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Banks' Performance Amid Oil Price Shocks: Empirical Evidence from GCC Countries, 2002-2017

By

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Abstract

The paper explores empirically the factors influencing banks' performances amid oil price fluctuations, using the GMM approach for a sample of GCC banks over the period 2002-2017. Five main results are found in this investigation. *First*, oil prices have significant effects on banking performance, and their adverse effects on aggregate fluctuations ultimately tend to affect financial institutions' performance. *Second*, it is difficult for undercapitalized, and illiquid banks to improve their performance compared to large and well-capitalized banks in presence of oil price volatility. *Third*, Islamic banks have managed to sustain their lending growth, while conventional banks are more focused on maximizing returns, and taking high credit risk than Islamic banks. The difference in the business models makes conventional banks more vulnerable to oil price decline compared to Islamic ones. *Fourth*, State ownership tends to have a positive effect on bank performance, as it eases constraints on banks' borrowing and boosts confidence in the outlook. *Finally*, banks with greater risk-appetite increase their lending but their profits remain more sensitive to oil price volatility.

Key Words: Banks performance, Oil price shocks, Dynamic Panel data modeling, GCC region.

JEL Classifications: C23 ; E50 ; G21 ; G30 ; Q43.

1. Introduction

The sharp oil price decline has generally put pressure on the banking sector in many oil-exporting countries, causing a contraction in liquidity, coupled with a slowdown in demand for loans that impacted credit growth and affected the non-oil activity accordingly. In fact, given that economic activity is reliant on oil prices, higher oil revenue boosts government spending, which leads to abundant liquidity in the banking system and strong confidence in the private sector, resulting in higher deposits and credit in support of the growth of the non-oil sector.

In Gulf Cooperation Council[3] countries (GCC), the oil prices decline in mid-2014 led to a drop in oil revenues that triggered a sharp fiscal consolidation. Most governments relied heavily on the banking system to finance their spending, by drawing down deposits and increasing borrowing. As a result, liquidity decreased, coupled with a reduction in international reserves as the oil price continued to tumble, which has weakened banks' performance in these countries. After the recovery in oil prices in 2017, government revenues recovered and the government started reversing its strategy, easing the pace of fiscal consolidation and diversifying sources of financing. However, despite the recovery in deposits and liquidity in the banking system, credit growth remained weak in many banks of the region, affecting their performances.

Given the importance of the oil sector to the banking system in GCC countries, a widespread literature has analyzed the relevant channels through which bank behavior is affected. However, most of those studies have only focused on the impact of oil price fluctuation on banks' performance, and there has been little attention to the main factors affecting banks' resilience to oil price shocks. This paper tries to fill this gap and focus on identifying the role of some characteristics that improve some measures of banks' performance amid oil price volatility.

According to the existing literature, some bank-specific characteristics could play an important role in increasing the resilience of the banking system amid oil price volatility. Some other banks can hedge against macroeconomic vulnerability and global spillovers by building their own capacity to weather the shocks. Moreover, hedging against nonperforming loans and safeguarding indicators of financial soundness foster growth and boost returns. For example, there has been much debate on the effect of government ownership on the banking system. On the one hand, state ownership brings a 'helping hand', which assumes that the higher the proportion of state ownership in a bank, the more capital

[3] The Gulf Cooperation Council is comprised of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.

subsidy is provided by the government. On the other hand, the government is considered as a patient investor that does not look only for profitability, but also for achieving social objectives that do not pay the return on investment. Another question of interest that has occasionally been explored in the literature is the response of Islamic banks to oil price fluctuation. Islamic banks in GCC countries have become systemically important and continue to increase their market penetration, outpacing conventional banks' assets, lending and deposit growth. It is worthwhile to address the specificity of Islamic banks in contrast to the traditional model of conventional banks, an aspect that has not been deeply analyzed in the literature.

This study uses the generalized method of moments (GMM) techniques on dynamic panels with bank-level data for the GCC countries over the period 2002-2017, to seek answers to the following questions: (i) How do GCC banks respond to oil price shocks? (ii) Which one of the bank's performance indicators is more sensitive to oil price fluctuations? (iii) Do bank-specific features such as size, capitalization and liquidity matter in the bank performance? (iv) How did the bank type (conventional vs. Islamic banks) affect its performance? (v) How government ownership affects banks' indicators? and finally (vi) Is there a role for other bank characteristics, such as risk-taking in influencing bank lending and profitability?

