IMPACTS OF OIL PRICE ON BANK PROFITABILITY

BY

CHEN YEE JING
CHONG KOOR XUAN
LIAN JIAN YANG
NG POOI LING
TEO WAN YUN

A final year project submitted in partial fulfillment of the requirement for the degree of

BACHELOR OF BUSINESS ADMINISTRATION
(HONS) BANKING AND FINANCE

UNIVERSITI TUNKU ABDUL RAHMAN

FACULTY OF BUSINESS AND FINANCE
DEPARTMENT OF FINANCE

APRIL 2019

DECLARATION

We hereby declare that:

(1) This undergraduate FYP is the end result of our own work and that due acknowledgement has been given in the references to ALL sources of information be they printed, electronic, or personal.

(2) No portion of this FYP has been submitted in support of any application for any other degree or qualification of this or any other university, or other institutes of learning.

(3) Equal contribution has been made by each group member in completing the FYP.

(4) The word count of this research report is 11,796.

Name of Student:	Student ID:	Signature:
1. Chen Yee Jing	1505896	
2. Chong Koor Xuan	1503575	
3. Lian Jian Yang	1503282	
4. Ng Pooi Ling	1504967	
5. Teo Wan Yun	1503251	

Date: _____

ACKNOWLEDGEMENT

This research project would not possible to complete without the assistance and support of various parties. We are thankful for their aspiring guidance, invaluably constructive criticism and friendly advice during the process of completing this research project. We are sincerely grateful to them for sharing their truthful and illuminating views on a number of issues related to this research project. Thus, we would like to take this golden opportunity to express our appreciation to all of the parties.

First and foremost, we would like to show a special gratitude to our supervisor, Mr. Lim Chong Heng, for giving us the opportunity to work together with him. Mr. Lim has contributed and shared his knowledge, guidance, experiences and valuable times
in this whole research project. Besides, a thousand of thanks would have to deliver for his patient guidance, full encouragement, valuable and constructive criticisms and suggestions to improve our research outcome. Without his assistance and dedicated involvement, this research project would have never been completed and succeeded.

Furthermore, our sincere thanks also go to our second examiner, Ms. Chin Lai Kwan She has given us valuable recommendation and suggestion which helped us in making better improvement on this research project. Without her kind advice and willingness to explain to us our weaknesses as well as pointing out the certain details that we had overlooked, we would not have rectified the errors that we made in the report.

In addition, we would like to thank our project coordinator, Encik Ahmad Harith Ashrofie Bin Hanafi for his advice and assistance during the planning and

development of this research. We sincerely appreciate his clarification whenever we are facing doubts or problems all the while. Lastly, we appreciate the endless efforts, time, and hard work of our group members in completing this research. The cooperation and teamwork among group members is the key that could bring us to accomplish this research successfully.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

AED	United Arab Emirates Dirham
AIC	Akaike information criteria
BIC	Bayesian information criteria
CAR	Capital Adequacy Ratio
CME	Chicago Mercantile Exchange
CPI	Consumer Price Index
DC	Domestic Credit to Private Sector
EIA	Energy Information Administration
FD	First Differing
FOD	Forward Orthogonal Deviation
FSIs	Financial Soundness Indicators
GCC	Gulf Cooperation Council region
GDP	Gross Domestic Product
GIPSI	Greece, Italy, Portugal, Spain and Ireland

GMM	Generalized Method of Moments
HQIC	Hannan-Quinn information criteria
ICE	Intercontinental Exchange
IRF	Impulse-Response Functions
IV	Instrumental Variables
MAIC	Modified Akaike information criteria
MBIC	Modified Bayesian information criteria
MENA	Middle Eastern and North African countries
MMSC	Moment and Model Selection Criteria
MQIC	Modified Hannan-Quinn information criteria
OPEC	Organization of the Petroleum Exporting Countries
PVAR	Panel Vector Autoregression
rGDP	Real Gross Domestic Product
ROA	Return on Asset
ROE	Return on Equity
UAE	United Arab Emirates
USD	United States Dollar

VAR	Vector Autoregression
VMA	Vector Moving-Average
WTI	West Texas Intermediate

PREFACE

To examine the oil price is a very popular and interesting topic for many researchers. This study, impacts of the oil price on bank profitability provide useful information or guidelines to several parties such as policy makers, governments, investors, researchers and companies who tend to have better understanding about how oil price affects the bank profitability.

ABSTRACT

This project is specifically for academic purpose. We come across this study as we notice some strange and noteworthy effects of the oil price. Lots of researches has been conducted on effects of macroeconomic conditions on the bank profitability where the concern we conducting this research is no longer trying to find out the impacts of macroeconomic conditions on the bank profitability. This study is concerning on the impact of oil price on the bank profitability, in other words, what how oil price influence bank profitability. Firstly is there a significant relationship between bank profitability namely ROA and ROE and oil price? Secondly is there a dynamic effect of oil price to bank profitability namely ROA and ROE? By understanding these two questions, it might help in constructing a better policy that will better shaping the country towards the economic condition.

CHAPTER 1: INTRODUCTION

1.0 Background of study

Stability of oil price is very important. The high volatility of oil prices could have critical negative effects on the economy through government spending in the oil-exporting countries. This is because oil export is the main source of government revenue as well as key channel of financing for government spending in the oil-exporting countries. Therefore, the oil revenue will affect the tax revenue as well as government spending of a country. As most of the government expenditure of oil-exporting countries highly depends on oil revenue, the economy of the countries will be highly sensitive to the oil price movement.

Besides, the oil price movement could affect a country's economy through macro-financial linkages. An upsurge in oil price will increase the oil revenue as well as the tax revenue of oil-exporting countries and thus results in the stronger countries' fiscal and external positions. In relation to this, the rise in oil price will lead to a greater non-oil output growth such as larger equity market returns and higher real estate prices. This is because the investors will be more active in the investment market as they expect a positive impact of oil price on corporate sector. Banking sector would then gain benefits from such situations which are the stronger bank balance sheets, liquidity and credit growth. In the case of United Arab Emirates (UAE), there is a 12% rise in the tax revenues in the third quarter of 2016 and the net investment income in 2017 is projected to increase by approximately 10.2 billion AED due to the recovery of oil price after the oil crisis, where AED is the currency of UAE (Central Bank of UAE, 2017).

The rise in economic growth, current account balances, gross federal revenue as well as foreign reserves are contributed by the upsurge in oil prices and will be accompanied by the growth of oil revenue and government spending. Higher oil prices will lead to an increase in external finance and investment, which

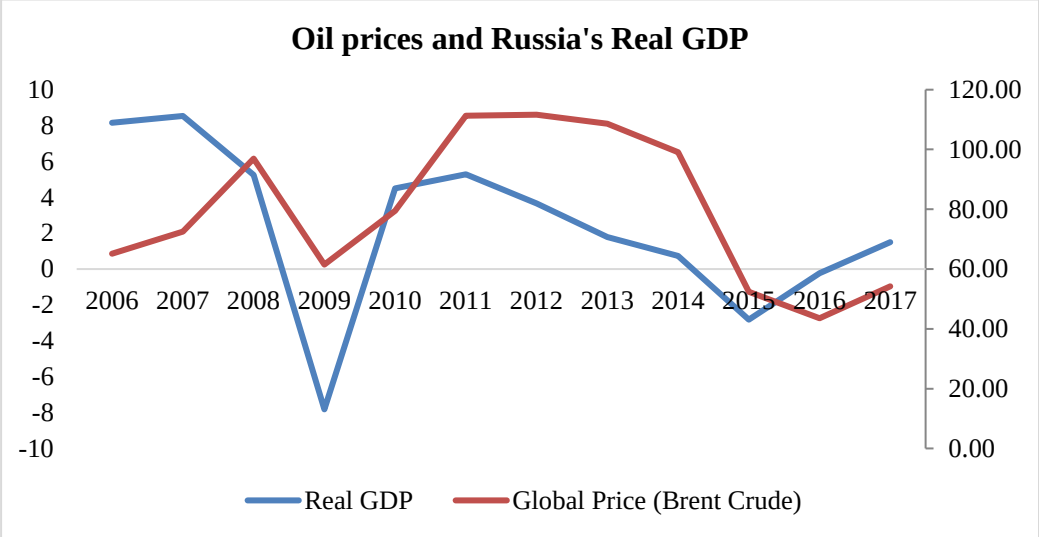
consequently improve the corporate profits. Stock is one of the examples for external finance and investment. The Saudi stock market is outperformed as compared to other countries after the rise in oil prices. The growth of Saudi stock market is also supported by the promotion of economic reforms by the Saudi Crown Prince which increases the investor confidence. Besides, there is an increase in the trading volume and price of Kuwaiti stocks in 2018. Kuwait Finance House and Mobile Telecommunications which are the top Kuwait exchange-listed stocks have experienced a robust growth with 13 percent and 26 percent of growth in trading volume respectively (Narayan, 2018). Furthermore, household's demand for goods and services may increase as the revenues will transfer from oil-importing countries to oil-exporting countries. In relation to this, the finance of enterprises and firms in oil-exporting economies will be strengthened with the rise in sales or businesses expansion. As a result, banks will have lesser pressure in collecting their claims on those firms. The quality of bank assets such as loan tends to improve as it is closely related to companies' performance. The stability of a country's financial system will lead to prosperity economy growth and stability.

