oil and macro-financial linkages: Evidence from the GCC countries. The Quarterly Review of Economics and Finance, 72, 1-13.

Kandil, M.E., Markovski, M. (2019), UAE banks' performance and the oil price shock: Evidence Across conventional and Islamic banks. Review of Middle East Economics and Finance, 15(3), 1-23.

Kasman, A., Tunc, G., Vardar, G., Okan, B. (2010), Consolidation and commercial bank net interest margins: Evidence from the old and new European Union members and candidate countries. Economic Modelling, 27(3), 648-655.

Khandelwal, P., Miyajima, K., Santos, A. (2016), The impact of oil prices on the banking system in the GCC. IMF Working Papers, 16(161), 1.

Khediri, K.B., Khedhiri, H.B. (2009), Determinants of Islamic bank profitability in the MENA region. International Journal of Monetary Economics and Finance, 2(3/4), 409.

Kosmidou, K. (2008), The determinants of banks' profits in Greece during the period of EU financial integration. Managerial Finance, 34(3), 146-159.

Mandal, K., Datta, R.P. (2024), Oil price dynamics and sectoral indices in India-pre, post and during COVID pandemic: A comparative evidence from wavelet-based causality and NARDL. International Journal of Economics and Financial Issues, 14(4), 18-33.

Mateev, M., Bachvarov, P. (2021), Regulation, ownership and bank performance in the MENA region: Evidence for Islamic and conventional banks. Emerging Markets Review, 47, 100789.

Molyneux, P., Thornton, J. (1992), Determinants of European bank profitability: A note. Journal of Banking and Finance, 16(6), 1173-1178.

Muda, M., Shaharuddin, A., Embaya, A. (2013), Comparative analysis of profitability determinants of domestic and foreignislamic banks in Malaysia. International Journal of Economics and Financial Issues, 3(3), 559-569.

Nusair, S.A. (2016), The effects of oil price shocks on the economies of the Gulf Co-operation Council countries: Nonlinear analysis. Energy Policy, 91, 256-267.

Pasiouras, F., Kosmidou, K. (2007), Factors influencing the profitability of domestic and foreign commercial banks in the European Union. Research in International Business and Finance, 21(2), 222-237.

Pesaran, M.H., Shin, Y., Smith, R.J. (2001), Bounds testing approaches the analysis of level relationships. Journal of Applied Econometrics, 16(3), 289-326.

Pesaran, M.H., Shin, Y., Smith, R.P. (1999), Pooled mean group estimation of dynamic heterogeneous panels. Journal of the American Statistical Association, 94(446), 621-634.

Quoc Trung, N.K. (2021), Determinants of bank performance in Vietnamese commercial banks: An application of the camels model. Cogent Business and Management, 8(1), 1979443.

Saif-Alyousfi, A.Y.H., Saha, A., Md-Rus, R. (2018), Impact of oil and gas price shocks on the non-performing loans of banks in an oil and gas-rich economy: Evidence from Qatar. International Journal of Bank Marketing, 36(3), 529-556.

Saif-Alyousfi, A.Y.H., Saha, A., Md-Rus, R., Taufil-Mohd, K.N. (2021), Do oil and gas price shocks have an impact on bank performance? Journal of Commodity Markets, 22, 100147.

Shin, Y., Yu, B., Greenwood-Nimmo, M. (2014), Modeling asymmetric cointegration and dynamic multipliers in a nonlinear ARDL framework. In Sickles, R.C., Horrace, W.C., editors. Festschrift in Honor of Peter Schmidt. New York, NY: Springer, New York. Available from: https://link.springer.com/10.1007/978-1-4899-8008-3_9

Short, B.K. (1979), The relation between commercial bank profit rates and banking concentration in Canada, Western Europe, and Japan. Journal of Banking and Finance, 3(3), 209-219.

Smirlock, M. (1985), Evidence on the (Non) Relationship between Concentration and Profitability in Banking. Journal of Money, Credit and Banking, 17(1), 69.

Stiroh, K.J., Rumble, A. (2006), The dark side of diversification: The case of US financial holding companies. Journal of Banking and Finance, 30(8), 2131-2161.

Sun, P.H., Mohamad, S., Ariff, M. (2017), Determinants driving bank performance: A comparison of two types of banks in the OIC. Pacific-Basin Finance Journal, 42, 193-203.

Trujillo-Ponce, A. (2013), What determines the profitability of banks? Evidence from Spain. Accounting and Finance, 53(2), 561–586.

Westerlund, J. (2007), Testing for error correction in panel data. Oxford Bulletin of Economics and Statistics, 69(6), 709-748.

Zeitun, R. (2012), Determinants of islamic and conventional banks performance in GCC countries using panel data analysis. Global Economy and Finance Journal, 5(1), 53-72.

ACKNOWLEDGEMENT

The authors extend their appreciation to the Deanship of Research and Graduate Studies at the University of Tabuk for funding this research no. S-1443-0219.