The remainder of this paper is organized as follows: Section 2 provides a review of related literature; section 3 describes the data set and discusses the adopted methodology; section 4 presents the empirical results and tests its robustness; and finally, section 5 concludes with some policy recommendations.

2. Literature review

While the relationship between oil price shocks and the banking sector has been studied topic in recent years, there has been little attention to the main factors affecting banks' resilience to oil price shocks, especially in the GCC region. In general, the banking literature finds that bank performance depends on both bank-specific and macroeconomic factors. Klein (2013) uses data over the period 1998-2011 for the ten largest banks in 16 countries (a total of 160 banks) in Central, Eastern and South-Eastern Europe and finds that macroeconomic conditions are relatively more important than banks specific factors in explaining banks' performance. Thus, this section will focus on the main characteristics described in the literature affecting the banks performance, especially during oil price shocks.

Khandelwal, et al. (2016) examine the links between global oil price movements and macroeconomic and financial developments in the GCC. Using a range of multivariate panel approaches, they found that loan loss provisions and capital adequacy ratios are positively correlated with indicators of business and financial cycles, which has helped strengthen the resilience of the financial system to the oil price decline since mid-2014. Moreover, Poghosyan and Hesse studied the impact of positive oil price changes and found that oil price shocks influence the performance of banks positively. They used data on 145 banks in 11 oil-exporting MENA countries for 1994–2008, to test hypotheses of direct and indirect effects of oil price shocks on bank profitability. Their results revealed that oil price shocks have indirect effect on bank profitability, channeled through country-specific macroeconomic and institutional variables, while the direct effect is insignificant. Investment banks appear to be the most affected ones compared to Islamic and commercial banks. Their paper highlighted systemic implications of oil price shocks on bank performance and underscore their importance for macro prudential regulation purposes in MENA countries.

Some recent studies examined and compared the impact of some alternative characteristics on the banks' performance. For example, findings on ownership have been mixed. Some studies (Borisova et al, 2012; Kandil and Markovski, 2017; Kang, 2012) showed that state ownership may have a positive effect on banks performance due to its several advantages, while other papers (Tian and Estrin, 2008; Pedersen and Kvist, 2006; Andres, 2008) indicated that states owned banks are not motivated in general by achieving a return on investments. Others (Konijn et al, 2011) found that the relationship between the ownership structure and the bank performance may vary from region to region.

Separately, recent literature started to distinguish between conventional and Islamic banks, to test the efficiency of banks' performance. Olson and Zoubi (2008) focused on 26 financial ratios for the GCC

banks. Their results indicated that measures of bank characteristics such as profitability ratios, efficiency ratios, asset quality indicators and cash/liability ratios are relevant indicators that differentiate between Islamic and conventional banks in the GCC region. Masruki et al. (2011) analyzed and measured the performance of both Islamic and conventional banks in Malaysia over 5 years, 2004-2008. Their results showed that Islamic banks have less level of profitability than conventional banks, which encountered high credit risk than Islamic banks.

In this paper, we extend the above-mentioned literature, with a focus on the GCC countries, which differs from the existing papers as follows. First, most of the existing studies focus mainly on the macroeconomic and financial determinants of banks' performance, neglecting the impact of oil price fluctuations. Second, we focus not only on the banks' response to oil price shocks but also on price volatility. In fact, we investigate if GCC banks are not affected by price volatility or if they become more prudent when oil prices become more volatile. Third, we test how bank-specific features such as size, capitalization and liquidity matter in the bank performance during oil price shocks. Finally, we explore the role of banks' classification in affecting their performance.

3. Methodology

This section presents our adopted approach to examine the banks' performance amid oil price shocks in the GCC region. To this end, we describe the selected variables, taking into consideration the data limitation and the intended objectives. Then, we specify the appropriate econometric model, which tackles all statistical problems and reflects the interconnectedness of the different GCC countries and their specific characteristics.