In contrast, plunging of oil price will bring adverse effect to the economy in oil-exporting countries. As the drop in oil prices will result in a government budget deficit, and thus it will lead to higher taxes imposed or lower government spending ultimately. The private sector would be negatively affected if these private companies have contracts with government agencies. Economic activities would be further reduced when the risk premiums and the cost of capital for these countries are raised accordingly. The reduction of economic activities will decrease the GDP growth and real estate prices. As a result, it will disrupt firms' ability to fulfil their financial obligations and lead to defaults. For example, bankruptcy is filed by the Pacific Exploration & Production Corporation for protection after 20% of its shares were purchased by the Derwick Associates during the falling of oil price in year 2015. This situation was due to the fact that the company had assumed too much of debt which is about USD 5 billion after it acquired the Petrominerales Ltd. After the acquisition, the company was unable to pay for the interest and led to the bankruptcy of the company (Smith, 2016). Particularly, lending in equity purchases and real estate industry by the banks have

experienced heavy losses. In the case of (UAE), due to the fact of oil price plunge, the annual government spending has dropped by 10.7% in 2015. This has developed a negative cycle. The market was underperforming as compared to the historical trend. The Central Bank of UAE also revealed a low capital adequacy ratio and Tier 1 Capital in conventional and Islamic banks as a result of the decline in oil price (Central Bank of UAE, 2017). Thus, it is expected that the downward movements in oil prices may cause banking financial instability as bank is primarily engaging in the risky businesses which are lending and investment. To cope with this, some governments would provide assistance by giving deposit insurances, funding for liquidity, capital assistance or equity purchases to safeguard the financial system in their countries' economies.

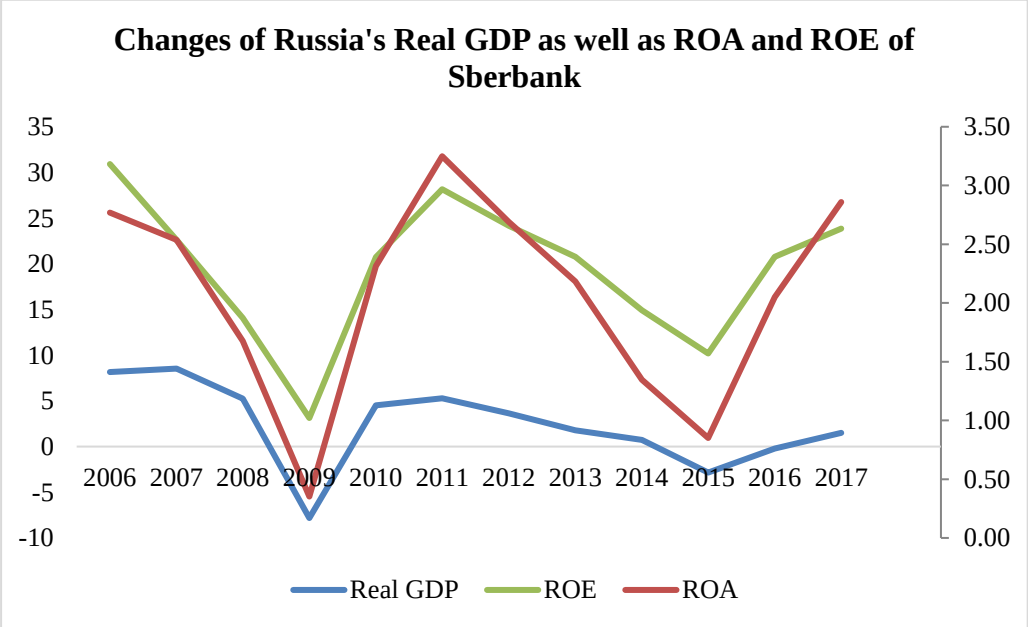
Although the bank profitability will be indirectly affected by the oil price movement through economy growth, it also plays an important role in order to achieve a sustainable economy growth in a country. In financial system, banking sector plays a critical role in promoting and maintaining monetary and financial stability of a country. It is the backbone of the financial system as it acts as the direct channel with the transmission function for a country's economy and wealth. To ensure the efficient allocation of financial resources in promoting economic growth and development, the banking sector acts as the financial intermediation to facilitate the flow of funds between depositors and borrowers. This financial intermediation process will be able to function smoothly with a stable financial system and a country will be confident in operating the key financial institutions as well as markets within the economy. In contrast, if the financial system is not stable, the spill over effects to other parts of the economy may result in tremendous effects. Therefore, a sound, healthy and stable financial system is vital in ensuring the financial resources to be allocated efficiently as well as risks distribution across the economy. A strong foundation of a country's banking system will lead to prosperity economy growth and stability. However, maintaining a strong and resilient banking system is not an easy task. Regulators and administrators are required to tackle with various challenges and uncertainties that may happen in the market.

Figure 1.1 Brent Crude Oil Prices and Russia's Real GDP from year 2006 to year 2018



Source: Bloomberg (2018); Statista (2018)

Figure 1.2 Russia's Real GDP, ROA, and ROE of Sberbank from year 2006 to year 2018

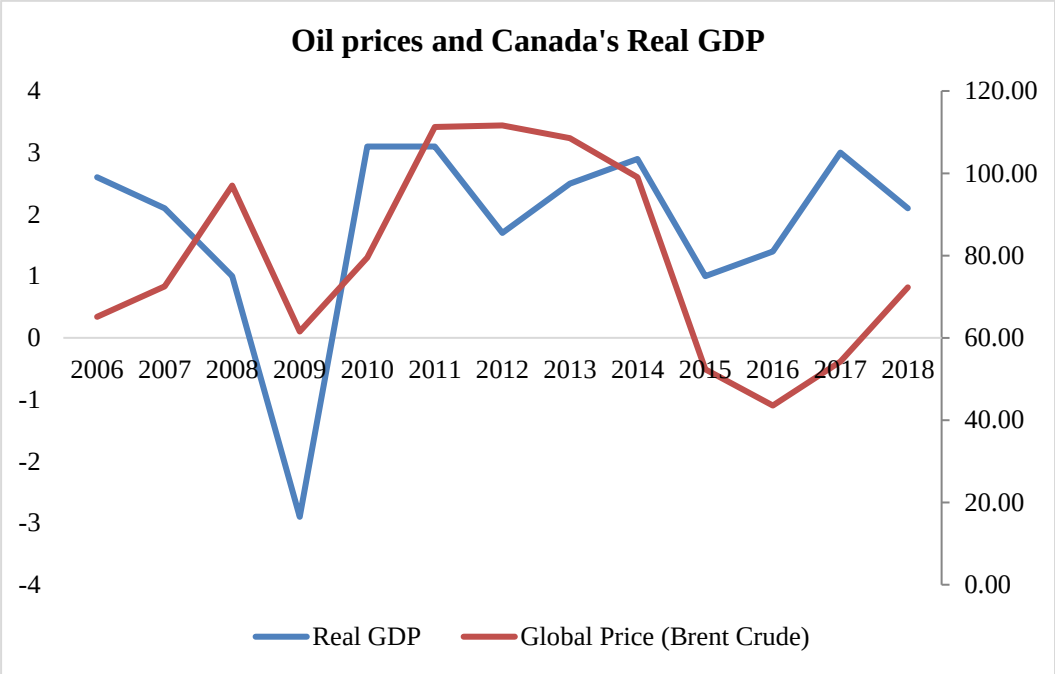


Source: Bloomberg (2018)

From Figure 1.1, the rise in oil price in 2010 to 2011 caused Russia to experience an increase in GDP of Russia from 4.50% in 2010 to 5.28% in 2011. As shown in Figure 1.2, the return on asset (ROA) of the Sberbank (largest Russian banks) increased by about 40.09% during this period. Meanwhile, its return on equity

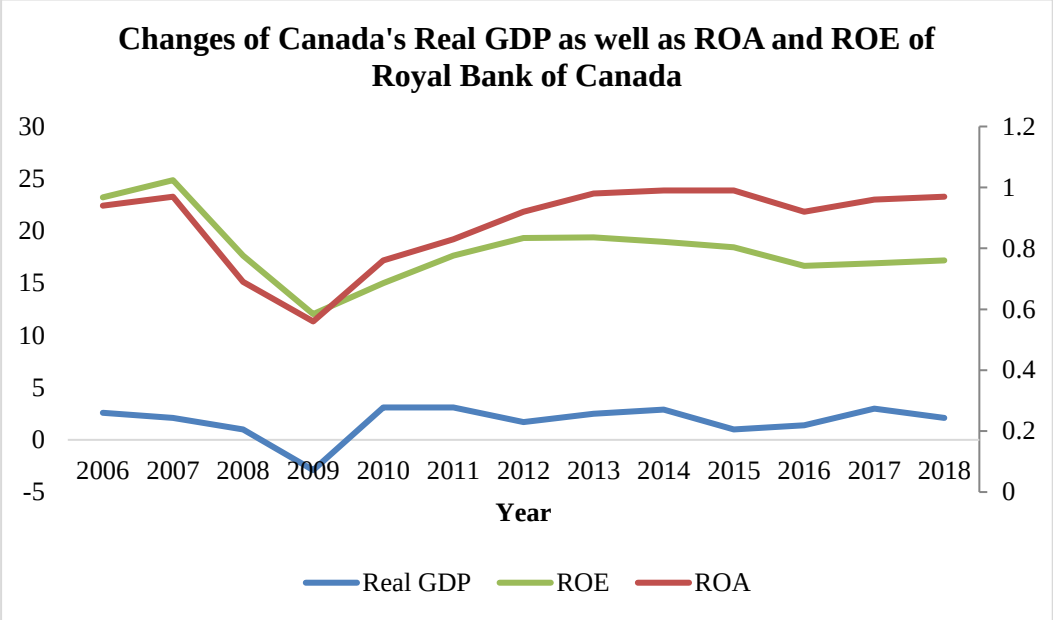
(ROE) grew by 35.73%. Due to the drop in the crude oil prices, Russia had suffered recession and experienced GDP growth of -7.82% in 2009. Sberbank experienced a decrease in ROA from 1.68x in year 2008 to 0.35x in year 2009. Its ROE has also decreased by about 77.79% from 14.09x in year 2008 to 3.13x in year 2009.

