International Journal of Bank Marketing

Impact of oil and gas price shocks on the non-performing loans of banks in an oil and gas-rich economy: Evidence from Qatar

Abdulazeez Y.H. Saif-Alyousfi, Asish Saha, Rohani Md-Rus,

Impact of oil and gas price shocks on the non-performing loans of banks in an oil and gas-rich economy

Evidence from Qatar

Received 9 May 2017
Revised 10 June 2017
Accepted 6 July 2017

Abdulazeez Y.H. Saif-Alyousfi
School of Economics, Finance and Banking, Universiti Utara Malaysia, Changlun, Malaysia and
Department of Finance and Banking, Faculty of Administrative Sciences, Taiz University, Taiz, Yemen
Asish Saha
Department of Finance, FLAME School of Business, FLAME University, Pune, India, and
Rohani Md-Rus
School of Economics, Finance and Banking, Universiti Utara Malaysia, Changlun, Malaysia

Abstract

Purpose – The purpose of this paper is to examine and compare the impact of oil and gas prices shocks on the non-performing loans (NPLs) of banks at the aggregate as well as at the level of commercial and Islamic banks in Qatar over the period 2000-2016.

Design/methodology/approach – Using the West Texas Intermediate Database, BankScope Database, World Bank's World Development Indicators Database, and International Monetary Fund Database, the authors use a one-step system generalized method of moments dynamic model to examine and compare the association between oil and gas prices shocks with NPLs in Qatari banks. The authors also test the hypotheses of direct and indirect impacts of oil price shocks and gas price shocks on bank NPLs.

Findings – The results indicate that oil price shocks and gas price shocks do not have directly affect NPLs of Qatari banks at the aggregate level, while they have indirect effects that are channeled through the country-specific macroeconomic and institutional factors. The authors find that oil and gas prices shocks affect NPLs of Qatari Islamic banks directly through extended oil and gas-related cash flows, while their impact on the NPLs of Qatari commercial banks is indirect. In other words, Islamic banks in Qatar greatly benefits from increased cash flow caused by the rise in the oil and gas prices, which make their NPLs, much lower than that in commercial banks. Better capital cushion, better managerial efficiency, better risk management, and liquidity management systems should be used by the Islamic banks in Qatar to expand their customer base. The authors also find that positive fiscal stance of the government reduces the NPLs in both commercial and Islamic banks.

Practical implications – The results of this study necessitate policy measures that can counter the effects of changes in oil and gas prices on the growth of bank NPLs.

Originality/value – It is widely recognized that oil and gas prices and the level of production are of great importance to the economic development of oil and gas-exporting countries. So far, however, no econometric study has been reported in the literature which analyses and compares the impact of oil and gas prices shocks on the NPLs of commercial and Islamic banks and also at the aggregate level in any of the oil economies. Thus, this study provides the first empirical evidence on distinct direct and indirect channels through which oil and gas prices shocks may affect bank NPLs.

Keywords Qatar, System GMM, Fiscal stance, Gas price shocks, NPLs, Oil price shocks

Paper type Research paper

International Journal of Bank Marketing
Vol. 36 No. 3, 2018
pp. 529-556

0265-2323
DOI 10.1108/IJBM-05-2017-0087

1. Introduction

Qatar provides an interesting case to study the association between bank credit risk and oil and gas prices shocks in the oil-exporting countries. During the last several years, Qatar has flourished with the sustained real GDP growth reaching around 37 percent in 2011 which is well above other countries in Gulf Cooperation Council (GCC) such as 13 percent for Bahrain, 34 percent for Kuwait, 19 percent for Oman, 27.1 percent for Saudi Arabia, and 21.3 percent for UAE over the said year. However, decline oil prices have dampened the outlook. Despite being the only GGC member economies, which did not have a budget deficit in 2015, due to low oil and gas prices, the economy has projected a budget deficit of SD 12.8 billion in 2016 which is about 6 percent of the GDP. Though Qatar's GDP is driven mainly by the oil and natural gas sectors, growth in construction, manufacturing, and financial services have raised the contribution of non-oil sectors to only around 50 percent of nominal GDP for the country. However, oil and natural gas account for 92 percent of export revenues and 56 percent of government revenues. The oil reserves of more than 25 billion barrels would allow production to continue at current levels of 56 years. Qatar's natural gas reserves exceed 25 trillion cubic meters, equivalent to 13 percent of the world's total and the third largest in the world. Due to the oil and natural gas, Qatar has the highest per capita income and lowest rate of unemployment in the world (Qatargas, 2016; Qatarpetroleum, 2015).

Given the strong correlation between non-oil growth and government spending, banking systems in the oil-exporting countries have been adversely affected by the decline in oil prices. The effects of lower oil prices on oil-exporting economic activity have weakened the asset quality and increased the non-performing loans (NPLs) of banks (IMF, 2015). During the financial crisis 2008-2009, the decline in oil and gas prices has resulted in declines in exports, revenues, fiscal balances, GDP growth, and real estate/equity prices in the oil-exporting countries which have put strains on both firm and bank balance sheets and credit growth to the private sector. These have significantly worsened the performance of many corporations including the banking sector in Qatar.

As indicated by the World Bank's World Development Indicators (WDI), from 2000 to 2016, the global situation of NPLs is portending an alarming scenario calling for immediate action since high NPLs ratio leads to financial distress and bank failure. Statistics showed that the NPLs at the global level stood at 3.85 percent in 2005 and fell to its lowest level of 2.7 percent in 2007 and rose to its highest level of 4.34 percent in 2015. Compared to the non-oil-exporting countries, NPLs are more pronounced among oil-exporting countries, including Qatar. The severity of bad debt problems is attributable to moral hazard on bank owners and the adverse selection of bank borrowers.

Given the dependence of oil-exporting countries in general and the Qatari economy in particular on the production and export of oil and gas, the relationship between oil and gas prices with NPLs of banks is of great political significance not only during the crises and recession periods but also during cycles of prosperity. If oil and gas prices affect deposits of domestic banks, which, in turn, are likely to affect the volume of loans as well as NPLs, it can potentially affect the country's economic growth. Evaluation of the extent of the relationship between oil and gas prices shocks with bank's NPLs in the oil-exporting countries is therefore of key relevance to researchers as well as the policy planners and regulators in the country. In other words, the issues to be addressed include oil and gas prices impact NPLs of banks in the oil-exporting countries? If so, are there a direct or indirect link between oil and gas prices and NPLs of banks if bank-specific factors and country-specific factors are accounted for? Are there any differences in the effect of the prices of oil and gas on the NPLs of commercial banks vs Islamic banks because Islamic banks operate according to the principles of Islamic law? What is the impact of the global financial crisis 2008 on the NPLs of Qatari banks and its link to oil and gas prices? It may be relevant at this stage to recall here the findings of Beck *et al.* (2013) in their analysis of the business models, efficiency, and stability of conventional *vis-à-vis*

Islamic banks on a cross-country sample of banks. The authors find that Islamic banks, because of their higher level of cushion of the capital and liquidity reserves, performed better during the financial crisis. They also report that conventional banks are less stable in markets dominated by Islamic banks. Kaabachi and Obeid (2016) conclude that Islamic bank reputation, the relative advantage of Islamic banking and its compatibility with consumer religious beliefs, values, lifestyle, and banking habits influence positively the intention to use it. Ltifi *et al.* (2016) argue that customers consider several factors while choosing an Islamic bank: the quality of service offered by the financial institutions, trust, and (especially) compliance with Sharia law. Al-Tamim *et al.* (2009) investigate how bank customers in the UAE view Islamic banks vs conventional banks and whether this image affects customer loyalties or selection of a bank with focus on five areas: bank image, bank products, service quality, cultural aspects, and religious factors, in addition to demographic attributes of the sample. The authors find that most UAE bank customers prefer banking with Islamic banks; customers generally have a positive image of whatever bank they dealt with, and they also indicate that the most important factor in choosing a bank was bank products followed by service quality and then religious factors. Bizri (2014) tries to identify and measure the factors that clients perceive as important in deciding to patronize an Islamic bank. The author suggests that trust in Islamic banks and their true compliance with Sharia (trust), customer awareness and familiarity with Islamic banking products and services, price competitiveness, accessibility, service quality, etc. needs careful consideration while devising marketing strategies by Islamic banks. Ltifi *et al.* (2016) argue that Islamic banks must consider the different determinants of choice in order to create value for consumers and prepare their marketing strategies. Abdul-Wahab and Haron (2017) examine the efficiency of the banking sector in Qatar and find that Islamic banks are most efficient in terms of scale efficiency as well as technical efficiency compared to conventional and foreign banks.

Our purpose of this paper is to provide the first empirical evidence on these issues and examine the impact of oil and gas prices shocks on the NPLs of banks using the data from oil and gas-rich economy and one of the main members of Organization of the Petroleum Exporting Countries (OPEC) during the period 2000-2016 (17 years). We also reflect whether some lessons can be drawn from our findings which may facilitate formulation of marketing strategies by Islamic banks in Qatar.

The previous literature has only focused on analyzing the impact of oil price fluctuations on macroeconomic indicators or stock market returns for developed and emerging economies and finds that the association between oil price changes and economic activities is highly significant (Bekiros *et al.*, 2015; Cologni and Manera, 2005; Cunado and Gracia, 2005; Hamilton, 2009; Kilian and Vigfusson, 2011; Melichar, 2016; Yazdan *et al.*, 2012). It is evident from the data of WDI that the level of NPL is quite high in the oil-exporting economies where lending activities of banks are crucial to economic growth, the impact of oil and gas price shocks on the level of NPLs of banks has not received due attention in the literature (see e.g. Saif-Alyousf *et al.*, 2017a, b; Mirzaei and Moore, 2016; Ashraf *et al.*, 2016; Abraham, 2013; Naceur and Omran, 2011; Al-Hassan *et al.*, 2010, among others), which needs to investigate the root causes of the problem in the oil-exporting countries in order to find solutions.

In addition, numerous research works have made several attempts to decipher the causes of NPLs, but have focused largely on the bank-specific factors, or macroeconomic factors as well as central bank autonomy (see e.g. Beck *et al.*, 2015; Chaibi and Ftiti, 2015; Castro, 2013; Louzis *et al.*, 2012; Ali and Daly, 2010; Vogiazas and Nikolaidou, 2010) and most of these studies have been carried for countries which are not major oil-exporting countries. Therefore, investigating the effects of oil and gas price shocks on the NPLs in major oil and gas-exporting countries will provide us with a better understanding of the drivers of NPLs in those countries. Until now, only Poghosyan and Hesse (2009) and Lee *et al.* (2015) have examined the impact of oil price on the bank performance. Poghosyan and Hesse (2009) examine the impact of oil price

shocks on ROA of banks in MENA economies using the generalized method of moments (GMM) model. Lee *et al.* (2015) examine the impact of oil production on bank deposit in the North Dakota over the period of 1995-2009. Idris and Nayan (2016) have only analyzed the joint effects of oil price changes with only macroeconomic variables (GDP, inflation, lending interest rate, and Unemployment rate) on the NPLs for the aggregate level of the banking sector in OPEC for 2000-2014 using the OLS model. However, they have not analyzed the relationship between oil and gas prices shocks as well as test hypotheses of direct and indirect impacts of oil price shocks and gas price shocks on the NPLs as is done in this study.