3.1. Data sources and variables description

We employed a bank-level dataset based on banks' balance sheets, sourced from Bankscope and IMF databases as well as national authorities, which covers 92 banks from six GCC countries over the period 2002-2017. From the total sample, we deleted the central banks and the investment banks, as well as all banks for which not all data are available or not reliable. We removed the top and bottom 1% of observations for the dependent variable, to reduce the outliers' effects. After adjustments, the final sample includes 77 banks over the period 2002-2017, giving a total of 1128 observations per variable. (see Table 1).

Table 1: GCC Banks

	Number of Banks	Total number of observations	The average number of observations
BAHRAIN	17	242	14.2
KUWAIT	10	156	15.6
OMAN	9	138	15.3
QATAR	10	139	13.9
SAUDI ARABIA	13	188	14.5
UAE	18	265	14.7
Total	77	1128	14.6

Sources: Bankscope, IMF and authors' calculations.

In order to explain the banks' performance, we selected three dependent variables namely (i) Lending growth, (ii) Return on Assets (ROA) and (iii) Return on Equity (ROE). Regarding the main selected independent variables, they include the standard bank characteristics, which are the size (*Size*), liquidity (*Liq*) and capital adequacy (*Cap*). The size is measured by total assets, and the liquidity is proxied by cash and securities over total assets, while capital adequacy is measured by the standard capital-to-asset ratio. Table A1 in the Appendix provides all definitions and sources of the variables in the empirical analysis.

Besides the classic banks' variables, we included a set of key macroeconomic factors that reflect the specificities of GCC countries. Specifically, and in line with a parsimonious specification and after several statistical tests to verify the validity of the economic theory, we used three variables, namely the interest rate, real GDP growth and Inflation. The data relative to these variables are collected from the IMF World Economic Outlook database (Appendix Table A1 for more details).

In addition, one of the key determinants of bank performance in the GCC countries is the oil price variation, given its effect on the fiscal sector and economic growth. However, the paper's focus is not only on the bank's response to oil price shocks, but also to price volatility. For that, we use two indicators of oil price variation: the first one is the change in the oil price to reflect the oil price shocks, based on annual Brent oil prices. The second measures the standard deviation over 12 months for each year to reflect the volatility of oil price.

For estimation purposes, we also add other dummy variables, to test some assumptions and investigate the robustness of our results. In fact, we define a dummy "Risk", that reflects bank riskiness on its performance, which is measured by the ratio of non-performing loans. This dummy variable equals 1

if the non-performing loan to total loan ratio of a bank belongs to the top 25 percentile in a given year, and 0 elsewhere. The second dummy variable reflects the classification of banks according to ownership type. Thus, the dummy "State_Owned" takes 1 if the bank is owned by the government, and 0 elsewhere. Finally, the last dummy variable "Islamic" takes 1 if the bank is Islamic and 0 if it is conventional.

Finally, it is worth noting that the stationarity of the adopted variables was tested using the Augmented Dickey-Fuller test (ADF), which indicates that all the series selected in this model are stationary.

3.2. Model specification

For the empirical investigation, the paper uses a detailed bank-level dataset, collected from Bankscope over the period 2002-2017, while data on macroeconomic variables are drawn from different sources (National authorities, IMF and World Bank publications). Thus, the paper examines the factors influencing banks performance in the GCC countries amid oil price shocks, by conducting econometric methods for bank-level panel data analysis.

The econometric model is based on the following approach. We use three equations using the same factors affecting the banks' performance for each of the three described dependent variables, namely (i) Lending growth, (ii) Return on Assets (ROA) and (iii) Return on Equity (ROE). The purpose of using the same explanatory variables is to understand how the selected factors affect each performance indicator, and which one is more influenced by the banks' characteristics. The empirical equation used in the investigation is as follows:

$$\boldsymbol{Y_{ijt} = \alpha + \beta Y_{ijt-1} + \lambda X_{ijt} + \partial Z_{ijt} + \tau_i + \varepsilon_{it}} \quad \textbf{(1)}$$