Figure 1.3 Brent Crude Oil Prices and Canada's Real GDP from year 2006 to year 2018



Source: Bloomberg (2018); Statista (2018)

Figure 1.4 Canada's Real GDP, ROA, and ROE of Royal Bank of Canada from year 2006 to year 2018



Source: Bloomberg (2018)

The slump in oil price will be accompanied by some adverse impacts on banking system. The oil company will decrease their borrowing from banks, ultimately, it would reduce the revenues of banking. The banking sector would face diminished profitability if the oil price does not rise in the short term. Figure 1.3 shows that the oil price decreased from 2008 till 2009 and it is followed by a decrease in the GDP for most of oil exporting countries. As the fifth world's largest oil producing country, oil price movements will have notable effect in the Canadian economy. The GDP in Canada has decreased from 1% in year 2008 to -2.9% in year 2009. From Figure 1.4, the return of asset (ROA) of Royal Bank of Canada (largest bank in Canada) dropped from 0.69x in year 2008 to 0.56x in year 2009. Its return of equity (ROE) also dropped from 17.64x in year 2008 to 12.04x in year 2009. While during the period of oil price rise from year 2010 to 2011, the ROA increase from 0.76x to 0.83x while ROE growth from 14.99x to 17.63x respectively.

From Figure 1.3, the global oil price had been declining since mid-2014. In 2015, there is oversupply of oil in the world market due to the drop in Brent crude oil to approximately 50 USD a barrel. The excess supplies of oil had increased US oil

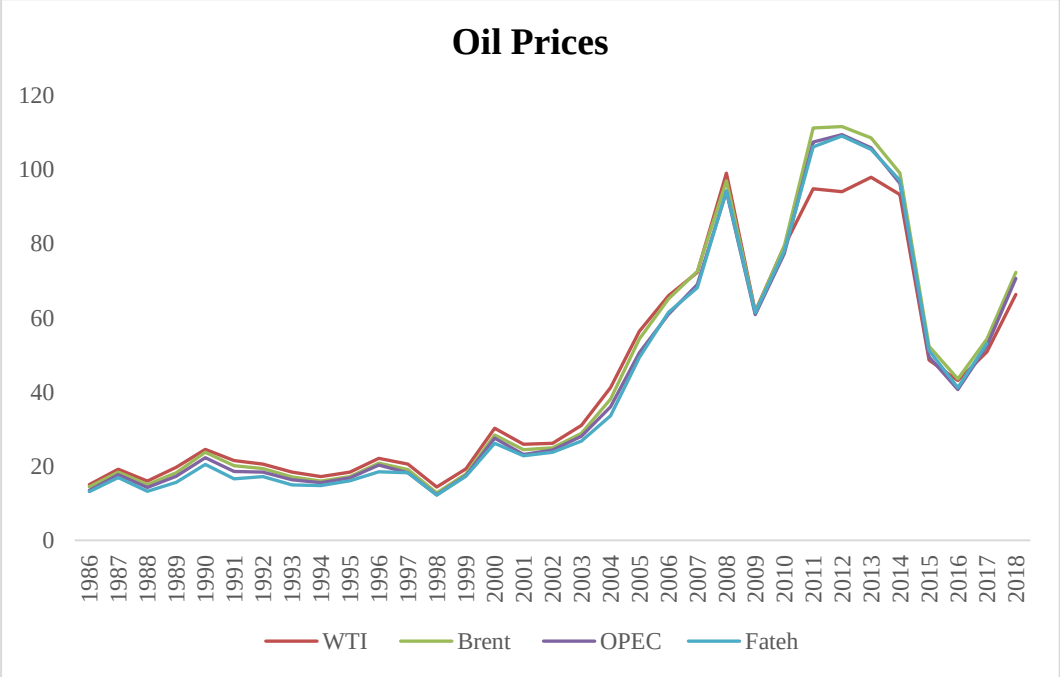
production as well as weaken the demand of oil in many emerging countries. This had caused a significant diminished of revenue in many oil-exporting countries. The government and the industries like the retailing or banking had suffered from the shortfalls of revenue in the country. This may lead to a lower GDP growth in the country.

In the fourth quarter of 2015, Citigroup, the fourth biggest US bank, revealed that there is 32% in non-performing loans for corporate loans due to the dropped in oil price (Citigroup, 2015). In January 2016, dropped in oil price had led to a big jump of costs in the three biggest US banks for bad energy loans as well as increased the fears of contagion in other portfolios. From the annual report of the Central Bank of UAE, the Financial Soundness Indicators (FSIs) of Conventional and Islamic Banks shows a low level of CAR as well as Tier 1 Capital in 2014 due to the dramatically decline of oil price in 2014 (Central Bank of UAE, 2017).

There are four benchmarks for oil prices. Figure 1.5 shows that the oil price for these different four benchmarks from year 1986 to 2018. The first benchmark is Brent North Sea oil which provides the value for crude oil production of African, European, and Middle Eastern. Brent is referred as "sweet" crude in which its sulphur content is 0.37 percent. Another benchmark is West Texas Intermediate (WTI) which designed specifically for the United States. WTI has sulphur content of 0.24 percent and hence it is sweeter than Brent Crude. WTI is a suitable for the gasoline production while Brent oil is used in the diesel production. After the 40-year ban on U.S. oil exports has been removed in December 2015, the difference between these two benchmarks was just $2 per barrel and this is due to WTI has lower sulphur content compared to Brent Crude. It is easy and lower costs incur to refine oil with lower sulphur content into others oil based products. The price differential is a location spread or quality spread. The future contracts of WTI crude oil is listed on New York Mercantile Exchange division of the CME Chicago Mercantile Exchange and its delivery occurs in Cushing, Oklahoma. Brent crude oil futures trade on the Intercontinental Exchange (ICE). Brent and WTI benchmark prices are often combined by Asian countries to value their crude oil (Andrew, 2019). Organization of the Petroleum Exporting Countries (OPEC) comprises of members states from Algeria, Angola, Ecuador, Gabon, Iraq, Iran,

Qatar, Kuwait, Libya, Nigeria, Saudi Arabia, Venezuela, and the United Arab Emirates. OPEC regulates the oil price for its member states by creating OPEC basket which referring to the average price of the various petroleum blends produced by the OPEC members. By altering its oil production, OPEC can keep the price between given range (Statista, 2017). The last benchmark is Fateh. It comprises of crude from Dubai, Oman and Abu Dhabi. This crude has lower quality than WTI or Brent because it is heavier and has higher sulphur content which led it to be put in the "sour" category (Daniel, 2018).

Figure 1.5: Annual oil prices from year 1986 to year 2018



Source: Statista (2018)

The oil prices are determined mainly by the world demand and supply for oil, geopolitical turbulences as well as arrangement of institutions. The increase in the U.S. production of shale oil and alternative fuels has contributed to the fluctuation in the oil price. It is estimated that the U.S. fuel production will reached on an average 11.8 million barrels per day in 2019. United States is estimated to become the world's largest oil producer by 2023. Oil prices began rising after the OPEC announced the cutting of production by 1.2 million barrels per day by January 2017. It is also the same in year 2018 that the OPEC members agreed to cut the production to 32.5 million barrels per day. Besides, U.S. dollars are used for the

payment of all oil transactions; hence, the foreign exchange rate is critical to the changes of oil price. The strong dollar in year 2014 and 2015 had caused 70 percent decline in the oil price for oil exporting countries. The appreciation of dollar tends to offsets decreased in oil prices since majority of oil-exporting countries peg their currencies to the dollar. Moreover, the global demand is growing slower than predicted. China is consuming almost 12 percent of global oil production and it contributed mostly to the increase in global oil demand from 92.4 million barrels per day in 2014 to 93.3 million barrels per day in 2015. Since economic reforms are growing slowly due to the trade war initiated by President Trump's, the global demand growth may continue to slow down (Kimberly, 2018).

According to the forecast done by Energy Information Administration (EIA), the average price of Brent crude oil will increase to $85.70 per barrel by 2025. The oil prices in 2050 will be $113.56 per barrel because the sources of oil with lower costs will have been exhausted and results higher costs to be incurred in order to extract oil. These figures are in year 2017 dollars and the effect of inflation has been removed. Transformation of laws and regulations may affect these forecasts. For instance, the Clean Power Plan has not been taken into consideration in the forecast (Kimberly, 2018).

1.1 Problem Statement

The economies can be affected by oil price movement because the effects are transferred over the financial cycle through macro-financial linkage. Upward movement of oil price or higher oil revenues will result in greater non-oil output growth such as larger equity market returns and higher real estate prices due to the anticipation of investors that the government spending will be larger. This is because high government spending can also improve bank balance sheets, liquidity and credit growth. The effects are opposite if the oil price drops.