Our paper provides several important contributions to the banking literature. First, to the best of our knowledge, our study is the first of its kind that examined the effect of oil and gas price shocks on banks' NPLs in major oil and gas-exporting country. Second, our study is the first study that assesses both the direct and the indirect channels through which the prices shocks of oil and gas may affect banks' NPLs. Third, this study is the first of its kind which investigates the impact of the global financial crisis 2008 on the NPLs of Qatari banks and its link to prices of oil and gas. Fourth, we also analyze and compare the effect of oil and gas prices shocks on the NPLs of Islamic and commercial banks separately in our study. Fifth, our study is also the first of its kind that examined the effect of fiscal stance (public surplus to GDP) on the NPLs of both commercial and Islamic banks as governments in the most oil-exporting economies massively rely on energy (oil and gas) production-related state revenues. Finally, most of the banking literature makes use of a linear panel framework; however, we employ dynamic panel methods (system GMM) to control for the persistence of credit risk or NPLs and endogeneity in the model and capture the relationship between oil and gas prices shocks and NPLs for both Islamic and commercial banks.

The remainder of the paper is structured as follows. Section 2 highlights the relevant literature. Section 3 explains the data and methods used. Section 4 outlines the findings, and Section 5 concludes.

2. Literature review

2.1 Literature on oil and gas prices

Previous studies on oil prices have mostly focused on investigating the impact of oil prices shocks on either economic growth or volatility in stock market returns. As shown in Table I, Hamilton (1983, 1996, 2003, 2009) and Mork (1989) in the USA, Lardic (2006) and Sarwar *et al.* (2017) in European countries, Zhang (2008) in Japan, and Brini *et al.* (2017) and Berument and Ceylan (2010) in Asian and African countries have examined the relationship between oil price shocks and economic growth and find that economic growth significantly affected by oil price shocks. Furthermore, Diaz and Gracia (2017), Gogineni (2010), Sadorsky (1999), and Jones and Kaul (1996) in developed economies like the USA, the UK, and Canada; Dutta, Nikkinen, and Rothovius (2017) in MENA; and Hammoudeh and Choi (2007) and Hammoudeh and Aleisa (2004) in GCC countries have studied the association between oil price shocks and the volatility of the stock market return and find a significant association between oil price fluctuations and stock returns volatility. However, in comparison with other GCC countries, Hammoudeh and Choi (2007) and Hammoudeh and Aleisa (2004) find the stock markets of Saudi Arabia and Oman having the highest overall return volatility to the oil price changes. Kilian and Lewis (2011), Herrera and Pesavento (2009), and Bernanke *et al.* (1997) examine the impact of oil price shocks on monetary systems in the USA and conclude that the monetary policy plays a significant role in explaining the impact of oil price shocks to economic changes.

In the banking literature, there are only three studies that investigate the effect of oil prices shocks on the bank performance. Lee *et al.* (2015) examine the effect of oil production on bank deposits in North Dakota. The authors find that oil production effect positively on bank deposits. Poghosyan and Hesse (2009) study the impact of oil price shocks on bank profitability measured by ROA and conclude that oil price shocks affect banks' ROA in the oil-exporting

Authors (year)	Country	Period	Methodologies	Empirical results
Panel A: oil price shocks and economic growth				
Brini *et al.* (2017)	Tunisia	1980-2011	ARDL model	An increase in oil price may imply an increase in renewable energy consumption
Sarwar *et al.* (2017)	OECD	1960-2014	Pooled OLS	A bidirectional relationship between oil price and GDP
Berument and Ceylan (2010)	MENA	1952-2005	VAR model	Oil price shocks have significant and positive impact on the economic growth of oil-exporting countries
Zhang (2008)	Japan	1957-2006	Pooled OLS	Oil price increase has a great negative impact on economic activities
Lardic (2006)	European	1999-2003	Pooled OLS	There is evidence of asymmetric cointegration between oil prices and GDP in the majority of the European economies included in the sample
Hamilton (2003)	USA	1949-1999	Pooled OLS	The estimated linear relationship between oil price shocks and GDP growth has become less pronounced
Hamilton (1996)	USA	1948-1994	Pooled OLS	The relation between GDP growth and net oil price increases is statistically significant
Mork (1989)	USA	1949-1986	Pooled OLS	Oil price decreases do not result in an economic boom in the same proportion as oil price increases induce recessions
Hamilton (1983)	USA	1948-1972	Pooled OLS	Oil price has significant effect on economic output
Panel B: oil price shocks and stock markets				
Diaz and Gracia (2017)	USA	1974-2015	VAR model	In the short run, there is a significant positive effect of oil price shocks on stock returns
Dutta *et al.* (2017)	MENA	2007-2014	GARCH-jump model	Uncertainties in oil price have large adverse effect on economic stability
Gogineni (2010)	USA	1998-2006	OLS	Oil price shocks have negative impact on the returns of Financial and insurance firms
Hammoudeh and Choi (2007)	GCC	1994-2004	VAR model	Return volatility is highest in the Oman and Saudi Stock market due to oil price shocks
Hammoudeh and Aleisa (2004)	GCC	1994-2001	VAR model	There is a bidirectional relationship between stock returns in Saudi Arabia and the oil price changes
Sadorsky (1999)	USA		VAR model	There is a significant association between oil price fluctuations and stock returns
Jones and Kaul (1996)	Canada, UK, Japan, and USA	1947-1991	Pooled OLS	The reaction of stock prices to oil price shocks in Canada and in the USA can be totally accounted for by the impact of these shocks on real cash flows alone, while these test results are uncertain in Japan and the UK
Panel C: oil price shocks and monetary systems				
Kilian and Lewis (2011)	USA	1973-2008	VAR model	There is no evidence of systematic monetary policy responses to oil price shocks
Herrera and Pesavento (2009)	USA	1959-2006	VAR model	Monetary policy plays a significant role in explaining the effect of oil price shocks to economic activities
Bernanke *et al.* (1997)	USA	1973-1985	VAR model	Oil price shocks have come mainly from the responses of monetary policy to the shock

(*continued*)

Table I.
Summary of empirical studies on oil and gas prices shocks

Table I.

Authors (year)	Country	Period	Methodologies	Empirical results
Panel D: oil price shocks and bank performance				
Lee *et al.* (2015)	North Dakota	1995-2009	GMM	The level of oil production is positively related to bank deposits
Poghosyan and Hesse (2009)	MENA	1994-2008	GMM	Oil price shocks have positive impact on banks' ROA
Panel E: oil price shocks and banks' NPLs				
Idris and Nayan (2016)	OPEC	2000-2014	Pooled OLS	The effect of oil price changes on the NPLs is statistically negative and significant

countries in the MENA region. Finally, using the OLS model, Idris and Nayan (2016) study the association between oil price shocks and macroeconomic factors with NPLs at the aggregate level in OPEC over the period 2000-2014 and find that oil price shocks have a negative and significant effect on bank's NPLs in OPEC. Table I shows the summary of empirical studies on oil and gas prices shocks.

2.2 Literature on NPLs determinants

Most of the previous literature generally distinguishes between two types of determinants that can affect NPLs for banks: bank-specific factors that affect irregular credit risk (NPLs) and macroeconomic factors that affect regular credit risk (NPLs) as well as economic and political changes that can have a significant impact on systemic credit risk. Few studies use both types of determinants. For example, Chaibi and Ftiti (2015) use a dynamic GMM model over the period 2005-2011 to investigate and compare both bank-specific and macroeconomic factors on the NPLs of banks in France and Germany. They found that all macroeconomic variables, excepting inflation rate, affect the NPLs of both France and Germany; however, the French economy is found to be more sensitive to bank-specific determinants. Likewise, Louzis *et al.* (2012) use a system GMM dynamic model to examine the impact of both bank-specific and macroeconomic determinants on the NPLs in the Greek banking sector for three loan categories: business loans, consumer loans, and mortgages. The authors find that NPLs in the banking sector of the said country are mostly affected by macroeconomic factors like unemployment rate, GDP growth public debt, and interest rate, while among bank-specific factors; they only find that NPLs are explained by bank efficiency variable.

Numerous studies examine the effect of the macroeconomic factors on the NPLs such as Beck *et al.* (2015), Castro (2013), and Ali and Daly (2010). Beck *et al.* (2015) study the impact of macroeconomic factors on the NPLs using the GMM model and data from 75 countries for 2000-2010.The authors find that loan problems have been mainly influenced by GDP growth, exchange rate, share prices, as well as the lending interest rate. Castro (2013) investigates the association between macroeconomic factors and NPLs in five European banking sectors (Portugal, Ireland, Italy, Greece, and Spain, known as PIIGS). Their results suggest that NPLs of banking sectors in the said economies are significantly influenced by unemployment rates, GDP growth, credit growth, interest rates, and housing price indices exchange rate, and the global financial crisis 2008. Using logit regression, Ali and Daly (2010) examine the impact of macroeconomic variables on the NPLs for the USA and Australian banking sectors. Their results indicate that the same set of macroeconomic variables represents various default rates for the two counties. However, compared to Australia, the US economy is much more susceptible to adverse macroeconomic shocks.

On the other hand, a few studies focus only on bank-specific factors like Ahmad and Arif (2007) and Berger and DeYoung (1997). Ahmad and Arif (2007) study the link between

bank-specific determinants and NPLs in developed economies (the USA, Australia, Japan, and France) compared to emerging economies (Malaysia, Thailand, India, Mexico, and Korea) over the period 1996-2002. The authors find that the quality of management is critical for the dominant banks on emerging-market loans. Berger and DeYoung (1997) also examine the impact of only bank-specific factors, focusing on cost efficiency indicators, on the NPLs of USA banks over the period 1985-1994 and find that the cost efficiency is an important indicator of NPLs and problem banks in the USA. Table II shows the summary of main empirical studies on NPLs determinants.

3. Data, variables, and methodology

3.1 Data

The data cover the bank NPLs of eight of the nine banks listed in the Qatar Stock Market using annual bank-level data for the period 2000-2016 (17 years panel data). The Qatar First Bank was listed at the end of the year 2014 and hence is excluded from the study.

Our final sample consists of five commercial banks and three Islamic banks. The data for NPLs and bank-specific factors are collected from the Bureau Van Dijk's Bankscope database provided by the library of Universiti Teknologi MARA. The oil price data are collected from West Texas Intermediate, while the data of natural gas price and macroeconomic indicators are collected from WDI provide by World Bank and International Monetary Fund. The entire analysis is carried out in three stages: in the first stage, Qatari banks are evaluated at the pool level by including all banks. In the second stage, commercial banks are evaluated as an independent group; it is followed by analysis of the Islamic banks in Qatar in the third stage.