Where i indicates the bank (i = 1,..,N), j refers to the country (j = 1, …,J), t denotes the time observation (t = 1,…T) for each variable. $\boldsymbol{Y_{ijt}}$ is the dependent variable for the bank i of the country j for the period t, and represents the performance of the bank as measures by either Lending growth, (ii) Return on Assets (ROA) and (iii) Return on Equity (ROE). $\boldsymbol{X_{ijt}}$ comprises a set of macroeconomic variables, such as the GDP growth, inflation, FED policy rate, and the Brent oil price. The term $\boldsymbol{Z_{ijt}}$ comprises a set of bank-specific control variables, including the standard bank characteristics, which are the size (*Size*), liquidity (*Liq*) and capital adequacy (*Cap*). It should be noticed that these characteristics are lagged one period, given that the bank's characteristics are items of the bank balance sheet and, as such, could be highly correlated with the dependent variable. $\boldsymbol{\lambda}$ and $\boldsymbol{\beta}$are the coefficients, while $\boldsymbol{\tau_i}$ and $\boldsymbol{\varepsilon_{it}}$ are the unobserved country-specific fixed effect and error terms.

Since the variables may be endogenous, OLS estimation of equation (1) could generate biased and inconsistent estimator. To tackle the heteroscedasticity and autocorrelation problems as well as the endogeneity problem of the lagged dependent variable, we use the Generalized Method of Moments (GMM) estimation technique, proposed by Arellano and Bond (1991)[4] as well as Blundell and Bond (1998)[5] which combines, within a system, the regression in levels and the regression in differences. For the regression in levels, the instruments used are the lagged differences of the endogenous and exogenous variables. The instruments for the regression in differences are lagged levels of the endogenous and exogenous variables previous or equal to (t-2). Thus, in order to eliminate the country-specific effect that might cause the biases of estimators, we estimate first-differences of our equation.

$$\Delta \boldsymbol{Y_{ijt}} = \boldsymbol{\alpha} + \boldsymbol{\beta}\Delta \boldsymbol{Y_{ijt-1}} + \boldsymbol{\lambda}\Delta \boldsymbol{X_{ijt}} + \boldsymbol{\partial}\Delta \boldsymbol{Z_{ijt}} + \Delta \boldsymbol{\varepsilon_{it}} \quad \textbf{(2)}$$

It should be noted that the validity of the System GMM estimator depends on two key assumptions. The error terms are not serially correlated, and the instruments used in the regression in levels and in differences are valid. In order to test both hypotheses, we run two specification tests proposed by Arellano and Bond (1991) and Arellano and Bover (1995). The first test examines the null hypothesis that the differenced error term $\Delta\varepsilon_{it}$ has no second-order serial autocorrelation, which means$E(\Delta\varepsilon_{it}\Delta\varepsilon_{it-2}) = 0$. The non-rejection of the null hypothesis provides support to our model estimations. The second is the Sargan test of over-identifying restrictions, which tests the overall validity of the instruments by analyzing the sample analog of the moment conditions used in the estimation procedure. The hypothesis tested is that the instrumental variables are uncorrelated to some set of residuals, and therefore they are acceptable instruments. Thus, our model specification is valid if we cannot reject the null hypothesis of over-identifying restrictions.

Blundell and Bond (1998) show that the standard errors of the two-step System GMM estimator are biased downward in finite samples. To overcome this problem, we employ a lower number of instruments than the number of sample countries, in order to mitigate the over-fitting problem of the endogenous variable and improve the efficiency of the two-step estimator[6]. Finally, failure to reject the null hypothesis of both tests gives support to our estimation procedure.

[4]For more details, see Arellano and Bond (1991), Bond (2002), Baltagi (2001, pp. 131–135) and Blundell and Bond (1998) Journal of Econometrics 87(1): 115-143.

[5]For more details, see Blundell and Bond (1998) Journal of Econometrics 87(1): 115-143.

[6]For more details, see Beck and Levine (2004) and Roodman (2009).

4. Empirical investigation

Following data description and theoretical approach, we started this section by estimating equation (2) over the period 2002-2017 for each of the three described dependent variables, namely (i) Lending growth, (ii) Return on Assets (ROA) and (iii) Return on Equity (ROE), using several models with different specifications. In fact, we estimate the baseline model with the lag of the dependent variable, the interest rate, GDP, inflation and the oil price (growth and volatility). Then, we sequentially include the three classic bank characteristics and other bank-specific variables (Ownership, type and Risk-taking).