The high volatility of oil prices could have critical negative effects on the economy. There are evidences showed that oil price could affect the economies. Good performance of economy tends to be related with high oil price. For example, during the period of year 1991-2014, the real government spending and non-oil GDP of GCC countries grew faster during oil price escalation than during downturns. Besides, the economy will experience downturns simultaneously when the oil prices drop. It is reported that the economic downturn caused the banks to have an increase in their loan losses if they have huge loan exposure to oil and gas companies. The increase in their impaired loans would in turn reduce the bank profitability. Making profit is the main objective of doing business and it is also true for the banks which are considered as one of the businesses in the economy. The business operations will be continued as long as profit is earned because profit can increase competitiveness and the financing ability of the business. In 2014, almost 45 per cent of non-investment grade syndicated loans were issued in oil and gas. For example, Wells Fargo had $37 billion of non-investment grade loans related to oil and gas. When oil price crash happened in the year 2015, its large exposure to oil industry had caused it to increase their unrecoverable debt which in turn reduces their profitability by 5.9% (Deloitte, 2018).

It is possible for the banking sector to affect the entire economy due to the interaction of the banks with the economic units such as households, firms and state. For this reason, it is crucial for bank to determine the impact of oil prices on bank profitability in order to build resilient and sound banking system. While there is a large volume of empirical evidence on how macroeconomic conditions affect the bank profitability, there is little research on the relationship between oil price movements and bank profitability. Since the banks play important role, this study aims to analyze the influences of oil price on bank profitability that is represented by ROA and ROE. This possesses the research question regarding whether the oil prices will influence the bank profitability.

1.2 Research Objective

General Objective

To investigate the changes in oil prices could bring impact to the bank profitability.

Specific Objective

To determine the impact of oil price to bank profitability namely ROA and ROE in long run.

To examine the dynamic effect of oil price to bank profitability namely ROA and ROE.

1.3 Research Question

Is there a significant relationship between bank profitability namely ROA and ROE and oil price?

Is there a dynamic effect of oil price to bank profitability namely ROA and ROE?

1.4 Significance of study

This study aims to analyse the impact of oil price on the profitability of 122 banks that operating in top 16 oil exporting countries. In order to ensure that the financial sector is strong and efficient, banks' profitability need to be constantly observed and measured because the banking sector plays a vital role in the economy. It will be to bank managers' advantage because this study could provide findings on the relationship between bank profitability and oil price. Practically, the bank officers will conduct their own research before they recommend to the bank manager on any investable securities or property. The outcome of the research is more persuasive in terms of the reliability due to the used of latest

information in the market in the research compared to relying on the past information which may out-dated. Thus, the investment strategies implemented by banks could be improved. Consequently, it could lower the chances of losses of their clients. In short, the officers could refer this research and use it as a source to support their recommendation to the bank manager.

Besides, the government and policy makers need to concern that the negative impacts of oil price shocks is a serious issue that affecting the economic stability. This research might assist government and policy makers to better control on the economic growth as well as maintaining the economic stability. A more effective and efficient policy can be implemented by the government and policy makers in order to limit the adverse effect of oil price shock towards the economy and consequently influence the banks sector. The sound policy would help the country to become more competitive in long run.

Other than bank itself, it is also important for the industrial sector, especially those that are more dependent on the capital information, external finance value added, and the number of establishments to look at the bank profitability. This is because the erosion of bank profitability will lead to both bank distress and poor economic performance. Consequently, banks will reduce their lending as they are facing liquidity and solvency problems. Businesses may lack of capital to finance their operations and projects. If the businesses are unable to find other sources of finance, they will have to stop the profitable production and investment projects.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

This chapter focuses on the relationship between the dependent (bank profitability which is represented by ROA and ROE) and independent variables. There are numbers of researchers who explained the relationship between the banking profitability and the relevant variables like real economic growth and others. There is statement agreed by part of the journalists and some of them might argue with it. In the literature review, we are able to find the relationship and the importance of selected determinants towards the banking crisis with the support of the researchers. The selected variables are real economic growth (measured by real gross domestic product growth, real GDP), inflation rate, and domestic credit to private sector.

2.1 Impacts of oil-macro-financials linkages

The results from the study of Poghosyan and Hesse (2009) that is conducted on the relationship between oil price shocks and bank profitability of 145 banks from 11 oil-exporting countries for 1994 - 2008 indicate that there is an indirect impact of oil prices to bank profitability and the overall effect is channelled through macroeconomic factors. The study stated that the oil income could influence the fiscal spending of oil exporting countries as most of the government and external income of these countries are generated from the export of oil. This is agreed by Alodayni (2016) that studied on the impacts of oil price to the financial stability in Gulf Cooperation Council (GCC) region (Bahrain, Kuwait, Oman, Qatar, United Arab Emirates (UAE) and Saudi Arabia) in which the result of this study indicated that the heavy reliance of government on oil revenue would create a high exposure of countries' economies to external shocks. This could negatively affect the

budgets, exports, fiscal revenues, GDP growth, and developments of the country if the oil prices move in unfavourable directions and hence would adversely affect bank profitability. Besides, Akinkunmi (2017) also claimed that the major interest-income of banks in Nigeria are came from the oil and gas sector. Therefore, the fall in oil price that affect the performance of oil sector will then pressure on the banking system. Besides, the falling oil price have decreased the government revenue (tax revenue) as well as government spending. This had result in the economic slowndown and accordingly affect the banking system in Nigeria.

Besides, a study on the effect of declining oil price on banks' profitability, such as Return on Assets (ROA), Return on Equity (ROE) and credit and deposits growth had been conducted for 22 national banks in the UAE over a period of 15 quarters by Magda and Minko (2018). This study indicates that a decrease in the oil price adversely affects all four banking indicators, attributed to the lowered economic activity, fiscal consolidation, employment and corporate profitability. Furthermore, Osamah and Ali (2017) that studied the impact of oil prices to bank non-performing loans of 2310 commercial banks in 30 oil-exporting countries for 2000-2014 also concluded that there are oil-macro-financial linkages in oil-exporting countries as oil prices that bring impacts on bank profitability will not only affect financial stability but also further impact the economic activities as well as social welfare. Rise in the oil prices will increase the productive capacity of oil-exporting countries and consequently pushing the growth rates even further. In the middle of year 2005 and 2008 of the pre-crisis boom, oil-exporting countries diversify the local economy and financial institutions by involving in large investment programs. These countries then acquired substantial profits and performed financially stable with low nonperforming loans and sound capital adequacy levels. In addition, from the study of Lee and Lee (2018) that investigates the influences of oil prices on banking profitability of China for 2000-2014, in order for better capture the correlation between oil prices fluctuations and banking profitability, macroeconomic factors is considered and the study concluded that oil prices significantly affects banking profitability. Nevertheless, this study stated that the adverse effect cause by oil prices shocks could be mitigated by economic stability.

The influences of oil prices to economy could through the oil-related lending or business activity in the banking system. For instance, the borrower of the bank can be the factory, supplier or employees and their business activity is affected by the oil price shocks. According to Idris and Nayan (2016), the cash flow of the borrower will be affected due to the impact in the production process and this may result in the default payment and thus adversely affect bank's profitability. This is consistent with Egan (2016) whereby there are at least 67 U.S**.** oil and natural gas companies went bankrupt when the oil price went down in year 2015 and it was a 379% spike from year 2014 when oil prices were substantially higher. This is further support by Long (2016) in which there are similarities between 2014-2016 crisis and the last oil crash in 1986. There were 27% of exploration and production companies went bankrupt and this event increased defaults in the year 1986. While it is reported that the America's biggest banks left some money in case more energy companies will go bankrupt in year 2016.

On the other hand, Said (2015) revealed that no direct relationship exists between the oil price on the profitability of Islamic bank in Middle Eastern and North African (MENA) countries. This is further supported by the study that found no significant relationship between the oil crisis and the bank profitability (conventional and Islamic banks) in Bahrain (Hawaldar, Rohit, Pinto & Rajesha, 2017). This is due to the measures have been taken by the banks in Bahrain in order to improve the performance for the period of the oil crisis.

2.2 Oil Price and Economic Growth

The effects of oil price change on economic growth in oil-exporting countries are usually explained by Dutch disease theory[1] (Corden & Neary, 1982). High oil price adversely affect the economy of oil-exporting countries due to the change of economic structure as a result of resource transfer. When oil prices are dropping, the transmission is same but in an opposite direction. Higher oil revenues will result in currency appreciation, lowering net-exports and weakening traded sectors that are characterized by economies of scale and learning-by-doing. The study of Malik, Ajmal and Zahid (2017) is consistent with Dutch disease theory in which the oil prices have negative and significant relationship with GDP growth. The rising crude oil prices increase inflation which causes businesses to reduce their activities because inflation reduces the purchasing power and saving but increase their production cost as crude oil is the basic material. Hence, their return on investment has been reduced. Besides, some government provide subsidiary to the affected companies. The budget allocated for the development of the country has been reduced; hence, slowed down the economic growth as shown in the low GDP growth.

It has been argued that oil price volatility is harmful to the economy because workers are retrenched and they might face difficulty in finding new job (Baldwin & Brown, 2004). In other words, less human capital is accumulated by the oil-abundant economies as compared to the oil-poor economies because there are fewer investments in skilled workers and the low quality of education. Furthermore, oil-rich economies are unable to take advantage of the learning-by-doing externality and they suffer from poor social capital as the urbanization and entrepreneurship associated with early industrialization do not take place.

[1] Dutch Disease Theory refers to the adverse effect on manufacturing due to the changes of natural resources. This theory was established after natural gas was discovered in Netherlands hurt the competitiveness of manufacturing sector in the late of 1950s. When boom occurred as a result of the tradable resource discovery, an increase in the resource price or both, wages normally would increase and labour would be relocated to resource sector. All these effects cause exchange rate appreciation which in turn reduces the international competitiveness of other tradable sectors because resource-based exports crowd out the commodity exports produced by these sectors. As a result, the country faces the risk of de-industrialisation.