3.2 Variables

The dependent variable is impaired loan (or NPLs) to total gross loans as a measure for credit risk. The independent variables to explain NPLs are based on the theory and literature review. Table III shows all variables used in previous studies to explain NPLs and main findings. The main independent variables of our study are oil price shocks and gas price shocks. Regarding the oil and gas prices shocks, oil and gas prices affect the NPLs of banks through both direct and indirect channels. In a direct channel, for example, oil and gas price shocks could affect bank NPLs directly via improved oil-related cash flows to borrowers, business activity or excess liquidity in the market. Indirectly, as oil and gas revenues constitute a large part of the government and external income in Qatar economy, prospects of oil and gas income affect fiscal spending, which, in turn, affects lending activities and NPLs of banks. Further, higher prices in oil and gas can increase the government spending limits and the consumption of economic units and thus stimulate further local demand in the economy that would restore more bank confidence, lending, and the low level of NPLs.

Other independent variables in our study are bank-specific factors and country-specific factors. The recent global financial crisis 2008 as dummy variable is also included in our model. The bank-specific factors are loan loss provisions, inefficiency, capitalization, liquidity, and bank size, whereas country-specific factors are GDP growth, fiscal stance, exchange rate, unemployment rate, and Herfindahl-Hirschman Index (HHI). In contrast to the previous literature on NPLS determinants that shown in Table III, we include the fiscal stance as is reflected in the ratio of public surplus to GDP as a further country control specific variable important to oil-exporting economies including Qatar; the said ratio is expected to have a negative effect on the NPLs of banks in the country. The definitions of all variables used in our study, their sources as well as the expected signs of the respective coefficients are reported in Table III.

Authors (year)	Samples	Determinants	Methods	Empirical results
Beck *et al.* (2015)	75 countries for 2000-2010	GDP growth Exchange rate Lending interest rate Share prices International claims Stock market capitalization	GMM	Problem loans are mainly related to the GDP growth, exchange rate, share prices, and the lending interest rate
Chaibi and Ftiti (2015)	France and Germany for 2005-2011	Bank-specific: Loan loss provisions Inefficiency Leverage Non-interest income Size Profitability Macroeconomic: Inflation GDP growth Interest rate Unemployment Exchange rate	GMM	Excepting the inflation rate, all macroeconomic variables influence the NPLs of both the economies. However, the French economy is more susceptible to bank-specific determinants
Castro (2013)	Greece, Ireland, Portugal, Spain, and Italy for 1997q1-2011q3	GDP Growth Inflation Interest rate Unemployment Credit growth Housing price index Real exchange rate Share price indices Financial crisis	GMM	NPLs are significantly influenced by the unemployment rate, GDP growth, interest rate, real exchange rate, housing price, and global financial crisis 2008
Louzis *et al.* (2012)	Greece for 2003-2009	Macroeconomic: GDP growth Lending rates Unemployment rate Bank-specific: Solvency ratio Return on equity Non-interest income Inefficiency Leverage ratio Size Ownership	GMM	NPLs are mainly related to the macroeconomic variables (GDP, unemployment, interest rates, and public debt) and management quality
Ali and Daly (2010)	USA and Australia for 14 years, 1995Q1 to 2009Q2)	GDP Interest rates Industrial production Debt-to-GDP ratio	Logit regression	The same set of macroeconomic variables displays different default rates for the two counties. However, they find that compared to Australia, the US economy is much more susceptible to adverse macroeconomic shocks
Berger and DeYoung (1997)	U.S.A for 1985-1994	Loan quality Bank capital Cost efficiency	Granger-causality techniques	Cost inefficiency may be an important indicator of future problem loans and problem banks

Table II.
Summary review of the main literature on NPLs determinants

Variable	Measurements	Expected sign
Dependent variable		
Non-performing loans	Impaired loans/gross loans	
Independent variables		
Oil price shocks	Oil price is the annual oil price changes (dollars per Barrel) (as proposed of WTI)	±
Gas price shocks	The changes of henry hub natural gas spot price (dollars per million Btu)	±
Bank-specific factors		
Loan loss provisions	Loan loss provisions/gross loans	+
Inefficiency	Operating expenses to total income	±
Capitalization	Equity capital to total assets	−
Liquidity	Liquid assets to total assets	+
Bank size	Natural log of total assets	±
Macro factors		
GDP growth	Annual growth rate of GDP as proposed of WDI	−
Fiscal stance	Government surplus/GDP	−
Exchange rate	Real effective exchange rate	±
Unemployment rate	Unemployment rate, in percentage terms	+
Herfindahl-Hirschman Index	Sum of the squared each bank's total assets to total banking sector assets	±
Global financial crisis	Dummy crisis takes a value of 1 for the years 2007-2009 and 0 otherwise	+

Table III. Variables definitions

3.3 Estimation methodology and hypothesis testing strategy

To examine the impact of oil and gas prices shocks on the NPLs, and to take into account the time persistence of NPLs or credit risk structure, endogeneity, autocorrelation unobserved heterogeneity that cannot be solved by fixed effects, the equations of the dynamic model can be written as follows:

$$NPLs_{ij,t} = \beta_{0_{it}} + \beta_{1_{it}} NPLs_{ij,t-1} + \beta_{2_{it}} OIL_{it} + \beta_{3_{it}} GAS_{it} + \beta_{4_{it}} BANK_{it} + \beta_{5_{it}} MACRO_{it} + \beta_{6_{it}} CRISIS_{it} + \epsilon_{ij,t} \quad (1)$$

where $NPLs_{ij,t}$ is the NPLs of bank i at time t, $NPLs_{ij,t-1}$ is the lagged dependent variable, while OIL_{it} is the oil price shocks, GAS_{it} is the natural gas price shocks, $BANK_{it}$ is the bank-specific factors, $MACRO_{it}$ is the country-specific determinants of NPLs, $CRISIS_{it}$ is the recent global financial crisis, and $\in_{ij,t}$ is an error term.

Our panel data are unbalanced because each variable is observed over a different period. Several previous studies in the banking literature have used traditional estimators of panel data such as pooled OLS, random effects, and fixed-effect model (Abraham, 2013; Ashraf *et al.*, 2016; Saif-Alyousf *et al.*, 2017a, b, among others). However, we follow the previous studies of Beck *et al.* (2015), Chaibi and Ftiti (2015), Castro (2013), and Louzis *et al.* (2012), who find that NPLs of banks are affected by their values of the previous periods due to the fact that banks have to match across periods the deposits and lending which are randomly determined as well as the non-interest activities. Therefore, the determinants of NPLs should also be examined by a dynamic panel method. Thus, we also estimate a dynamic panel data model employing a one-step system GMM suggested by Arellano and Bond (1991). The GMM estimator is more efficient than 2SLS since it accounts for heteroscedasticity (Hall, 2005).

We use the system GMM estimator instead of the difference the GMM estimator because the system GMM estimator provides more precise results and addresses the issue of unit root property (Bond, 2002; Tan, 2016). Furthermore, we use the one-step system GMM estimator rather than the two-step system GMM estimator due to the fact that it first provides a smaller bias and a smaller standard deviation of the estimation (Judson and Owen, 1999; Tan, 2016). To test the over-identifying restrictions, the Sargan test is used, while in order to make sure that there is no second-order autocorrelation in the estimation, the predetermined variable is instrumented using levels lagged by one-year period.

Oil and gas prices shocks can affect NPLs of banks directly or indirectly through their effects on macroeconomic variables, which prompted us to distinguish these two impacts. In order to examine for the hypotheses of the direct and indirect impacts of oil and gas prices shocks, we follow Poghosyan and Hesse (2009) to adopt the following empirical testing strategy.

For the purpose of analysis, we start to examine the impact of oil and gas prices shocks separately on the NPLs of banks, and then we introduce the bank-specific factors and country-specific factors separately into the models as well. If the impact of oil and gas prices shocks is not significant, the oil and gas prices shocks are not associated with NPLs of banks. Otherwise, if the impact of oil and gas prices shocks is significant, we would take an additional step to distinguish between the direct and indirect impacts of oil and gas prices shocks on the NPLs of banks by including both bank-specific and country-specific factors into the models. If the impacts of oil and gas prices shocks remain significant when bank-specific and country-specific factors are inserted together into the models, then we can say that oil and gas prices shocks have a direct impact on the NPLs of banks. Otherwise, we can say that oil and gas prices have the indirect impact on the NPLs of banks via macro variables.

4. Findings and discussion

4.1 Descriptive analysis

Table IV shows the review of descriptive statistics for the dependent and independent variables for entire banks as well as for both commercial and Islamic banks in Qatar. Table IV indicates that the average of NPLs at the aggregate level is 4.9 percent: 2.3 percent for Islamic banks compared to 5.9 percent for commercial banks, suggesting that Islamic banks on average have lower NPLs than commercial banks. However, the

	Entire banks				Commercial banks				Islamic banks			
Variable	Mean	Min.	Max.	SD	Mean	Min.	Max.	SD	Mean	Min.	Max.	SD
NPLs	4.9	0.1	47.5	8.6	5.9	0.3	47.5	9.9	2.3	0.1	10.6	2.6
Oil price shocks	9.8	−47.8	57.1	26.9	9.8	−47.8	57.1	26.9	9.8	−47.8	57.1	27.1
Gas price shocks	7.5	−55.5	89.9	37.4	7.5	−55.5	89.9	37.5	7.5	−55.5	89.9	37.7
Loan loss provisions	0.6	−0.9	8.2	1.1	0.6	−0.9	8.2	1.2	0.4	−0.2	1.9	0.6
Inefficiency	31.2	11.9	80.3	11.8	34.0	15.8	80.3	11.8	24.8	11.9	45.9	9.0
Capitalization	16.0	7.0	50.6	6.4	14.7	7.0	38.0	4.9	19.1	7.4	50.6	8.3
Liquidity	21.4	5.3	59.1	10.8	22.9	5.6	59.1	11.4	18.1	5.3	40.3	8.3
Bank size	15.9	13.3	18.8	1.2	15.9	13.3	18.8	1.3	15.8	13.9	17.4	1.0
GDP growth	11.1	3.6	26.2	7.1	11.1	3.6	26.2	7.1	11.1	3.6	26.2	7.1
Fiscal stance	9.1	2.9	19	4.9	9.1	2.9	19	4.9	9.1	2.9	19	4.9
Exchange rate	3.6	3.6	3.6	0.0	3.6	3.6	3.6	0.0	3.6	3.6	3.6	0.0
Unemployment rate	0.69	0.30	1.5	0.35	0.69	0.30	1.5	0.35	0.69	0.30	1.5	0.35
HHI	424	4.6	3508	852	584	4.6	3508	978	54.3	8.4	149.7	35.8
Global financial crisis	0.1	0.0	1.0	0.3	0.1	0.0	1.0	0.3	0.1	0.0	1.0	0.3
No. of observations	136				85				51			

Source: Authors calculation

Table IV.
Descriptive statistics

average NPLs for Qatari banks as a whole (4.9 percent) is equivalent to the global average NPLs that revealed by WDI and reached 4.96 percent during the same period 2000-2016. Furthermore, on average, Islamic banks show a lower ratio of loan loss provisions (0.4 percent), efficiency (24.8 percent), and liquidity (18.1 percent, indicating that Islamic banks are less risky, efficient, and liquid than commercial banks. It is also apparent that the Islamic banks in the country are less concentrated (54.3 percent) than commercial banks (58.4 percent). However, on average, Islamic banks are more capitalized (19.1 percent) than commercial banks (14.6 percent). However, Islamic banks size (15.8 percent) is a bit smaller than commercial banks (15.9 percent) during the period under reference. These findings corroborate that of Beck *et al.* (2013). Table IV exhibits that the average of oil price shocks and gas price shocks are 9.78 and 7.54 percent, respectively. Furthermore, it also shows that the average of GDP, fiscal stance, exchange rate, and unemployment rate are 11.1, 9.1, 3.6, and 0.69 percent respectively.