4.1. Role of the classic characteristics in the bank performance

Table 2 shows the results of the regression estimated using the GMM approach for a sample of GCC banks over the period 2002-2017. The first column for each dependent variable (Models 1, 4 and 7) presents the baseline model (defined above). Then, we re-estimate the equation, by replacing oil price variation with the oil price volatility in the second column (Models 2, 5 and 8). Finally, the other models (3, 6 and 9) are estimated with the bank characteristics, in addition to the baseline variables.

Table 2: GMM estimates using the classic banks' characteristics

	Lending			ROA			ROE		
Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**
LOANS(-1)	-0.325*** (0.008)	-0.339*** (0.011)	-0.223*** (0.014)						
ROA(-1)				-0.247*** (0.015)	-0.287** (0.025)	-0.187** (0.019)			
ROE(-1)							-0.144** (0.011)	-0.185** (0.015)	-0.109** (0.018)
ΔIR	-0.183** (0.033)	-0.182** (0.068)	-0.078** (0.044)	-0.039* (0.022)	-0.015** (0.029)	-0.015** (0.017)	-0.093* (0.047)	-0.069 (0.042)	-0.027 (0.032)
RGDP	0.132** (0.025)	0.194** (0.012)	0.134** (0.029)	0.134*** (0.021)	0.158** (0.027)	0.141** (0.022)	0.134** (0.024)	0.137** (0.023)	0.112* (0.019)
INFLATION	-0.015** (0.008)	-0.016* (0.011)	-0.009** (0.007)	-0.007* (0.011)	-0.009 (0.029)	-0.011 (0.031)	-0.016* (0.011)	-0.029* (0.052)	-0.012** (0.068)
OIL_PRICE	0.232*** (0.025)		0.182*** (0.021)	0.173** (0.023)		0.147** (0.051)	0.176** (0.021)		0.125** (0.025)
OIL_VOL		-0.309*** (0.055)			-0.375* (0.021)			-0.470* (0.012)	
SIZE(-1)			0.318* (0.158)			0.108 (0.027)			0.383 (1.213)
LIQ(-1)			0.446* (0.164)			0.415** (0.484)			0.286** (0.225)
CAP(-1)			0.505* (0.063)			0.377* (0.748)			0.079* (0.376)
Sargan test (p-value)	0.29	0.27	0.30	0.48	0.33	0.35	0.26	0.23	0.19
AR(1)	-2.03**	-1.73*	-1.83**	-1.77*	-1.89**	-1.71*	-1.09*	-1.97**	-1.44*
AR(2)	-0.59**	-2.01**	-0.81**	-1.90**	-0.77**	-2.41**	-1.68**	-1.73*	-1.88**
Nb. of banks	75	75	75	75	75	75	75	75	75
Nb. of observations	840	840	840	840	840	840	840	840	840

***, **, and * indicate significance levels at 1, 5, and 10 percent, respectively.
Standard errors are reported in parentheses.

As discussed in the model specification section, we rely on the Hansen test for the overall validity of our instruments, as well as on the Arellano and Bond test (1991) for the presence of second-order autocorrelation in the differenced residuals. The results show that for all the adopted models, the Hansen test cannot reject, at the 1% level, the null hypothesis of the instruments overall validity. Furthermore, the Arellano and Bond test cannot reject, at the 1% level, the null hypothesis of the absence of autocorrelation of residuals. Therefore, the results obtained in Tables 2 are almost similar

and bring support to using dynamic panel models to identify the factors affecting banks performance in GCC countries. These results could be summarized as follows.

The sign of the coefficients on the policy rate (ΔIR) in Table 2 confirms the expected effect of monetary policy on banks' performance. Its coefficients are negative and statistically significant in all models. The interest rate variation is negatively correlated with bank performance, as it influences the cost of lending, and may impact the demand for credit. Thus, an interest rate hike (cut) affects negatively (positively) the bank performance, especially the lending growth (higher coefficient in model 3). As per the macro level, the elasticity of lending with respect to GDP is positive and significant, while the response to prices is always negative and significant. In fact, higher inflation leads to higher nominal interest rates that could reduce the demand for loans and then likely decrease bank lending and profitability.