In addition, resource-abundant countries have poorer fiscal policies (Arezki & Van der Ploeg, 2010). This is further supported by Sachs and Warner (2001) who stated that unfriendliness of the institutions in resource-rich countries to the producer are harmful to economy. This might due to the fact that the oil-exporting developed countries benefited from strong and established institutions before the oil boom, whereas in developing countries, the weak institutions were highly affected and shaped by the large oil windfall (Husain, Tazhibayeva & Ter-Martirosyan, 2008).

In contrast, Mikesell (1997) showed that the Dutch disease mechanism cannot be used to explain for poor economic performance in some of the countries. Alkhathlan (2013) showed that there is a significant and positive either short run or long run impact between oil revenues and real gross domestic product of Saudi Arabia. This has proved that countries with abundant natural resources have rapid economic growth due to the rise in income and wealth as well as greater investment opportunities. The rise in oil price caused disposable income of the consumers to rise and subsequently increased their consumption. The same result was generated by Stober (2016) who concluded that crude oil price has a positive and significant relationship to economic development. It is also proven by Ferderer (1996) who found out that the output growth usually increases after an oil price shock. Besides, the GDP growth of China is positively related with oil prices. This may be due to the China's monetary policy which is resistant to oil price shocks (Du, He & Wei, 2010). This is also consistent with Chang, Gozgor and Bilgin (2017).

2.3 Oil Price and Inflation

According to Farzanegan and Markwardt (2009) who studied the influences of asymmetric oil price shocks on Iran, an oil-exporting country's economy from the period 1975Q2 to 2006Q4 also found that the positive oil price shocks will increase the inflation, vice versa. In the case of Vietnam, a country that export crude oil and also import petroleum, the study found that the higher oil prices will rise the inflation during 2000 to 2015 (Trang, Tho & Hong, 2017). The rise in oil

prices will then increase the inflation (Ferderer, 1996; Chuku, Effiong & Sam, 2010; Kilian, 2014). Furthermore, Sek, Teo and Wong (2015) also pointed out the positive and direct relationship between the changes in oil price effect the domestic inflation in low dependency group. The study explained that the low dependency group is also known as the oil-exporting countries that actually produce own oil and export it. Therefore, the rise in oil price will increase the income or output for the oil-exporting countries and accordingly upsurge the consumption and price levels of the country. Also, the upsurge oil price will raise the exporter's production cost and consequently pass-through into the domestic price levels. The higher domestic price levels will then increase the domestic inflation indirectly. This is consistent with the study done by Arinze (2011) who found that the significant positive impact of petroleum price on inflation in Nigeria is due to the higher oil price will increase the production cost and thus increase inflation.

On the other hand, Dias (2013) claimed that inflation for the Portuguese economy between 1984 and 2012 will be higher in the first two years following to the oil price shock. However, this effect appears to be temporary, since as from the third year, the impact decreases slowly with a nearly no long-term effect on the price level. This is supported by the study of Cunado and Gracia (2005). It suggested that the effect of oil price on inflation is applicable in the short run and it is more significant when oil price shocks are expressed in local currencies. For these Asian countries, the oil prices–consumer prices relationship is also found to be more important than the oil prices–economic activity relationship. Besides, Ibrahim (2015) found no significant long run relationship between oil price movement and food price in Malaysia. This is also supported by the study of Jiranyakul (2015) that unable to detect the influence of oil price movement in Thailand on consumer prices in long run. Apart from that, Chou and Tseng (2011) revealed a different result which is there is a significant influence of oil price shocks on CPI inflation in long run but no impact in short run.

However, the study done by Blanchard and Gali (2007) argue that although there is a strong relationship between oil price shock and inflation in 1970s, the strong relationship may vary over the time. The oil price shock in 1990s that did not

affect the inflation have shown the weaker relationship between oil price shock and inflation. The weaker relationship may be due to other shocks that occurred at the same time distorted the effect of oil price shocks on the inflation. Moreover, the diminished in share of oil consumption, real wage rigidities and also the greater credibility of monetary policy are also the explanations of the diminished of inflationary effect of oil price shocks. Furthermore, Peersman (2009) claimed that the weaker relationship between oil price and inflation is caused by the less elastic of oil demand curve over time. There are some other explanations for smaller impact of oil price shocks on inflation such as, globalization of price setting, advanced energy efficiency of production processes, and the enhanced conduct of monetary policy that assist the country in reducing the effect of oil price shocks (Alvarex, Hurtado, Sanchez & Thomas, 2009).

Other than that, some of the studies report that the influence of oil price on inflation is limited. Hooker (1999) who studied the oil price changes on United State inflation claimed that before 1981 oil prices changes did contribute a significant direct effect to the inflation but the impact showed little since that time due to the change in the monetary regime that move economy to a low inflation environment. Olomola and Adejumo (2006) found that there is no substantial impact of oil price shock on inflation. Besides, the study of Chen and Wen (2011) also showed the same results by using the data from 1985 to 2011. This limited effect of oil price to inflation is also supported by Gregorio, Landerrectche and Neilson (2007).

2.4 Bank Profitability and Economic Growth

From the perspective of the effect of macroeconomic variables on the bank profitability, most of the studies showed that economic growth is insignificantly affecting the bank profitability. Yves and Mizeroyabade (2017) who analysed the relationship between economic factors on profitability of commercial banks in Rwanda has found that gross domestic product (GDP) growth rate has insignificant relationship with bank profitability. This has also been proven by

Kiganda (2014) as well as Ong and Teh (2013). This is also consistent with Alper and Anbar (2011) as well as Mirzaei and Mirzaei (2011).

However, Gul, Irshad and Zaman (2011) had proved that GDP can be positively related with ROA in a significant way. Real GDP growth positively and significantly affects banking profitability through net interest income, loan losses, and operating costs. Banks profitability increases during economic expansion and it declines during recession. When the GDP growth increases, bank loans and deposits rises and at the same time improving the bank's net interest income and loans losses. Besides, higher GDP growth indicates higher disposable income and lower unemployment and reduces defaults on consumer loans. Net interest income and loan losses are pro-cyclical with GDP growth. However, lower GDP growth may reduce bank deposits and loans as well as its managing costs. These conditions may also increase the costs of debt collection. Furthermore, Flamini, McDonald and Schumacher (2009) stated that the increase in lending and bank profitability would be observed during the cyclical upswing because the GDP growth can affect cyclical output as well as the loans and deposits. During economic downturn, banks may have increasing nonperforming loans and consequently decrease in profits. Athanasoglou, Brissimis and Matthaios (2008) also found that economic growth moves in the same direction and are strongly related with bank profitability. This is also supported by Sufian (2009).

In contrast, GDP growth and bank profitability are found to be negatively related as shown in the study of Tan and Floros (2012). This is probably due to the fact that the banks miss the chance to take advantage from inflationary environment to increase profits when the banks cannot correctly predict the inflation levels. The other reasons may be the establishment of new banks which created more competitions. The competition occurred caused the banks cannot benefit from economic growth and additional business opportunities to increase profitability.

2.5 Bank Profitability and Inflation

According to Yves and Mizeroyabade (2017), inflation is significantly and negatively related to the commercial banks profitability in Rwanda. The study explained inflation could affect the money value, purchasing power and the real interest rate that banks charge and receive. Besides, Waqas, Muhammad, Inam, Imran and Haseeb (2014) who studied on the impact of inflation on commercial bank profitability in Pakistan over the time period from 2004-2010 also showed the same results, where the bank profit is represent by ROE. This is consistent with the study done by Otuori (2013) in Kenya and also Habibullah and Sufian (2009) who claimed that inflation is negatively affecting the 37 number of commercial banks' profitability in Bangladesh from 1997 to 2004. This is further supported by Khrawish (2011). Some empirical studies explained that inflation has a negative relationship with bank profitability under the situation that banks may not be instantaneously realized that inflation has risen (Boyd & Champ, 2006).

In contrast, Driver and Windram (2009) found that inflation have a direct impact on ROA. This indicates that when the bank predict the inflation to be increase the future, they believe they will not suffer a fall in demand for their output even if they raise their prices. This scenario shows that there will be no negative impact on the performance of business activities and bank in the condition that the expected inflation will be equivalent to the actual inflation. According to Gul et al. (2011), inflation is positively related with ROA. Also, Athanasoglou, Brissimis and Delis (2006) found that inflation had a positive relationship with the bank's profitibility. This is consistent with the study done by Sufian (2009) which aim to explore the main causes the profitability of banks in China (12 joint stock commercial banks and four state-owned commercial banks) from 2000 to 2007. This is further supported by Tan and Floros (2012) who found that inflation is significantly and positively related to bank profitability in Chinese banking sector. This indicates that inflation is fully projected which enables banks to adjust interest rates accordingly. This causes revenues to increase faster than costs and

thus contributing to increased profitability. The finding is consistent with the study done by Pasiouras and Kosmidou (2007).

According to Revell (1980), the influence of inflation towards bank profitability is depends on whether the rise in operation cost is at a faster or a lower rate as compared to the inflation rate. Also, Perry (1992) claims that inflation will bring a positive and negative impact on bank profit, depends on whether the inflation is projected or not. Bank will be able to adjust interest rates timely in the case that inflation is anticipated. The quick action by bank will enable them to increase the revenues faster than costs and hence inflation impact bank profitability positively. Conversely, bank will not able to adjust interest rates immediately when the inflation rate is unanticipated. The bank will then get a higher cost as compared to revenue and consequently record a negative impact on bank profitability.