4.2 Correlation analysis

As shown in Tables V and VI, the correlation between the independent variables for both commercial and Islamic banks is < 0.90. This explains that there is no problem of multicollinearity and that interpretation of the regression coefficient should not be affected adversely (Gujarati, 2003).

4.3 Empirical results

This section describes the results of regression analysis on the NPLs of banks for the aggregate level of banks as well as for both commercial and Islamic banks separately in Qatar. To reveal the impact of oil and gas prices shocks on the NPLs of banks, we use the one-step system GMM dynamic model estimator to ameliorate the potential endogeneity produced by bank-specific characteristics such as capitalization liquidity, and size as well as the persistence of bank credit risk or NPLs. The dependent variable in all models is NPLs to gross loans.

4.3.1 Findings at the aggregate level. Table VII reports the empirical results of Equation (1) for NPLs of banks measured by NPLs to total loans for all banks taken together in Qatar using the one-step system GMM dynamic model. Panel A of Table VII consists of six columns: Column 1 presents the regression results of NPLs on only oil price shocks. Column 2 shows the regression results of NPLs on oil price shocks and its bank-specific determinants. Column 3 shows the regression results of NPLs on oil price shocks and its country-specific factors. Column 4 exhibits the regression results of NPLs when we insert both bank-specific and macro variables to oil price shocks. Colum 5 shows the regression results of NPLs on all independent variables including the dummy variable of the recent global financial crisis, while Column 6 reports the regression results of NPLs on all independent variables including the dummy variable of both the financial crisis and individual bank dummy.

The results of Sargan test and AR (1) and AR (2) in all columns of Table VII present that the GMM model is correctly specified and there are no identification issues. On other words, the Sargan test and the serial correlation prove the validity of the individual lag one-step GMM coefficient estimations. Furthermore, Table VII shows that our lagged dependent variable NPLs across all models are significant, confirming the correctness of use of a dynamic model. We report a high degree of persistence of our credit risk measure or NPLs.

According to Panel A of Table VII, Columns 1, 2 and 3 show that the association between oil price shocks and NPLs is negative and significant at the level of 5 and 1 percent, implying that oil prices are indeed associated with NPLs of banks in Qatar economy. The higher the oil price, the lower the NPLs of banks in Qatar. On average, an increase in the

Table V.
Correlations analysis of commercial banks in Qatar

Variable	NPLs	Oil	Gas	LLP	Inefficiency	Capital	Liquid	Size	GDP	Fiscal	Exchange	Unemp	HHI	Crisis
NPLs	1													
Oil price shocks	0.099	1												
Gas price shocks	0.228	0.672**	1											
Loan loss provisions	0.537**	0.180	0.343**	1										
Inefficiency	0.397**	0.065	0.099	0.288*	1									
Capitalization	−0.296*	0.126	−0.070	−0.246*	0.410**	1								
Liquidity	0.645**	0.463**	0.410**	0.380**	0.333**	−0.140	1							
Bank size	−0.650**	−0.297*	−0.282*	−0.362**	−0.530**	0.015	−0.694**	1						
GDP growth	−0.171	0.461**	−0.175	−0.135	−0.052	0.136	0.175	−0.058	1					
Fiscal stance	−0.274*	0.059	−0.026	−0.263*	−0.157	0.116	−0.156	0.048	0.219	1				
Exchange rate	−0.153	−0.279*	−0.286*	−0.109	−0.052	0.064	−0.448**	0.298*	−0.191	−0.089	1			
Unemployment rate	0.736*	0.495**	0.211**	0.640	0.151*	0.014*	0.360	−0.688*	0.223	0.491**	0.046	1		
HHI	−0.212	0.068	0.075	−0.173	−0.400**	−0.086	−0.035	0.406**	0.003	−0.022	−0.096	0.516	1	
Global financial crisis	−0.160	0.055	−0.076	−0.028	0.096	0.190	0.037	0.088	0.200	−0.082	−0.130	−330	−0.063	1

Note: *,**Significant at the 0.05 and 0.01 levels, respectively

Table VI.
Correlations analysis of Islamic banks in Qatar

Variable	NPLs	Oil	Gas	LLP	Inefficiency	Capital	Liquid	Size	GDP	Fiscal	Exchange	Unemp	HHI	Crisis
NPLs	1													
Oil price shocks	0.239	1												
Gas price shocks	0.140	0.672**	1											
Loan loss provisions	0.484**	0.283	0.471**	1										
Inefficiency	0.297	−0.020	0.297	0.650**	1									
Capitalization	−0.099	0.131	−0.251	−0.529**	−0.657**	1								
Liquidity	0.702**	0.058	−0.264	0.123	0.018	0.229	1							
Bank size	−0.679**	−0.410*	−0.309	−0.769**	−0.252	−0.033	−0.502**	1						
GDP growth	0.122	0.461**	−0.175	−0.096	−0.413*	0.589**	0.452*	−0.255	1					
Fiscal stance	−0.392*	−0.353*	0.206	−0.277	−0.132	0.090	−0.355	0.273	−0.256	1				
Exchange rate	−0.233	−0.279	−0.286*	−0.288	0.095	−0.398*	−0.267	0.499**	−0.191	−0.045	1			
Unemployment rate	0.736*	0.495**	0.211**	0.640	0.151*	0.014*	0.360	−0.688*	0.223	0.491**	0.046	1		
HHI	0.293	0.258	0.112	0.382*	0.445*	−0.264	0.039	−0.116	0.132	−0.38*	−0.113	0.516	1	
Global financial crisis	−0.174	0.055	−0.076	−0.211	−0.286	0.336	0.049	−0.030	0.200	0.295	−0.130	−0.330	−0.080	1

Note: *,**Significant at the 0.05 and 0.01 levels, respectively

Table VII.
Estimation results of oil and gas prices shocks on NPLs equation with complete sample

	Panel A: oil price shocks						Panel B: gas price shocks					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
$LNPL_{t-1}$	0.856***	0.788***	0.782***	0.712***	0.711***	0.703***	0.850***	0.786***	0.798***	0.716***	0.716***	0.709***
	(0.0150)	(0.0262)	(0.0249)	(0.0373)	(0.0388)	(0.0566)	(0.0142)	(0.0311)	(0.0314)	(0.0373)	(0.0369)	(0.0539)
Oil price shocks	−0.0369**	−0.0122**	−0.0408***	−0.00979	−0.00706	−0.00124						
	(0.0147)	(0.00526)	(0.0144)	(0.0136)	(0.0166)	(0.00827)						
Gas price shocks							−0.0294**	−0.0299**	−0.0186**	−0.00828	−0.00779	−0.00766
							(0.0108)	(0.0101)	(0.00904)	(0.00850)	(0.00848)	(0.00736)
Loan loss provisions		1.766***		1.183***	1.195***	1.034*		1.861***		1.198***	1.195***	0.992*
		(0.615)		(0.351)	(0.347)	(0.553)		(0.713)		(0.363)	(0.363)	(0.560)
Inefficiency		0.0572**		0.0132	0.0119	0.00881		0.0650***		0.0160	0.0148	0.0125
		(0.0272)		(0.0180)	(0.0203)	(0.0236)		(0.0244)		(0.0186)	(0.0204)	(0.0240)
Capitalization		−0.0625*		−0.0429*	−0.0429*	−0.0584*		−0.0893*		−0.0591*	−0.0499*	−0.0591*
		(0.0356)		(0.0207)	(0.0205)	(0.0301)		(0.0511)		(0.0335)	(0.0233)	(0.0347)
Liquidity		0.112**		0.0925**	0.0953**	0.0816*		0.103**		0.0914***	0.0925**	0.0748*
		(0.0479)		(0.0375)	(0.0425)	(0.0453)		(0.0460)		(0.0353)	(0.0365)	(0.0410)
Bank size		−0.998***		−0.209	−0.241	−0.778		−0.958***		−0.166	−0.179	−0.682
		(0.206)		(0.578)	(0.580)	(1.148)		(0.191)		(0.556)	(0.543)	(1.108)
GDP growth			−0.1000**	−0.0717**	−0.0702**	−0.0680**			−0.140***	−0.0861*	−0.0844*	−0.0854*
			(0.0400)	(0.0352)	(0.0346)	(0.0315)			(0.0502)	(0.0448)	(0.0453)	(0.0515)
Fiscal stance			−0.347**	−0.399**	−0.302**	−0.0816**			−0.291**	−0.108**	−0.117**	−0.142**
			(0.126)	(0.100)	(0.104)	(0.0360)			(0.111)	(0.0504)	(0.0508)	(0.0520)
Exchange rate			396.1	371.8	416.5	331.4			475.6	226.3	244.6	74.15
			(440.0)	(703.8)	(715.8)	(752.4)			(375.4)	(582.7)	(571.6)	(596.0)
Unemployment rate			2.334**	2.839**	3.601**	3.881**			2.848**	2.780**	2.844**	3.015**
			(1.144)	(1.414)	(1.730)	(1.866)			(1.342)	(1.394)	(1.397)	(1.501)
HHI			−0.000716	−0.000252	−0.000274	−0.000522			−0.00108	−0.000383	−0.000387	−0.000504
			(0.000963)	(0.000547)	(0.000574)	(0.00136)			(0.00111)	(0.000673)	(0.000682)	(0.00135)
Global financial crisis					−0.236	−0.606					−0.139	−0.488
					(0.504)	(0.385)					(0.336)	(0.288)

(*continued*)

Table VII.