The results also confirmed the crucial role played by the oil price on the bank performance in GCC countries. An increase in oil price is found to boost government revenues, and therefore, improve bank liquidity, and increase their performance accordingly. This is reflected by the statistically significant positive coefficient in all models. However, oil price volatility has a negative impact on the three bank indicators. This means that, higher volatility is likely to affect the stability and the sustainability of government revenues and reduces banks' liquidity, which puts more pressure on banks' profitability.

As for standard bank characteristics, all coefficients are positive and in line with theoretical predictions. Specifically, results show that small, undercapitalized, and less liquid banks find it harder to improve their credit performance compared to large and well-capitalized banks. This confirms the role of oil revenues in boosting some banks' performance, as most of big banks benefit in general from important flows through significant public spending and substantial government bank deposits, as well as many incentives for the citizens to take loans. This raises another question on what makes these banks different from others, to be able to sustain their performance even during oil price shocks. The next section tries to shed more light on bank characteristics that influence the bank's profitability, as well as to answer the rest of the questions defined in the introduction.

4.2. Role of the banks' classifications in their performance

This section highlights an interesting issue, related to the role of bank type in affecting their performance. In fact, there has been much debate on the effect of government ownership on the

banking system, and how some banks benefit from oil revenue compared to others. Also, the difference between the Islamic banks and the conventional ones also raised questions about the banks' response to the oil price fluctuation. And finally, it's not clear in the literature how risk-taking banks could be impacted when facing an oil price shock.

To investigate this further, we use the three defined dummy variables (Ownership, type and Risk-taking) in the previous equation. We interact each of these variables with the oil price (variation and volatility) and we examine carefully the sign and the significance of the interaction coefficients to check the differential response during oil shocks. The results are presented in Table 3.

Table 3: GMM estimates using banks' classifications

	Lending			ROA			ROE		
Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**
LOANS(-1)	-0.314*** (0.017)	-0.311** (0.014)	-0.245*** (0.017)						
ROA(-1)				-0.197*** (0.013)	-0.257** (0.022)	-0.201** (0.014)			
ROE(-1)							-0.134** (0.012)	-0.175** (0.015)	-0.109** (0.018)
ΔIR	-0.143** (0.023)	-0.011 (0.017)	-0.028** (0.044)	-0.029* (0.022)	-0.011** (0.029)	-0.015** (0.017)	-0.093* (0.047)	-0.069 (0.042)	-0.027 (0.032)
RGDP	0.132** (0.025)	0.194** (0.012)	0.134** (0.029)	0.134*** (0.021)	0.158** (0.027)	0.141** (0.022)	0.134** (0.024)	0.137** (0.023)	0.112* (0.019)
INFLATION	-0.015** (0.008)	-0.016* (0.011)	-0.009** (0.007)	-0.007* (0.011)	-0.009 (0.029)	-0.011 (0.031)	-0.016* (0.011)	-0.029* (0.052)	-0.012** (0.068)
OIL_PRICE* Risk	0.132*** (0.025)			0.193 (0.023)			0.196 (0.021)		
OIL_VOL* Risk	-0.309** (0.055)			-0.147 (0.021)			-0.170 (0.012)		
OIL_PRICE* Islamic		0.482*** (0.021)			0.087* (0.051)			0.075* (0.025)	
OIL_VOL* Islamic		-0.028* (0.178)			-0.108 (0.027)			0.083 (1.213)	
OIL_PRICE* State_Owned			1.146* (0.134)			1.015** (0.434)			0.986* (0.205)
OIL_VOL* State_Owned			-0.504 (0.083)			1.777* (0.748)			0.079 (0.376)
Sargan test (p-value)	0.45	0.51	0.44	0.26	0.23	0.28	0.28	0.38	0.44
AR(1)	-1.97*	-1.58**	-1.78*	-1.77*	-2.24*	-1.66*	-2.04*	-1.97*	-1.87*
AR(2)	-1.73*	-1.98**	-1.67*	-1.88**	-0.68**	-2.19**	-1.98**	-1.67*	-2.19**

Nb. of banks	75	75	75	75	75	75	75	75	75
Nb. of observations	840	840	840	840	840	840	840	840	840

***, **, and * indicate significance levels at 1, 5, and 10 percent, respectively.
Standard errors are reported in parentheses.