However, there are some argue that there is no significant effect of inflation to bank's profitability. Kiganda (2014) revealed that inflation is insignificant to explain the profitability of Kenya Equity bank. This is further support by the study done by Ong and Teh (2013) who examine the influence of macroeconomic conditions and bank-specific characteristics on the commercial banks' profitability in Malaysia from 2003 to 2009. Besides, Alper and Anbar (2011) who investigate the the influence of macroeconomic determinants and bank-specific on the profitability of bank in Turkey from 2002 to 2010 also found the same result, in which the inflation is insignificant to explain the bank's equity and assets returns.

2.6 Domestic Credit to Private Sector and Bank Profitability

Firtescu and Roman (2015) proposed that domestic credit to private sector has a negative impact on banks profit in a significant way. Domestic bank credit to private sector acts as a measurement of the importance of bank financing in the economy. A high level of this indicator can cause a growth of credit risk, and thus

bringing a negative effect on bank profit. These effects can be clarified through the fact that in the years before the crisis, Romania and Bulgaria have experienced a major and rapid increase of bank loan ratio that implied a significant increase of the credit risk, with a negative impact upon bank profitability (Firtescu & Roman, 2015). The results are consistent with the study of Ayaydin and Karaaslan (2014).

The results are also supported by the study of Mirzaei and Mirzaei (2011) which indicated an opposite and statistically significant relationship between domestic credit to private sector and profitability. It explained that population growth and domestic credit to the private sector will significantly affect the profits. Interpretation of this result may be difficult since it is inconsistent with the expected relationship. However, one reason to explain the negative relationship could be it is a way to increase the credit to private sector is bank resources, and thus banks with paying more money are more likely to experience default risks.

In contrast, Yu and Gan (2010) had argued that domestic credit to private sector has a positive and statistically significant relationship with bank profitability. The study explained that it is important to consider the negative relationship between domestic financial liberalization and domestic credit to private sector. This is because the domestic credit to private sector is significant related to domestic financial liberalization as well as economic growth. In relation to this, the financial liberalization is negatively and significantly related to banking profitability (Abdelaziz, Mouldi & Helmi, 2011). Thus, this implied that there is a positive relationship between domestic credit to private sector and banking profitability. The results are in line with the study of Abreu and Mendens (2002).

The positive relationship is also consistent with the study done by Messai, Gallali and Jouini (2015) which examined the leading factors of profitability for the Western Europe countries during the distress period from 2007 to 2011. The study had divided the sample of 322 banks into two sub categories, which are GIPSI countries (Greece, Italy, Portugal, Spain and Ireland) as well as the other countries of Western Europe. For the overall sample, the result demonstrated that domestic credit to private sector is positively and significantly related to bank profit.

However, for the GIPSI countries, it found that domestic credit to private sector is not significant in explaining the bank profitability. The study revealed that bank profitability is influenced by proxies considered and the situation of country (Messai et al., 2015).

CHAPTER 3: METHODOLOGY

3.0 Introduction

In order to fulfil the objectives of this study, panel data analysis is employed to determine the impact of changes in oil price on bank profitability namely ROA and ROE in 122 banks of top 16 oil exporting countries. The independent variables selected for this study include oil price, inflation rate, real economic growth and domestic credit to private sector.

This study builds on the research framework from Khandelwal, Miyajima and Santos (2016). This study aims to further study on whether fluctuations in oil prices would affect banks profitability.

This study employed Panel Vector Autoregression (PVAR) methodology. PVAR treats all the variables in the system as endogenous and evaluates dynamic interactions as it combines the traditional VAR approach. It allows for unobserved individual heterogeneity with the panel data approach. The impulse-response functions are used to indicate the response of one variable to the innovations in another variable in the model, while keeping all other shocks equal to zero. The identifying assumption is that the variables that come earlier in the model are more exogenous while the ones that come later are more endogenous. It means that the variables that appear earlier in the ordering will bring impact to the following variables with a lag simultaneously, while the variables that come later affect the previous variables only with a lag.

Panel vector autoregression models fit a multivariate panel regression of each dependent variable on lags of itself, lags of all other dependent variables and exogenous variables, if any. The generalized method of moments (GMM) is employed to capture long run relationship among the variables.

The results extracted from the model cannot be considered stable until a series of diagnostic checking tests are conducted. Hence, PVAR stability test are employed to check the stability of the model. The model concluded as stable if all the moduli are in the unit circle.

3.1 Scope of Study

The sample of this study is 122 banks in top 16 oil exporting countries. The time period involved in this study is 12 years, which is from year 2006 to 2017. This study consists of four independent variables which are oil price, inflation rate, real economic growth and domestic credit to private sector.

All of the variables data used are measured annually from the periods of year 2006 to year 2017.This is because as mentioned previously in Chapter 1, oil prices experienced its lowest point during the period of 2008 to 2009 and 2015 to 2017.

Table 3.1: Sources of Data

Variables	Proxy	Unit of measurement	Sources
Return on Asset	Ratio of total net income over total asset	Ratio	Bloomberg
Return on Equity	Ratio of net income over shareholder's equity	Ratio	Bloomberg
Inflation Rate	Consumer Price Index (CPI)	Percentage	World Bank
Real Gross Domestic Product	Real gross domestic product	Percentage	World Bank
Domestic Credit to Private Sector	Ratio of domestic credit to private sector to GDP	Percentage	World Bank
Oil price	Brent Crude Oil	Log Brent Crude Oil Price	Federal Reserve

Note: The countries included in the sample are Algeria, Angola, Canada, Ecuador, Gabon, Iraq, Kuwait, Malaysia, Mexico, Nigeria, Norway, Qatar, Russia, Saudi Arabia, United Arab Emirates, and United States.

3.2 Research Framework

The research framework of this study is adopted from Khandelwal et al., (2016). This study aims to further study on whether fluctuations in oil prices would affect banks profitability.

The model is specified as follow:

$$Y_{it} = \beta_0\alpha + \beta_1\pi_{it} + \beta_2 rGDP_{it} + \beta_3 DC_{it} + \beta_4 logOil_{it} + \varepsilon_{it}$$

(Equation 1)

Y_{it} = Return on Asset (ROA) and Return on Equity (ROE)

π_{it} = Inflation rate (annual %)

$rGDP_{it}$ = Real Gross Domestic Product (annual %)

DC_{it}= Domestic Credit to Private Sector (% of GDP)

$logOil_{it}$= Log Brent Crude Oil Price

ε_{it}= Error Term

Panel Vector Autoregression (PVAR) is employed in order to determine the macroeconomics shocks on bank profitability (ROA, ROE).

Matrix notation:

$$\begin{pmatrix} y_{it} \\ \pi_{it} \\ RGDP_{it} \\ DC_{it} \\ logOil_{it} \end{pmatrix} = \begin{pmatrix} \pi_{it} & RGDP_{it} & DC_{it} & logOil_{it} \\ y_{it} & RGDP_{it} & DC_{it} & logOil_{it} \\ \pi_{it} & y_{it} & DC_{it} & logOil_{it} \\ \pi_{it} & RGDP_{it} & y_{it} & logOil_{it} \\ \pi_{it} & RGDP_{it} & DC_{it} & y_{it\,it} \end{pmatrix} \begin{pmatrix} \beta_{11} \\ \beta_{12} \\ \beta_{13} \\ \beta_{14} \end{pmatrix} + \cdots +$$

$$\begin{pmatrix} \pi_{it-n} & RGDP_{it-n} & DC_{it-n} & logOil_{it-n} \\ y_{it-n} & RGDP_{it-n} & DC_{it-n} & logOil_{it-n} \\ \pi_{it-n} & y_{it-n} & DC_{it-n} & logOil_{it-n} \\ \pi_{it-n} & RGDP_{it-n} & y_{it\,it-n} & logOil_{it-n} \\ \pi_{it-n} & RGDP_{it-n} & DC_{it-n} & y_{it-n} \end{pmatrix} \begin{pmatrix} \beta_{15} \\ \beta_{16} \\ \beta_{17} \\ \beta_{18} \end{pmatrix} + \begin{pmatrix} \alpha_{it} \\ \alpha_{it} \\ \alpha_{it} \\ \alpha_{it} \\ \alpha_{it} \end{pmatrix} + \begin{pmatrix} \varepsilon_{1it} \\ \varepsilon_{2it} \\ \varepsilon_{3it} \\ \varepsilon_{4it} \\ \varepsilon_{5it} \end{pmatrix}$$

(Equation 2)

Where α's and β's are the unknown coefficients; e_{1it} and e_{2it} are the error terms.

The estimated coefficients in VAR modelling are hard to interpret. Hence, impulse-response functions and variance decomposition are generated. It is well recognised that in dynamic panel such as the above, the lagged endogenous variables will have correlation with the individual-fixed effects, rendering the traditional panel to be biased.

The sample of this study consists of total observations of 1,464 observations and 12 years in which the n is big enough to employed generalized method of moments (GMM). Besides, to overcome the endogeneity issue in PVAR, GMM is used equation (2) as the solution to solve the problem.

There are two ways of filtering out the fixed effects – first differing (FD) and forward orthogonal deviation (FOD, also known as Helmert transformation)

First differing yields:

$$(ROA_{it} - ROA_{it-1}) = \alpha_1(ROA_{it-1} - ROA_{it-2}) + \alpha_2(rGDP_{it-1} - rGDP_{it-2}) + (e_{1it} - e_{1it-1})$$

(Equation 3)

Helmert Transforming:

$$ROA^*_{it} = \alpha_1 ROA^*_{it-1} + \alpha_2 rGDP_{it-1} + e^*_{it}$$

(Equation 4)

$$m^*_{it} = (m_{it} - \overline{m_{it}})\sqrt{T_{it}/(T_{it}+1)}$$

(Equation 5)

Where m = (ROA, rGDP or e), $\overline{m_{it}}$ is the average of all variable observations and T_{it} is the number of all available observations. In the presence of gap in the data, the Helmert transformation is preferred as it minimizes data loss while FD transformation will magnify the gap.