	Panel A: oil price shocks						Panel B: gas price shocks					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Bank dummy						Yes						Yes
Constant	0.298	−19.35***	7,900***	4,953**	5,308**	5,710**	0.491*	−18.44***	9,959***	5,855**	6,291***	6,958***
	(0.257)	(6.231)	(2,450)	(2,365)	(2,388)	(2,626)	(0.255)	(6.234)	(2,507)	(2,406)	(2,430)	(2,698)
No. of observations	111	111	111	111	111	111	111	111	111	111	111	111
No. of banks	8	8	8	8	8	8	8	8	8	8	8	8
Wald χ^2	1,186.90	1,518.55	1,171.05	1,506.04	1,490.21	1,344.42	1,189.77	1,496.79	1,157.39	1,530.07	1,517.77	1,369.65
p-Value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sargan test p-value	0.1312	0.1149	0.3100	0.1519	0.2218	0.3615	0.1971	0.1317	0.4700	0.1740	0.2499	0.4017
AR(1) p-value	0.0933	0.0809	0.0765	0.0723	0.0644	0.0584	0.0922	0.0598	0.0604	0.0673	0.0551	0.0489
AR(2) p-value	0.1324	0.6178	0.7029	0.7861	0.5192	0.4060	0.3658	0.5087	0.7686	0.7606	0.4950	0.4332

Notes: The table reports the results of one-step system GMM dynamic panel model for all banks. The dependent variable in all models is non-performing loans (NPLs). Value of Sargan test is insignificant, indicating that instruments are valid. Significant values of AR(1) show that null hypothesis of no autocorrelation among error terms in first difference is rejected. AR(2) is significant, showing that error terms in level regressions are not correlated. Standard errors in parentheses. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

prices of oil by USD1 is associated with an average reduction of 0.0365 in NPLs of banks in Qatar. This means that the rise in the price of crude oil will improve the health of the borrowing clients and reduce the chances of default. This result is in line with the findings of Idris and Nayan (2016), who analyze the impact of oil price shocks and macroeconomic variables (GDP, inflation, unemployment, and environmental risk) on the NPLs of the aggregate level of OPEC banks and find that an increase in oil price leads to a decrease in the NPLs. This is also consistent with the results of Poghosyan and Hesse (2009), who find that oil prices enhance the profitability of banks in MENA oil-exporting economies.

To distinguish between direct and indirect impacts of oil prices shocks on the NPLs of banks, we incorporate a number of country-specific factors to our model. The empirical results that are reported in Columns 4, 5, and 6 of Panel A of Table VII reveal that the impact of oil price shocks on the NPLs remained negative but becomes insignificant when bank-specific and macro factors are incorporated together into the model. This suggests that there is no direct impact from the fluctuations of oil prices on the NPLs of all banks in Qatar, but the overall effect is channeled through country-specific factors. In particular, GDP growth, fiscal stance as well as unemployment rate seem to be the main macro drivers of NPLs of Qatari banks as a whole.

As expected, all columns of Panel A in Table VII show that the impact of GDP and the fiscal stance on the NPLs is negative and significant at the level of 5 percent, indicating that an increase in GDP and fiscal stance (public surplus to GDP) will reduce NPLs. In other words, NPLs of banks usually decrease in times of economic prosperity because, in times of economic prosperity (high GDP growth and the financial stance of the government), the amount of cash flows in the market increases that adds to the financial health of the borrowers, which facilitates servicing of loan (interest payment) as well as in their repayment behavior.

Regarding unemployment rate, the empirical results in Panel A of Table VII show that unemployment rate has a positive and significant effect on the NPLs of entire banks in Qatar at the level of 5 percent, implying that rising unemployment rate increases problems of loans (NPLs) by 3.16 on average. In other words, higher the unemployment rate, greater is the financial difficulties faced by households, which, in turn, adversely affect business cash flows. This result is in line with our expectation and also consistent with the findings of the previous studies such as Idris and Nayan (2016) in OPEC, Chaibi and Ftiti (2015) in France and Germany, Castro (2013) in GIPSI economies, and Louzis *et al.* (2012) in Greece. The impact of the exchange rate and HHI on the NPLs of banks is found to be insignificant.

The dummy variable for the recent global financial crisis 2008 shows that the impact of the recent global financial crisis on among bank-specific determinants of NPLs, we find that loan loss provisions and liquidity have a positive and significant impact on the NPLs, while capitalization has a negative and significant impact on the NPLs of banks. These indicate that higher the NPLs, higher is the provision, consequently, banks need to increase provisions when loans tend to become impaired. The results also indicate that a higher liquidity of banks leads to increase the NPLs, however, an increase in capitalization results in a decrease in NPL. The impact of inefficiency measured by the cost-to-income ratio and bank size is only found to be significant when we regress oil price with bank-specific factors while other columns show that their effects are insignificant. This means that the inefficiency and bank size do not have impact on the NPLs of Qatari banks.

NPLs determinants, as unexpected, are negative but insignificant. In general, this may due to the financial supports that provided by Qatar Government to the banking sector during the period of global financial crisis 2007-2009. Our main findings are unchanged when we include the global financial crisis as a dummy variable as well as a dummy variable for individual banks.

Similar to Panel A in Table VII, Panel B in Table VII consists of six columns but the latter displays the empirical results of gas price shocks on the NPLs equation with the aggregate sample as well. Likewise, the results of lagged dependent variable ($LNPLs_{t-1}$), Sargan test, AR (1), and AR (2) in all columns of Panel B in Table VII indicate that the moment conditions of the GMM dynamic model are correctly specified and valid.

As shown in Columns 1, 2 and 3 of Panel B in Table VII, the association between gas price shocks and NPLs of banks is negative and significant at the level of 5 percent, indicating that gas prices shocks are also indeed related to the NPLs of banks in Qatar where the higher the prices of gas the lower the NPLs of banks. On average, an increase in the prices of gas by USD1 is related to an average reduction of 2.6 percent in the NPLs of banks in Qatar. This also indicates that an increase in natural gas prices has a positive effect on the financial health of borrowers and reduces the likelihood of their inability to service their debt or in repayment. In return, Columns 4, 5 and 6 of the said Panel report that gas price shocks have remained negative but have become insignificant, stressing that gas prices volatility has also indirect impact on the NPLs of aggregate banks in Qatar, while its impact is directed via macro variables especially through GDP growth, fiscal stance, and unemployment rate. The results of bank-specific and country-specific factors, and a global financial crisis remain consistent when we regress gas price shocks rather than oil price shocks.

4.3.2 Commercial banks. This section reports the estimation results of NPLs equation with only the sample of commercial banks. Similar to Table VII, each Panels A and B of Table VIII consist of six models and reveal that the results of Sargan tests, AR(1) and AR(2), and lagged dependent variable in all models are valid and support us to use the system GMM estimator.

As shown in both Panels A and B of Table VIII, Columns 1, 2, and 3 of each panel show that the oil price shocks and gas price shocks are negatively and significantly related to the NPLs, suggesting that the higher prices of oil and gas the lower NPLs of commercial banks in Qatar. However, Columns 4, 5, and 6 of the said panels reveal that the relationships between both oil price shocks and gas price shocks with NPLs remain negative but insignificant when we introduce country-specific factors as well as dummy variables of global financial crisis and individual banks. These imply that there is no direct effect of fluctuations of both oil and gas prices on the NPLs of Qatari commercial banks; however, overall impacts are driven by economic factors, particularly GDP growth, the financial position of the government and the unemployment rate.

The results of bank-specific factors, macroeconomic variables, as well as our dummy variable of the financial crisis are similar to our main results that described in the previous Section 4.3.1.

4.3.3 Islamic banks. This section describes the empirical results of NPLs equation with only the sample of Islamic banks as shown in Table IX. The each panel of the table also consist of six models that are similar to the tables in the prior two sections. All models in both panels of Table IX show that the results of lagged dependent variable, Sargan tests, AR(1), and AR(2) are also quite and the moment conditions of the system GMM dynamic model are valid.

As shown in Columns 1, 2 and 3 of both panels in Table IX, the results indicate that the impact of oil price shocks and gas prices shocks is negative and significant at the level of 1 percent for oil price and 5 percent for gas price, meaning that an increase in prices of oil and gas leads to decrease NPLs of Islamic banks in Qatar. Moreover, Models 4, 5, and 6 of the said panels show that the effect of both oil and gas prices shocks on the NPLs of Qatari Islamic banks has remained negative and significant at the same levels when we include the bank-specific and macroeconomic factors together, as well as the financial crisis, confirming

Table VIII.
Estimation results of oil and gas prices shocks on NPLs equation with commercial banks' sample

	Panel A: oil price shocks						Panel B: gas price shocks					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
$LNPL_{t-1}$	0.839***	0.794***	0.815***	0.778***	0.777***	0.781***	0.838***	0.800***	0.833***	0.783***	0.782***	0.785***
	(0.0238)	(0.0341)	(0.0378)	(0.0497)	(0.0509)	(0.0584)	(0.0248)	(0.0349)	(0.0368)	(0.0499)	(0.0509)	(0.0582)
Oil price shocks	−0.0471***	−0.0719***	−0.0388**	−0.0163	−0.0154	−0.0166						
	(0.00930)	(0.0104)	(0.0153)	(0.0183)	(0.0256)	(0.0274)						
Gas price shocks							−0.0254***	−0.0190**	−0.0199**	−0.0117	−0.0112	−0.0117
							(0.00754)	(0.00691)	(0.00870)	(0.00934)	(0.0104)	(0.0111)
Loan loss provisions		1.902***		1.257***	1.263***	1.155**		1.924***		1.258***	1.263***	1.161**
		(0.323)		(0.448)	(0.472)	(0.544)		(0.315)		(0.433)	(0.440)	(0.513)
Inefficiency		0.112***		0.0218	0.0213	0.0268		0.112***		0.0293	0.0276	0.0335
		(0.0340)		(0.0486)	(0.0505)	(0.0555)		(0.0330)		(0.0485)	(0.0509)	(0.0559)
Capitalization		−0.137**		−0.185*	−0.183*	−0.228*		−0.140**		−0.105*	−0.129*	−0.149*
		(0.0672)		(0.0854)	(0.0865)	(0.0961)		(0.0643)		(0.0657)	(0.0670)	(0.0765)
Liquidity		0.0719**		0.0945**	0.0956*	0.0916*		0.0701**		0.0874**	0.0963**	0.130**
		(0.0356)		(0.0441)	(0.0498)	(0.0544)		(0.0358)		(0.0437)	(0.0465)	(0.0505)
Bank size		−0.767**		−0.254	−0.246	−0.147		−0.791**		−0.298	−0.287	−0.189
		(0.345)		(0.541)	(0.575)	(0.862)		(0.340)		(0.535)	(0.548)	(0.829)
GDP growth			−0.156***	−0.132***	−0.131***	−0.135**			−0.0967**	−0.0974**	−0.150**	−0.160**
			(0.0405)	(0.0444)	(0.0468)	(0.0515)			(0.0444)	(0.0495)	(0.0533)	(0.0588)
Fiscal stance			−0.171**	−0.105**	−0.102**	−0.114*			−0.115**	−0.187**	−0.185**	−0.195**
			(0.0696)	(0.0532)	(0.0968)	(0.109)			(0.0502)	(0.0629)	(0.0648)	(0.0743)
Exchange rate			40.67	99.24	113.9	101.3			206.2	95.28	70.63	87.71
			(604.4)	(747.7)	(818.0)	(882.8)			(639.5)	(776.2)	(807.8)	(867.9)
Unemployment Rate			3.575***	2.891**	2.937**	3.044**			4.014***	2.874**	2.942**	3.060**
			(0.964)	(1.307)	(1.445)	(1.541)			(0.917)	(1.240)	(1.360)	(1.550)
HHI			−0.00132*	−0.000845	−0.000853	−0.000674			−0.00159**	−0.000972	−0.000982	−0.000795
			(0.000688)	(0.000717)	(0.000745)	(0.00130)			(0.000695)	(0.000721)	(0.000733)	(0.00130)
Global financial crisis					−0.0735	−0.0134					−0.161	−0.101
					(1.549)	(1.676)					(1.233)	(1.322)
Bank dummy						Yes						Yes
Constant	0.372*	−15.37**	8,641***	6,003**	6,377**	7,624***	0.349**	−15.74**	10,179***	7,206***	7,670***	9,157***
	(0.195)	(6.182)	(2,752)	(2,669)	(2,708)	(2,935)	(0.105)	(6.119)	(2,909)	(2,761)	(2,803)	(3,073)
No. of observations	71	71	71	71	71	71	71	71	71	71	71	71
No. of banks	5	5	5	5	5	5	5	5	5	5	5	5

(*continued*)

Table VIII.