The results obtained in Table 3 confirm the findings in the previous section about the impact of oil price on banks' performance. In fact, the significant positive coefficient of all the interaction terms with the oil price variation reflects the importance of oil revenue to boost banks' lending and profitability, while the negative sign of the interaction variables with oil price volatility shows that high volatility makes it difficult for banks to sustain a stable performance.

However, the magnitude of the coefficients is not comparable for the three bank classifications in all estimations. This could be interpreted as follow. *First*, higher oil prices improve significantly lending growth in Islamic banks but not their profitability. This might be due to the fast-growing pace of Islamic banks that may have forced lower returns on assets and equities, and a lower margin for the difference between the return on investment and the cost of raising funds. *Second*, the results show a positive effect of state ownership on bank performance during episodes of higher oil prices, as it eases constraints on banks' borrowing and boosts confidence in the outlook through facilitating higher ratings and cheaper sources of funding. *Finally*, model 1 reveals that higher risk-taking banks increased their lending in response to an increase in oil prices, while models 4 and 7 do not show any evidence of the impact of risk-taking on banks' profitability.

4.3. Bank performance response to lower oil price

Since GCC banks benefit from significant public spending and substantial liquidity when oil prices are high, it would be interesting to analyze the structural impact on banks' performance indicators, during periods of low oil prices. For that, we define a new dummy variable (Low_Oil) that equals 1 when Brent oil price is below the fiscal breakeven oil price for each GCC country in a given year and 0 elsewhere.

Table 4: GMM estimates during lower oil price periods

	Lending			ROA			ROE		
Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**
LOANS(-1)	-0.325*** (0.008)	-0.339*** (0.011)	-0.223*** (0.014)						
ROA(-1)				-0.247*** (0.015)	-0.287** (0.025)	-0.187** (0.019)			
ROE(-1)							-0.144** (0.011)	-0.185** (0.015)	-0.109** (0.018)
ΔIR	-0.183** (0.033)	-0.009 (0.017)	-0.048** (0.044)	-0.039* (0.022)	-0.015** (0.029)	-0.015** (0.017)	-0.093* (0.047)	-0.069 (0.042)	-0.027 (0.032)
RGDP	0.132** (0.025)	0.194** (0.012)	0.134** (0.029)	0.134*** (0.021)	0.158** (0.027)	0.141** (0.022)	0.134** (0.024)	0.137** (0.023)	0.112* (0.019)
INFLATION	-0.015** (0.008)	-0.016* (0.011)	-0.009** (0.007)	-0.007* (0.011)	-0.009 (0.029)	-0.011 (0.031)	-0.016* (0.011)	-0.029* (0.052)	-0.012** (0.068)
Risk	0.119* (0.013)			-0.133* (0.025)			-0.166* (0.022)		
Islamic		0.431*** (0.037)			-0.135* (0.022)			-0.247* (0.037)	
State_Owned			1.014* (0.034)			1.013** (0.014)			1.103* (0.015)
Low_Oil	-1.163*** (0.034)	-1.327** (0.078)	-1.207** (0.113)	-1.471** (0.151)	-1.258** (0.047)	-1.657** (0.128)	-1.123** (0.115)	-1.082* (0.117)	-1.039* (0.226)
Sargan test (p-value)	0.39	0.48	0.43	0.27	0.21	0.31	0.28	0.38	0.44
AR(1)	-1.87*	-1.38**	-1.77*	-1.72*	-2.11*	-1.55*	-2.13*	-1.85*	-1.82*
AR(2)	-1.71*	-1.88**	-1.33*	-1.83**	-0.68**	-2.05**	-1.91**	-1.37*	-2.27**
Nb. of banks	75	75	75	75	75	75	75	75	75
Nb. of observations	840	840	840	840	840	840	840	840	840

***, **, and * indicate significance levels at 1, 5, and 10 percent, respectively.
Standard errors are reported in parentheses.