Table 3.2: Expected relationship between variables

Independent Variables	Relationship with ROA and ROE
Inflation rate (annual %)	Positive
Real Gross Domestic Product (annual %)	Positive
Domestic Credit to Private Sector (% of GDP)	Positive
Log Brent Crude Oil Price	Positive

In this study, return on asset (ROA) and return on equity (ROE) are employed to measure the bank profitability. ROA indicates the efficiency of bank management in using assets to generate earnings while ROE implies the competency of bank management in generating returns for the shareholders (Davydenko, 2011).

3.2.1 Lag Order Selection

PVAR analysis can be predicated upon selecting the ideal lag order in both PVAR specification and moment condition. Andrews and Lu (2001) had proposed a consistent moment and model selection criteria (MMSC) for GMM models according to Hansen's J statistic of over-identifying restrictions. The proposed MMSC are similar to several commonly used maximum likelihood-based model selection criteria, which are Bayesian information criteria (BIC), Akaike information criteria (AIC) and Hannan-Quinn information criteria (HQIC) (Sigmund & Ferstl, 2017). Therefore, the minimum MAIC, MBIC and MQIC will be selected in order to obtain an optimal PVAR, provided that the Hansen's J statistic indicates a non-rejection of the over-identifying restrictions.

3.2.2 Granger Causality

Granger causality is not testing a true cause-and-effect relationship, but it helps to identify whether a particular variable occurs before another in time series. It is a probabilistic account of causality because empirical data is used to find correlation patterns. Granger causality has assumption that the variables are independent in the data generating processes in any time series. The null hypothesis is that lagged x-values cannot explain the changes in y (Leamer, 1985).

3.2.3 Impulse Response

Preserving the generality, the exogenous variables are placed in the notation and the autoregressive structure of the panel VAR emphasized as shown in equation (1). According to Lütkepohl (2005) and Hamilton (1994), if all moduli of the companion matrix $\bar{A}$ are not more than one, a stable VAR model can be formed, where the companion matrix is computed by:

$$\bar{\mathbf{A}}=\begin{bmatrix} \boldsymbol{A_1} & \boldsymbol{A_2} & \cdots & \boldsymbol{A_p} & \boldsymbol{A_{p-1}} \\ \boldsymbol{I_k} & \mathbf{0_k} & \cdots & \mathbf{0_k} & \mathbf{0_k} \\ \mathbf{0_k} & \boldsymbol{I_k} & \cdots & \mathbf{0_k} & \mathbf{0_k} \\ \vdots & \vdots & \ddots & \vdots & \vdots \\ \mathbf{0_k} & \mathbf{0_k} & \cdots & \boldsymbol{I_k} & \mathbf{0_k} \end{bmatrix}$$

(Equation 6)

A stable VAR model enables the panel VAR to be invertible and has vector moving-average (VMA) representation. Besides, it also enables panel VAR to provide interpretation for the projected impulse-response functions (IRF) as well as forecast-error variance decompositions. In order to compute a simple impulse-response function ϕ_i, the model could be modified as an infinite vector moving-average (VMA), where ϕ_i are the VMA parameters.

$$\Phi_{\boldsymbol{i}} = \begin{cases} \boldsymbol{I_k}, & \boldsymbol{i = 0} \\ \sum_{\boldsymbol{j=1}}^{\boldsymbol{i}} \Phi_{\boldsymbol{t-j}}\, \boldsymbol{A_j}, & \boldsymbol{i = 1, 2, ..} \end{cases}$$

(Equation 7)

There is no causal interpretation in the simple IRFs. Shock on a variable will cause shock on another variable due to the correlation of e_{it} that occur at the same time. Given that matrix P, where P'P=$\sum$. VMA parameters could be transformed into the orthogonalized impulse-responses $P\phi_i$ by applying P to orthogonalize the innovations as e_{it} P^{-1}. The identification restrictions could be imposed effectively on the system of dynamic equations by using matrix P (Abrigo & Love, 2015).

According to Sims (1980), although the Cholesky decomposition of $\sum$ that is subject to the order of variables in $\sum$ is not unique, it was proposed to be used in imposing a recursive structure on a VAR.

3.2.4 Variance Decomposition

The equation can be generalised as below:

$$\boldsymbol{Y_{it+h} - E[Y_{it+h}] = \sum_{i=0}^{h-1} e_{i(t+h-i)} \Phi_i}$$

(Equation 8)

Where, Y_{it+h} represents observed vector at time $t+h$ and $E[Y_{it+h}]$ is the h-step ahead predicted vector made at time t. The matrix P is responsible to orthogonalise the shocks so that the orthogonalised shocks $e_{it}P^{-1}$ has I_k as covariance matrix. This process allowed the decomposition of the forecast-error variance in a direct manner. In other words, matrix P is used to separate contribution of each variable to the variance of forecast-error. The effect of a particular variable on the forecast-error variance of variable contribution can be obtained by using the following formula:

$$\boldsymbol{\sum_{i=0}^{h-1} \theta_{mn}^2 = \sum_{i=1}^{h-1} (i'_n P \phi_i i_m)^2}$$

(Equation 9)

Where, i_s is s-th column of I_k. In reality, the effects are usually normalized based on the forecast-error variance (Abrigo & Love, 2015).

$$\sum_{i=0}^{h-1} \boldsymbol{\theta}_{.n}^{2} = \sum_{i=1}^{h-1} \boldsymbol{i'}_{n} \phi_i' \sum \phi_i \boldsymbol{i}_n$$

(Equation 10)

3.3 Diagnostic Checking

3.3.1 Over-Identifying Restrictions

Empirical works often identify the parameter of interest by using Instrumental Variables (IV) and Generalized Method of Moments (GMM). The success of this methodology will be influenced by the validity of a series of moment conditions, and thus the validity of the assumed moment conditions have to be tested frequently. It is recognized that an exactly identified model is not likely to be tested on its validity of moment conditions. However, if the model is over-identified, over-identifying restrictions tests can be employed to assess on its validity of moment conditions (Parente & Silva, 2012).

Hansen's J test is a statistical test that used to test the over-identifying restrictions in a statistical model. It is grounded on the assumption that parameters of the model are determined through some priori restrictions on the coefficients. The test statistic is computed from residuals of instrumental variables regression by creating a quadratic form according to the cross-product of the residuals and exogenous variables (Sargan, 1988). The statistic is asymptotically distributed as a chi-square variable with (m-k) degrees of freedom in which m refers to the number of instruments and k refers to the number of endogenous variable.

The hypothesis test can be shown as below:

H_0: Instruments are valid

H_1: Instruments are invalid

3.3.2 PVAR Stability

Stability of PVAR is crucial as it implies that the model is invertible and has an infinite-order vector moving-average representation for the simulation of impulse-response functions and variance decompositions (Sigmund & Ferstl, 2017). The standard stability condition of the panel VAR coefficients is based on the modulus of each eigenvalue of the estimated model. Besides, the VAR model is stable when all moduli of the companion matrix are strictly not more than one (Lütkepohl, 2005). PVAR satisfied stability condition if all the eigenvalues are within the unit circle. Thus, this indicates that the model is stable.

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

This chapter focus on conducting the diagnostic tests as mentioned in Chapter 3, which included Hansen's J test, lag order selection, and PVAR stability to detect the econometric problem in the model. The sample period we used in this study is from year 2006 to year 2017 involving 122 banks in top 16 oil exporting countries. In other words, this study consists of total 1,464 observations. In the PVAR model, the dependent variable is bank profitability, which is represented by ROA and ROE, while the selected independent variables are real economic growth, inflation rate, domestic credit to private sector and oil price.

4.1 Lag Order Selection

Table 4.1: Lag order result generated with ROA

lag	MBIC	MAIC	MQIC
1	-191.860	223.625	60.176
2	-120.229	191.384	68.798
3	-50.505	157.237	75.513

Table 4.2: Lag order result generated with ROE

lag	MBIC	MAIC	MQIC
1	-127.097	198.297	71.298
2	-102.658	114.271	29.605
3	-31.329	77.135	34.802

The result above indicates that in MBIC and MQIC are minimum at lag 1 while MAIC is minimum at lag 3. When the sample size is large enough, both MBIC and MAIC will generate unbiased results. Hence, in terms of the model lag selection, this study employs lag 1 which is the minimum lag in its estimation.