	Panel A: oil price shocks						Panel B: gas price shocks					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Wald χ^2	1,245.14	1,624.51	1,227.87	1,549.29	1,522.87	1,419.25	950.19	1,589.38	1,149.49	1,542.66	1.517.83	1,391.96
p-Value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sargan test *p*-value	0.8553	0.8475	0.8465	0.8570	0.1316	0.2053	0.9091	0.8858	0.8429	0.1560	0.2095	0.3527
AR(1) *p*-value	0.0984	0.1399	0.0813	0.1483	0.1468	0.1329	0.1195	0.1792	0.0835	0.1380	0.1277	0.1128
AR(2) *p*-value	0.2073	0.1595	0.8082	0.2379	0.2038	0.1953	0.1518	0.1727	0.7687	0.2886	0.2322	0.2180

Notes: The table reports the results of one−step system GMM dynamic panel model for only commercial banks. The dependent variable in all models is non-performing loans (NPLs). Value of Sargan test is insignificant, indicating that instruments are valid. Significant values of AR(1) show that null hypothesis of no autocorrelation among error terms in first difference is rejected. AR(2) is significant, showing that error terms in level regressions are not correlated. Standard errors in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$

Table IX.
Estimation results of oil and gas prices shocks on the NPLs equation with Islamic banks' sample

	Panel A: oil price shocks						Panel B: gas price shocks					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
$LNPL_{t-1}$	0.594***	0.353***	−0. 556***	−0.512***	−0.451***	−0.412***	0.633***	0.338***	0.302**	−0.602***	−0.637***	−0.602***
	(0.0402)	(0.0632)	(0.110)	(0.0719)	(0.107)	(0.0987)	(0.0420)	(0.0461)	(0.115)	(0.0807)	(0.0845)	(0.0735)
Oil price shocks	−0.0061***	−0.0076***	−0.029***	−0.0341***	−0.0425***	−0.034***						
	(0.00181)	(0.00186)	(0.00329)	(0.00442)	(0.00815)	(0.00137)						
Gas price shocks							−0.00289**	−0.00294**	−0.0203**	−0.0186**	−0.0183**	−0.014***
							(0.00144)	(0.00146)	(0.0111)	(0.00745)	(0.00741)	(0.00285)
Loan loss provisions		0.943***		1.546***	1.160**	1.016**		0.826***		1.459***	1.689***	1.542***
		(0.306)		(0.306)	(0.503)	(0.451)		(0.308)		(0.295)	(0.355)	(0.339)
Inefficiency		0.0403***		0.0796***	0.0759***	0.0145		0.0422***		0.0685***	0.0713***	0.0216
		(0.0140)		(0.0258)	(0.0278)	(0.0840)		(0.0126)		(0.0227)	(0.0237)	(0.0904)
Capitalization		−0.125***		−0.114***	−0.108***	−0.0791*		−0.126***		−0.157***	−0.162***	−0.0885*
		(0.0341)		(0.0309)	(0.0419)	(0.0398)		(0.0244)		(0.0371)	(0.0392)	(0.0482)
Liquidity		0.137***		0.0784*	0.0734**	0.0913**		0.137***		0.0688*	0.0781*	0.0855*
		(0.0286)		(0.0408)	(0.0354)	(0.0417)		(0.0321)		(0.0379)	(0.0411)	(0.0440)
Bank size		−1.317***		−2.532***	−2.838***	−2.521***		−1.246***		−2.413***	−2.230***	−2.218***
		(0.200)		(0.252)	(0.131)	(0.248)		(0.156)		(0.274)	(0.301)	(0.274)
GDP growth			−0.173***	−0.102***	−0.108***	−0.105***			−0.213***	−0.0929***	−0.0938***	−0.0768***
			(0.0203)	(0.0211)	(0.0166)	(0.0222)			(0.0421)	(0.00274)	(0.00602)	(0.00777)
Fiscal stance			−0.226***	−0.0867***	−0.0944***	−0.0526***			−0.202***	−0.0392**	−0.0346**	−0.0808***
			(0.0185)	(0.0262)	(0.0359)	(0.0173)			(0.0197)	(0.0167)	(0.0138)	(0.0182)
Exchange rate			−1,532***	107.6	427.6	461.1			−1,384***	37.06	178.4	5.898
			(259.5)	(258.4)	(440.7)	(381.7)			(197.9)	(317.8)	(357.7)	(313.8)
Unemployment Rate			5.484***	2.108***	1.952**	1.436**			4.693***	3.159***	3.696***	3.571***
			(0.694)	(0.296)	(0.719)	(0.596)			(0.653)	(0.516)	(0.641)	(0.529)
HHI			−0.0280**	−0.0156***	−0.0216***	−0.00965			−0.0333**	−0.0125**	−0.0097**	−0.0180
			(0.0134)	(0.00380)	(0.00582)	(0.0221)			(0.0133)	(0.00619)	(0.00485)	(0.0238)
Global financial crisis					−1.004**	−0.782***					−0.473*	−0.430*
					(0.494)	(0.272)					(0.256)	(0.228)

(*continued*)

Table IX.

	Panel A: oil price shocks						Panel B: gas price shocks					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Bank dummy						Yes						Yes
Constant	0.900***	21.48***	5,582***	306.5	−511.4	−214.4	0.848***	20.28***	5,041***	169.3	680.6	13.38
	(0.324)	(3.071)	(945.8)	(2,717)	(3,538)	(3,708)	(0.276)	(2.730)	(721.5)	(1,154)	(1,298)	(1,140)
No. of observations	40	40	40	40	40	40	40	40	40	40	40	40
No. of banks	3	3	3	3	3	3	3	3	3	3	3	3
Wald χ^2	25.17	117.85	23.78	139.57	129.55	112.42	24.61	116.49	22.01	131.21	119.85	109.15
p-Value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sargan test p-value	0.2840	0.6982	0.7899	0.9075	0.9275	0.9728	0.3075	0.7038	0.8037	0.9290	0.9475	0.9757
AR(1) p-value	0.2860	0.2182	0.2997	0.1202	0.1446	0.1127	0.2921	0.2218	0.3134	0.1194	0.1452	0.1078
AR(2) p-value	0.1178	0.3905	0.5573	0.1767	0.1646	0.1957	0.2481	0.3802	0.2760	0.2349	0.2388	0.2615

Notes: The table reports the results of one-step system GMM dynamic panel model for Islamic banks. The dependent variable in all models is non-performing loans (NPLs). Value of Sargan test is insignificant, indicating that instruments are valid. Significant values of AR(1) show that null hypothesis of no autocorrelation among error terms in first difference is rejected. AR(2) is significant, showing that error terms in level regressions are not correlated. Standard errors in parentheses. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

that oil and gas prices have direct impact on the NPLs of Islamic banks in Qatar. Clearly, Islamic banks in Qatar greatly benefits from increased cash flow created by oil and gas prices, which make their average NPLs (2.3 percent), much lower than that in commercial banks (5.9 percent).

In contrast to commercial banks, Table IX shows that the coefficient of the bank inefficiency measured by the cost-to-income ratio is positive and statistically significant at the 1 percent level for Islamic banks NPLs, giving support to the bad management hypothesis. This indicates that bad management performs (high-cost inefficiency) lead to an increase in the NPLs. Regarding bank size measured by the natural logarithm of total assets, all columns in Table IX show that size is significantly and negatively associated with Islamic banks NPLs at the 1 percent level. This indicates that large Islamic banks take less risk by not increasing their leverage under the assumption of "too big to fail" and thus have less of NPLs. Furthermore, the results show that HHI has also a negative effect on Islamic banks NPLs concentration in Islamic banking reduces NPLs. This result is in line with market structure conduct performance (SCP) hypothesis that argues that in a highly concentrated banking market where competition is low, the banks are more profitable and less risky.

Regarding the global financial crisis, the impact of the recent global financial crisis on the NPLs of Islamic banks in Qatar is negative and significant; it is, however, not consistent with our expectation. This implies that NPLs of Qatari Islamic banks have declined during the global financial crisis 2008. The average of NPLs for Islamic banks in Qatar before the crisis (2000-2006) was 5.48 percent but dropped down during the crisis period (2007-2009) to 1.36 percent. This indicates that Islamic banks operating in Qatar have benefited greatly from the financial support provided by the Government of Qatar to the banking sector during the period of the global financial crisis 2007-2009; furthermore, they have been able to face –off the challenge from the global financial crisis as they are not exposed to the issues arising out of securitization.

4.3.4 Robustness tests. We provide several robustness checks. First, we regress the oil price shocks and gas price shocks separately and find that our main findings are similar. Second, we distinguish between direct and indirect channels through which oil price shocks and gas price shocks may affect NPLs. Third, we divided our sample into two sets: commercial banks and Islamic banks samples and regressed separately. Finally, another set of robustness checks takes into consideration how the data behave with regards to different estimators. We consider the 2SLS, fixed-effect model panel data techniques, and pooled OLS. As shown in Table X, completely the results of all variables, excepting bank size and HHI, are similar to our main findings that shown in the Section 4.3.1. This means that our main findings remain unchanged even when we re-run our models by 2SLS, fixed-effect model as well as pooled OLS. The size of the bank and the HHI of market concentration is found to have a negative and significant impact on the NPLs for Qatari banks as a whole, providing support to the SCP hypothesis that argues that banks with more concentration have more profit and less risk, and do not support "too big to fail" hypothesis.