The coefficients of the dummy variable Low_Oil are negative and statistically significant in all nine models in Table 4, which is in line with expectations. This means that Banks' performance indicators have deteriorated during periods of low oil prices, as demand for credit has slowed down amid weaker economic activity. In addition, the coefficients of the dummy variable ISLAMIC are statistically significant in all models, with a negative sign when we use ROA and ROE as dependent variables, and a positive sign for Lending growth. This reflects the ability of Islamic banks to increase and sustain their lending portfolio, even during low oil price periods. However, conventional banks are better in terms of financial performance that might be due to cheaper cost of raising funding, and a higher

return on lending, and a higher interest margin, accordingly. As per the ownership, the positive and statistically significant coefficients show that government ownership has a positive effect on bank performance. This could be explained by the fact that it eases constraints on banks' borrowing as it boosts confidence in the outlook facilitating higher ratings and cheaper sources of funding. Finally, the estimates of the dummy variable RISK are statistically significant in all models, while the sign is positive in the Lending growth but it is negative for the profits' indicators. This means that banks with greater risk-appetite increased their lending but their profits are more sensitive to oil price volatility.

5. Conclusion

The importance of oil prices for economic growth in the GCC countries has been extensively studied. However, the impact of oil price fluctuation on bank performance has lacked a rigorous empirical analysis. This paper fills this gap by providing an empirical investigation of the oil price shocks effects on banks' performance in GCC countries.

The results indicate, first, that oil prices have significant effects on banking performance, and their adverse effects on aggregate fluctuations ultimately lead to reduced performance for financial institutions. Second, small, undercapitalized, and illiquid banks find it harder to improve their performance compared to large and well-capitalized banks when facing oil price volatility. Third, the evaluation of the difference between Islamic and conventional banks indicates contrasts between the two business models. Islamic banks, judged by lending growth, have managed to tailor their products to cater to growing demand. In contrast, conventional banks are more focused on maximizing returns, and taking high credit risk than Islamic banks, but appear to be the most affected ones by oil price decline compared to Islamic banks. Fourth, the results point to a positive effect of state ownership on bank performance, given that it eases constraints on banks' borrowing as it boosts confidence in the outlook facilitating higher ratings and cheaper sources of funding. Finally, banks with greater risk-appetite increased their lending but their profits are more sensitive to oil price volatility.

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Appendices

Table A1: Variables description

	Empirical definition	Source
Dependent variable		
Lending growth (*Loan*)	Annual percent change of bank lending	Bankscope, Author's estimation
Return on Assets (*ROA*)	ROA is the net income divided by the total assets	Bankscope, Author's estimation
Return on Equity (*ROE*)	ROE is the net income divided by shareholders' equity	Bankscope, Author's estimation
Independent variables		
Size (*Size*)	Bank size is the log of total assets in a bank. This ratio is a proxy for the degree of monopoly. The bigger the size of the bank, the higher the degree of monopoly power.	Bankscope, Author's estimation
Liquidity (*Liq*)	Liquidity ratio is proxied by net loans over the deposit and short term funding. This variable measures the risk of not having sufficient reserves of cash to cope with withdrawal of deposits.	Bankscope, Author's estimation
Capital adequacy (*Cap*)	Capital adequacy is given by the ratio of capital to total assets. A bank's capital is a sign of its financial strength, i.e. the higher a bank's capital, the lower its marginal debt or equity funding cost.	Bankscope, Author's estimation
Real GDP growth (*RGDP*)	Real GDP growth (Annual percent change)	IMF
Inflation (*Inflation*)	Annual percent change of the average consumer prices	IMF
Interest rate (*IR*)	Nominal Short-Term Interest Rates	IMF
Oil price growth (*oil_price*)	Annual percent change of Brent oil prices	OPEC, IMF, Author's estimation
Oil price volatility (*oil_vol*)	An alternative measure of volatility is constructed, from the monthly oil price series. The standard deviation in the 12 months for each year is considered as one observation of the annual volatility series for a particular year.	OPEC, IMF, Author's estimation
Risk (*Risk*)	Dummy variable =1 if the non-performing loan to total loan ratio of a bank belongs to the top 25 percentile in a given year, and =0 elsewhere.	Author's estimation
Bank type (*Islamic*)	Dummy variable =1 if it is an Islamic bank, and =0 elsewhere.	Author's estimation
Ownership (*State_Owned*)	Dummy variable =1 if the government owned 50% or more of the bank, and =0 elsewhere.	Author's estimation