5. Conclusion

There is no doubt that oil and gas prices and their production are of great importance to the economic development of oil and gas-exporting countries. However, the effect of oil and gas prices shocks on the NPLs of banks in those economies has so far lacked an accurate empirical analysis. This paper attempts to fill these gaps by giving an in-depth quantitative analysis of the impact of oil price shocks and gas price shocks, separately, on the NPLs of banks in an oil and gas-rich economy. Therefore, to our best knowledge, this study is a first study to examine the impact of oil and gas prices shocks and fiscal stance of government on

Table X.
Estimation results of oil and gas prices shocks on the NPLs with complete sample using 2SLS, fixed effect, and pooled OLS models

	2SLS model				Fixed-effect model				Pooled OLS			
	Panel A: oil price		Panel B: gas price		Panel A: oil price		Panel B: gas price		Panel A: oil price		Panel B: gas price	
Variables	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Oil price shocks	−0.0337**	−0.0321			−0.0312***	−0.0410			−0.0337**	0.0321		
	(0.0128)	(0.0469)			(0.0123)	(0.0455)			(0.0158)	(0.0469)		
Gas price shocks			−0.0156**	−0.00828			−0.0304**	−0.0153			−0.0356**	−0.00828
			(0.0066)	(0.0204)			(0.0151)	(0.0191)			(0.0166)	(0.0204)
Loan loss provisions	1.717***	1.295**	1.772***	1.124**	2.196***	1.278**	2.236***	1.133**	1.717***	1.295**	1.772***	1.124**
	(0.603)	(0.577)	(0.611)	(0.524)	(0.589)	(0.549)	(0.596)	(0.522)	(0.603)	(0.577)	(0.611)	(0.524)
Inefficiency	0.0878	0.00308	0.0996*	0.000963	0.128*	0.0592	0.145**	0.0606	0.0878*	0.00308	0.0996*	0.000963
	(0.0571)	(0.0518)	(0.0569)	(0.0518)	(0.0721)	(0.0742)	(0.0719)	(0.0745)	(0.0471)	(0.0518)	(0.0569)	(0.0518)
Capitalization	−0.286**	−0.207*	−0.316***	−0.208*	−0.298**	−0.232*	−0.231*	−0.242*	−0.286**	−0.207*	−0.316***	−0.208*
	(0.118)	(0.106)	(0.119)	(0.107)	(0.129)	(0.123)	(0.129)	(0.124)	(0.118)	(0.106)	(0.119)	(0.107)
Liquidity	0.321***	0.360***	0.305***	0.345***	0.345***	0.387***	0.333***	0.371***	0.321***	0.360***	0.305***	0.345***
	(0.0709)	(0.0826)	(0.0699)	(0.0783)	(0.0789)	(0.0911)	(0.0789)	(0.0876)	(0.0709)	(0.0826)	(0.0699)	(0.0783)
Bank Size	−1.714**	−1.776*	−1.635**	−1.717*	−0.699*	−2.880*	−0.511*	−2.627*	−1.714***	−1.876**	−1.635**	−1.717*
	(0.665)	(0.927)	(0.666)	(0.884)	(0.349)	(1.479)	(0.246)	(1.411)	(0.665)	(0.927)	(0.666)	(0.884)
GDP Growth		−0.232**		−0.222**		−0.288***		−0.266**		−0.232**		−0.222**
		(0.0955)		(0.109)		(0.0917)		(0.103)		(0.0955)		(0.109)
Fiscal Stance		−0.359**		−0.326**		−0.375**		−0.355***		−0.398**		−0.326**
		(0.180)		(0.142)		(0.175)		(0.134)		(0.180)		(0.142)
Exchange rate		1,731		1,533		2,233		2,074		1,731		1,533
		(1,593)		(1,585)		(1,617)		(1,573)		(1,593)		(1,585)
Unemployment rate		2.521**		2.342**		5.506**		5.507*		−5.521*		5.342**
		(0.869)		(1.412)		(2.406)		(2.891)		(2.869)		(2.412)
HHI		−9.7e-05		−0.00289		−0.00529**		−0.0055**		−9.74e-05		−0.000289
		(0.00993)		(0.00934)		(0.00219)		(0.00218)		(0.00099)		(0.000934)
Financial crisis		−1.917		−1.061		−3.000		−2.096		1.917		1.061
		(2.775)		(2.312)		(2.703)		(2.198)		(2.775)		(2.312)
Constant	26.13**	−6,270	25.10**	−5,552	4.977	−8,080	2.032	−7,506	26.13**	−6,270	25.10**	−5,552
	(12.26)	(5,795)	(12.32)	(5,768)	(15.16)	(5,877)	(15.15)	(5,716)	(12.26)	(5,795)	(12.32)	(5,768)
No. of observations	120	120	120	120	120	120	120	120	120	120	120	120

(*continued*)

Table X.

	2SLS model				Fixed-effect model				Pooled OLS			
	Panel A: oil price		Panel B: gas price		Panel A: oil price		Panel B: gas price		Panel A: oil price		Panel B: gas price	
Variables	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
R^2	0.598	0.614	0.593	0.613	0.560	0.624	0.553	0.623	0.598	0.614	0.593	0.613
No. of banks	8	8	8	8	8	8	8	8	8	8	8	8
Hausman test					13.19***	16.62**	14.45***	29.56***				
Breusch-Pagan, LM									174.32***	217.38***	98.12***	219.74***

Notes: The table reports the results of 2SLS model, fixed-effect model, and pooled OLS model for all banks. The dependent variable in all models is non-performing loans (NPLs). Hausman test ($P = 0.0000 < 5\%$) indicates that for the present analysis fixed-effect model is more appropriate for analysis. The p-value of Breusch-Pagan, LM is significant ($p < 0.01$), suggesting that null hypothesis of homoscedasticity is rejected, which means that there is a heteroscedasticity problem in the study model. Standard errors in parentheses. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

the NPLs of banks as well as compare their impacts for both commercial and Islamic banks. Furthermore, we distinguish between direct and indirect channels through which oil price shocks and gas price shocks may affect banks NPLs. We examine the impact of oil price shocks, gas price shocks, as well as a fiscal stance of government on the NPLs of Qatari banks over the period 2000-2016. We consider 17 years panel data for 8 listed banks (5 commercial banks and 3 Islamic banks, using the one-step system GMM estimator).

Overall, our results suggest that oil price shocks and gas price shocks do not have a direct impact on the NPLs of Qatari banks as a whole, implying that our empirical results lend support for the indirect channel hypothesis. We find no evidence supporting the direct channel hypothesis, but the overall impact is channeled through country-specific factors, particularly through GDP growth, fiscal position, and the unemployment rate, which appear to be the major overall drivers of NPLs in Qatari banks as a whole. Among two types of banks, we find that the impact of oil and gas prices is evident for the NPLs of Qatari Islamic banks; however, there is less evidence supporting the same in the case of commercial banks' NPLs. Unlike commercial banks, our results for Islamic banks highly support the direct channel hypothesis. This means that the rise in the prices of crude oil and natural gas improves the net position of borrowing clients from Islamic banks and reduces the chances of default on their loans and interest. In short, oil price shocks and gas price shocks affect NPLs of Qatari Islamic banks directly through extended oil and gas-related cash flows, while their impact on the NPLs of Qatari commercial banks is indirect, i.e., the impact is shifted through the macroeconomic and institutional characteristics of the country that are reinforced by the growing expectations of the country.

We also find that fiscal stance of government leads to decline the level of NPLs for both Islamic and commercial banks. Moreover, we find that the global financial crisis 2008 has indeed strengthened the Islamic banking industry by decreasing the level of their NPLs, while it does not have any effect on that for commercial banks. More interestingly, the relationship between oil price shocks and gas prices shocks with NPLs for both Islamic and commercial banks has not been distorted by the global financial crisis 2008, which suggests that the impact of global crises on oil and gas prices should be considered into while investigating the relationship between oil and gas price shocks and banks NPLs.

Our results have significant policy implications since they present the first evidence of a systemic impact of both oil and gas prices shocks together for bank NPLs in an oil and gas-rich economy. Evidently, Islamic banks in Qatar greatly benefit from increased cash flows caused by positive oil and gas price shocks. NPLs may increase during the recession (period of sharp decline in oil and gas prices) due to the expansion of lending activities during the period of the boom (period of sharp rise in oil and gas prices). This finding clearly points out that the Qatari Monetary Authority should monitor fluctuations in oil and gas prices. Positive impact results in improved cash flow resulting in a decrease in the volume of NPLs in Islamic banks directly and commercial banks indirectly. However, unbridled loan growth during the phase of positive impact might result in mounting NPLs during the recessionary times. Moreover, the Qatari Monetary Authority may like to monitor the fiscal stance of government in the country in the view of the findings that fiscal stance has a direct negative association with the NPLs for both Islamic and commercial banks. Furthermore, our findings suggest that measures to increase efficiency in banks, growth-oriented government's policy stance and employment fosters stability in the country's banking system and finally the economy. In addition, there is evidence that NPLs in Islamic banks significantly more affected by bank-specific factors than in commercial banks. The strength of Islamic banks in Qatar terms of their capital cushion, coupled with their ability to contain NPLs, managerial performance, better efficiency in risk management and managing liquidity, should be used by the management of Islamic banks in the country to expand their customer base through appropriate marketing strategies.

In order to generalize the empirical findings, it would be useful to expand the scope of future studies to include other oil- and gas-based economies. It would also be interesting to examine the impact of oil and gas prices shocks on loan growth and non-traditional activities of banks in oil and gas-exporting countries using alternative analytical tools like structural equation modeling.

References

Abdul-Wahab, A.-H. and Haron, R. (2017), "Efficiency of Qatari banking industry: an empirical investigation", *International Journal of Bank Marketing*, Vol. 35 No. 2, pp. 298-318.

Abraham, A. (2013), "Foreign ownership and bank performance metrics in Saudi Arabia", *International Journal of Islamic and Middle Eastern Finance and Management*, Vol. 6 No. 1, pp. 43-50.

Ahmad, N.H. and Arif, M. (2007), "Multi-country study of bank credit risk determinants", *The International Journal of Banking and Finance*, Vol. 5 No. 1, pp. 135-152.

Al-Hassan, A., Khamis, M. and Oulidi, N. (2010), "The GCC banking sector: topography and analysis", *IMF Working Papers*, Vol. 10 No. 87, pp. 1-45.

Al-Tamim, H.A.H., Lafi, A.S. and Uddin, H. (2009), "Bank Image in the UAE: comparing Islamic and conventional banks", *Journal of Financial Services Marketing*, Vol. 14 No. 3, pp. 232-244.

Ali, A. and Daly, K. (2010), "International review of financial analysis macroeconomic determinants of credit risk : Recent evidence from a cross country study", *International Review of Financial Analysis*, Vol. 19 No. 3, pp. 165-171.

Arellano, M. and Bond, S. (1991), "Some tests of specification for panel Carlo application to data: evidence and an employment equations", *The Review of Economic Studies*, Vol. 58 No. 2, pp. 277-297.

Ashraf, D., Ramady, M. and Albinali, K. (2016), "Financial fragility of banks, ownership structure and income diversification: empirical evidence from the GCC region", *Research in International Business and Finance*, Vol. 38 No. 3, pp. 56-68.

Beck, R., Jakubik, P. and Piloiu, A. (2015), "Key determinants of non-performing loans: new evidence from a global sample", *Open Economies Review*, Vol. 26 No. 3, pp. 525-550.

Beck, T., Demirgüç-Kunt, A. and Merrouche, O. (2013), "Islamic vs. conventional banking: business model, efficiency and stability", *Journal of Banking and Finance*, Vol. 37 No. 2, pp. 433-447.

Bekiros, S., Gupta, R. and Paccagnini, A. (2015), "Oil price forecastability and economic uncertainty", *Economics Letters*, Vol. 132 No. 9, pp. 125-128.

Berger, A.N. and DeYoung, R. (1997), "Problem loans and cost efficiency in commercial banks", *Journal of Banking & Finance*, Vol. 21 No. 6, pp. 849-870.

Bernanke, B.S., Gertler, M. and Watson, M. (1997), "Systematic monetary policy and the effects of oil price shocks", *Brookings Papers on Economic Activity*, Vol. 1997 No. 1, pp. 91-157.

Berument, H. and Ceylan, N.B. (2010), "The impact of oil price shocks on the economic growth of selected MENA1 countries", *The Energy Journal*, Vol. 31 No. 1, pp. 149-176.

Bizri, R.M. (2014), "A study of Islamic banks in the non-GCC MENA region: evidence from Lebanon", *International Journal of Bank Marketing*, Vol. 32 No. 2, pp. 130-149.

Bond, S.R. (2002), "Dynamic panel data models: a guide to micro data methods and practice", *Portuguese Economic Journal*, Vol. 1 No. 2, pp. 141-162.

Brini, R., Amara, M. and Jemmali, H. (2017), "Renewable energy consumption, International trade, oil price and economic growth inter-linkages: the case of Tunisia", *Renewable and Sustainable Energy Reviews*, Vol. 76 No. 3, pp. 620-627.

Castro, V. (2013), "Macroeconomic determinants of the credit risk in the banking system: the case of the GIPSI", *Economic Modelling*, Vol. 31 No. 1, pp. 672-683.

Chaibi, H. and Ftiti, Z. (2015), "Credit risk determinants: evidence from a cross-country study", *Research in International Business and Finance*, Vol. 33 No. 1, pp. 1-16.

Cologni, A. and Manera, M. (2005), "Oil prices, inflation and interest rates in a structural cointegrated VAR model for the g-7 countries", *Energy Economics*, Vol. 30 No. 3, pp. 856-888.

Cunado, J. and Gracia, F.P.d. (2005), "Oil prices, economic activity and inflation: evidence for some Asian countries", *Quarterly Review of Economics and Finance*, Vol. 45 No. 1, pp. 65-83.

Diaz, E.M. and Gracia, F.P.De. (2017), "Oil price shocks and stock returns of oil and gas corporations", *Finance Research Letters*, Vol. 20 No. 2, pp. 75-80.

Dutta, A., Nikkinen, J. and Rothovius, T. (2017), "Impact of oil price uncertainty on Middle East and African stock markets", *Energy*, Vol. 123 No. 3, pp. 189-197.

Gogineni, S. (2010), "Oil and the stock market: an industry level analysis", *The Financial Review*, Vol. 45 No. 4, pp. 995-1010.

Gujarati, D.N. (2003), *Basic Econometrics*, 4th ed., McGraw-Hill, New York, NY, available at: www.afriheritage.org/TTT/2%20Basic%20Econometrics%20-%20Gujarati[1].pdf

Hall, A.R. (2005), *Generalized Method of Moments*, Oxford University Press, available at: http://personalpages.manchester.ac.uk/staff/Alastair.Hall/GMM_EQF_100309.pdf

Hamilton, J.D. (1983), "Oil and the macroeconomy since World War II", *Journal of Political Economy*, Vol. 91 No. 2, pp. 228-248.

Hamilton, J.D. (1996), "This is what happened to the oil price-macroeconomy relationship", *Journal of Monetary Economic*, Vol. 38 No. 2, pp. 215-220.

Hamilton, J.D. (2003), "What is an oil shock?", *Journal of Econometrics*, Vol. 113 No. 2, pp. 363-398.

Hamilton, J.D. (2009), "Causes and consequences of the oil shock of 2007-08", *National Bureau of Economic Research*, Vol. 40 No. 2, pp. 215-283.

Hammoudeh, S. and Aleisa, E. (2004), "Dynamic relationships among GCC stock markets and NYMEX oil futures", *Contemporary Economic Policy*, Vol. 22 No. 2, pp. 250-269.

Hammoudeh, S. and Choi, K. (2007), "Characteristics of permanent and transitory returns in oil-sensitive emerging stock markets: the case of GCC countries", *Journal of International Financial Markets, Institutions and Money*, Vol. 17 No. 3, pp. 231-245.

Herrera, A.M. and Pesavento, E. (2009), "Oil price shocks, systematic monetary policy and the 'great moderation' ", *Macroeconomic Dynamics*, Vol. 13 No. 1, pp. 107-137.

Idris, I.T. and Nayan, S. (2016), "The joint effects of oil price volatility and environmental risks on non-performing loans: evidence from panel data of Organization of the Petroleum Exporting Countries", *International Journal of Energy Economics and Policy*, Vol. 6 No. 3, pp. 522-528.

IMF (2015), *Regional Economic Outlook: Middle East and Central Asia Department*, International Monetary Fund, available at: file:///C:/Users/user/Downloads/_mreo0115pdf.pdf

Jones, C.M. and Kaul, G. (1996), "Oil and stock markets", *The Journal of Finance*, Vol. 51 No. 2, pp. 463-491.

Judson, R.A. and Owen, A.L. (1999), "Estimating dynamic panel data models: a guide for macroeconomists", *Economics Letters*, Vol. 65 No. 1, pp. 9-15.

Kaabachi, S. and Obeid, H. (2016), "Determinants of Islamic banking adoption in Tunisia: empirical analysis", *International Journal of Bank Marketing*, Vol. 34 No. 7, pp. 1069-1091.

Kilian, L. and Lewis, L. (2011), "Does the fed respond to oil price shocks ?", *The Economic Journal*, Vol. 121 No. 555, pp. 1047-1072.

Kilian, L. and Vigfusson, R.J. (2011), "Are the responses of the US economy asymmetric in energy price increases and decreases?", *Quantitative Economics*, Vol. 2 No. 3, pp. 419-453.

Lardic, S. (2006), "The impact of oil prices on GDP in European countries: an empirical investigation based on asymmetric cointegration", *Energy Policy*, Vol. 34 No. 18, pp. 3910-3915.

Lee, T.K., Dennis, S.A. and Simlai, P. (2015), "The effect of oil production on bank deposits in North Dakota's Bakken formation", *In Overlaps of Private Sector with Public Sector Around the Globe*, Vol. 6 No. 6, pp. 1-16.

Louzis, D.P., Vouldis, A.T. and Metaxas, V.L. (2012), "Macroeconomic and bank-specific determinants of non-performing loans in Greece: a comparative study of mortgage, business and consumer loan portfolios", *Journal of Banking and Finance*, Vol. 36 No. 4, pp. 1012-1027.

Ltifi, M., Hikkerova, L., Aliouat, B. and Gharbi, J. (2016), "The determinants of the choice of Islamic banks in Tunisia", *International Journal of Bank Marketing*, Vol. 34 No. 5, pp. 710-730.

Melichar, M. (2016), "Energy price shocks and economic activity: which energy price series should we be using?", *Energy Economics*, Vol. 54 No. 1, pp. 31-443.

Mirzaei, A. and Moore, T. (2016), "Banking performance and industry growth in an oil-rich economy: evidence from Qatar", *The Quarterly Review of Economics and Finance*, Vol. 60 No. 30, pp. 58-69.

Mork, K.A. (1989), "Oil and the macroeconomy when prices go up and down: an extension of Hamilton's results", *Journal of Political Economy*, Vol. 97 No. 3, pp. 740-744.

Naceur, S.B. and Omran, M. (2011), "The effects of bank regulations, competition, and financial reforms on banks' performance", *Emerging Markets Review*, Vol. 12 No. 1, pp. 1-20.

Poghosyan, T. and Hesse, H. (2009), "Oil prices and bank profitability: evidence from major oil-exporting countries in the Middle East and North Africa", *IMF Working Papers*, Vol. 9 No. 220, pp. 1-23.

Qatargas (2016), "Forging lasting relationships: building on Qatargas' reputation for safety, flexibility and reliability", The Magazine of Qatargas Operating Company, available at: www.qatargas.com/english/MediaCenter/The%20Pioneer/The%20Pioneer%20-%20Quarter%203,%202016.pdf

Qatarpetroleum (2015), "Qatar petroleum – annual report 2014", available at: www.qp.com.qa/en/MediaCentre/Documents/2014%20Annual%20Report%20-%20English.pdf

Sadorsky, P. (1999), "Oil price shocks and stock market activity", *Energy Economics*, Vol. 21 No. 5, pp. 449-469.

Saif-Alyousf, A.Y.H., Saha, A. and Md-Rus, R. (2017a), "Profitability of Saudi Commercial Banks: a comparative evaluation between domestic and foreign banks using capital adequacy, asset quality, management quality, earning ability and liquidity parameters", *International Journal of Economics and Financial Issues*, Vol. 7 No. 2, pp. 477-484.

Saif-Alyousf, A.Y.H., Saha, A. and Md-Rus, R. (2017b), "Shareholders' value of Saudi commercial banks: a comparative evaluation between Islamic and conventional banks using CAMEL parameters", *International Journal of Economics and Financial Issues*, Vol. 7 No. 1, pp. 97-105.

Sarwar, S., Chen, W. and Waheed, R. (2017), "Electricity consumption, oil price and economic growth: global perspective", *Renewable and Sustainable Energy Reviews*, Vol. 76 No. 3, pp. 9-18.

Tan, Y. (2016), "The impacts of risk and competition on bank profitability in China", *Journal of International Financial Markets, Institutions and Money*, Vol. 40 No. 1, pp. 85-110.

Vogiazas, S.D. and Nikolaidou, E. (2010), "Investigating the determinants of nonperforming loans in the Romanian banking system: an empirical study with reference to the Greek crisis", *Economics Research International*, Vol. 2011 No. 2, pp. 1-13.

Yazdan, G.F., Ehsan, A.G. and Hossein, S.S.M. (2012), "Is cointegration between oil price and economic growth? Case study Iran", *Procedia – Social and Behavioral Sciences*, Vol. 62 No. 7, pp. 1215-1219.

Zhang, D. (2008), "Oil shock and economic growth in Japan: a nonlinear approach", *Energy Economics*, Vol. 30 No. 5, pp. 2374-2390.

Corresponding author
Abdulazeez Y.H. Saif-Alyousfi can be contacted at: azizalyousfi@yahoo.com