4.2 PVAR Stability Test

Figure 4.1: PVAR stability result generated by using ROA

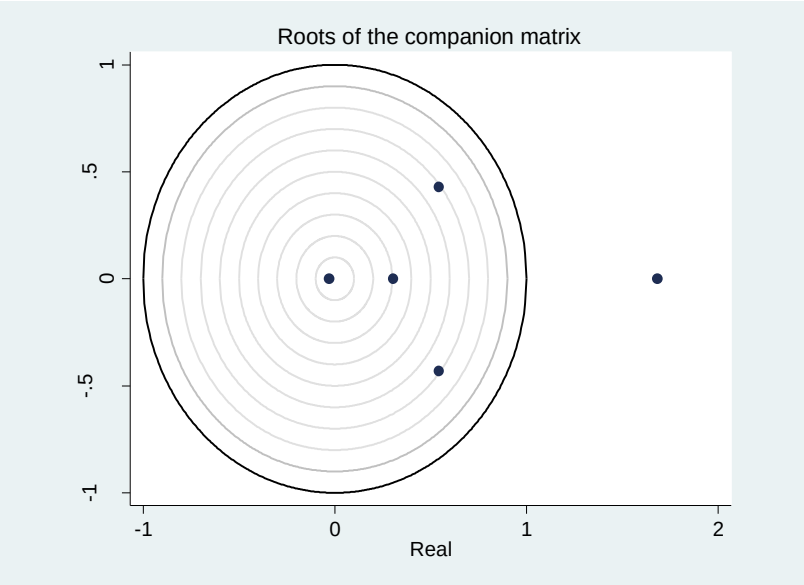
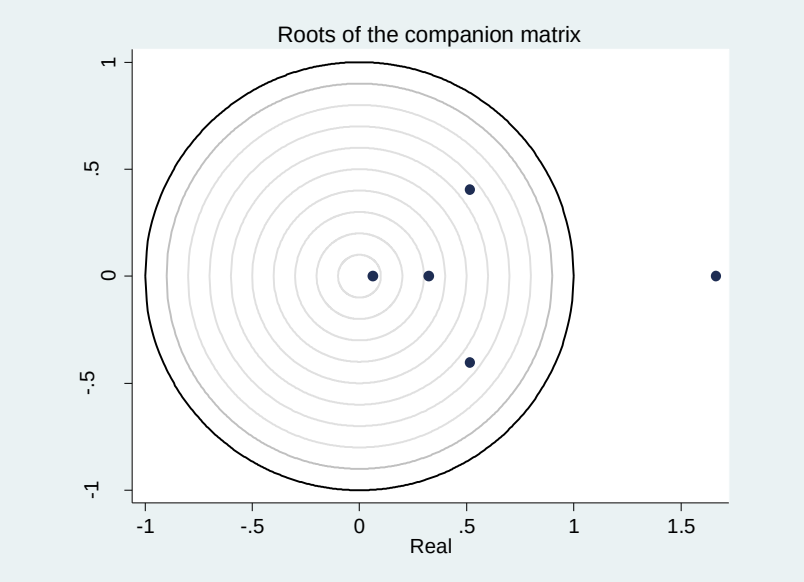


Figure 4.2: PVAR stability result generated by using ROE



Based on Figure 4.1 and 4.2, the overall model is considered stable as all the moduli are in the circle except one modulus.

4.3 Panel VAR results

Table 4.3: Estimated Panel VAR Coefficients and P-values using ROA as dependent variables

	roa	rgdp	dc	inf	bco
Roa (L1)	0.059*	2.084***	2.852***	-0.751***	0.237***
Rgdp (L1)	0.034***	0.717***	0.935***	0.313***	0.013***
Dc (L1)	0.002	0.262***	0.488***	0.0131*	0.017***
Inf (L1)	0.192***	0.229***	2.727***	0.621***	0.105***
Bco (L1)	0.386***	6.445***	14.216***	0.969***	1.257***
Hansen's J	83.537				

Note: ***, **, and * signify statistical significance at 1%, 5% and 10% level.
L1 = Lag 1, lag selection is based on MBIC.

Table 4.4: Estimated Panel VAR Coefficients and P-values using ROE as dependent variables

	roe	rgdp	dc	inf	bco
Roe (L1)	0.571***	0.196***	2.599***	-0.210***	0.028***
Rgdp (L1)	0.419***	1.006***	0.942***	0.164***	0.081***
Dc (L1)	0.103***	0.317***	0.527***	0.040***	0.010***
Inf (L1)	0.090*	0.579***	1.475***	0.034*	0.042***
Bco (L1)	0.445**	6.851***	25.293***	1.875***	1.805***
Hansen's J	89.636				

Note: ***, **, and * signify statistical significance at 1%, 5% and 10% level.
L1 = Lag 1, lag selection is based on MBIC.

The results from panel VAR model suggest that, oil price movements contribute a significant effect to bank profitability. A rise in oil prices results increase in countries' earnings and hence boost the economic growth and the escalation of inflation which would further upsurge the bank profitability and domestic credit during the boom period. From the results shown in Table 4.3 and 4.4, 1 percent rise in oil price will lead to 0.3 – 0.45 percentage point growth in bank profitability.

4.4 Granger Causality Test

Table 4.5: Granger causality using ROA as dependent variable

	Δ roa	Δ rgdp	Δ dc	Δ inf	Δ bco
Δ roa	-	18.110***	0.189	116.991***	22.932***
Δ rgdp	110.301***	-	269.355***	24.013***	352.571***

Note: ***,**, and * signify statistical significance at 1%, 5% and 10% level.

Table 4.6: Granger causality using ROE as dependent variable

	Δ roe	Δ rgdp	Δ dc	Δ inf	Δ bco
Δ roe	-	32.064***	8.820***	0.387	0.322
Δ rgdp	75.629***	-	435.255***	113.748***	356.550***

Note: ***,**, and * signify statistical significance at 1%, 5% and 10% level.

Granger causality test has a null hypothesis of endogenous variables do not Granger cause the dependent variable. By referring to Table 4.5, oil prices will granger cause the ROA. Based on the results in Table 4.6, there is no Granger causality from oil prices to ROE as the null hypothesis is not rejected.

4.5 Forecast-error Variance Decompositions

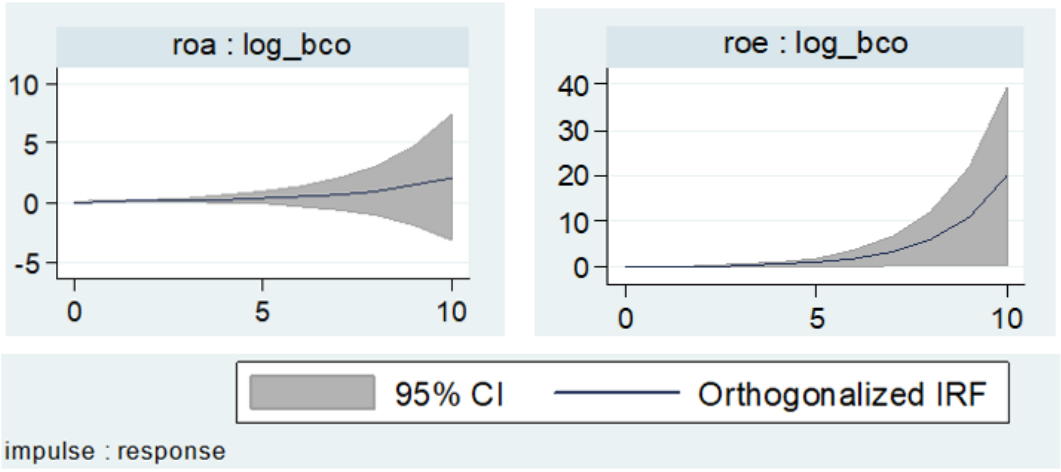
Table 4.7: Result of forecast-error variance decompositions

Response variable and Forecast horizon	Impulse variable: roa	rgdp	dc	inf	log_bco
roa					
0	0	0	0	0	0
1	1	0	0	0	0
2	.7802376	.1015111	.0006327	.1087356	.2565649
3	.6677803	.2302464	.0027575	.0837376	.2169031
4	.5348607	.3518618	.0071035	.0563778	.2039513
5	.4036891	.431454	.0305321	.036387	.1670486
6	.2728042	.4695842	.0861896	.031944	.1278454
7	.1661789	.4658864	.1592064	.0457953	.0917224
8	.095591	.437099	.2248119	.0700334	.0632227
9	.0544734	.4016273	.2742025	.0949954	.0425103
10	.0316838	.3694969	.3092307	.1159778	.0283382
roe					
0	0	0	0	0	0
1	1	0	0	0	0
2	.9131483	.0692905	.0168324	.0005322	.0230376
3	.7018936	.2299361	.0246242	.0144925	.0257076
4	.4431598	.3711312	.0294222	.0344663	.0257076
5	.2368314	.4519634	.0470378	.0440748	.0210241
6	.1139076	.4953523	.072209	.0457316	.0172409
7	.055681	.5177316	.0887182	.0459288	.0144718
8	.031833	.5269782	.0953141	.0463259	.0126841
9	.0227163	.5295779	.0974843	.04661	.0115903
10	.0192961	.5299094	.0983996	.0466802	.0109384

The forecast-error variance decompositions for the Panel VAR are presented in Table 4.7. It is shown that over 25.7% of the forecast-error variance of the oil price will contribute to ROA and oil price contributes 2.3% of the forecast-error variance to the ROE at 2-year horizon. Results from forecast-error variance decompositions at 10-year horizon show that oil price contributes to ROA and ROE with respectively 2.8% and 1.1%. Overall, it shows the downward trends from 1 year to 10-year horizon.

4.6 Impulse Response Functions (IRFs)

Figure 4.3: Response of bank profitability (ROA and ROE) and oil price.



Based on Figure 4.3, the results obtained from IRFs reveals that oil price shocks will positively affect bank profitability (ROA and ROE); however, it does not show a clear picture of the relationship in long run.

4.7 Major Findings

The interest of this research is the response of bank profitability to the oil price. The results revealed a positive relationship between oil price and bank profitability. This is in line with the literature of Poghosyan and Hesse (2009) as well as Alodayni (2016) which proved that oil revenue could adversely affect the banks through the government budgets and economic growth if the oil prices move in an unfavourable direction. Magda and Minko (2018) also found that a decrease in the oil price adversely affects banks' ROA and ROE due to the lowered economic activity. Lee and Lee (2018) also concluded that oil prices significantly affects banking performance through the instability of economic condition. This is also supported by the study of Akinkunmi (2017) which stated that the banks in Nigeria are highly relying on the interest-income from oil and gas sector. Therefore, the drop in oil price that affect the performance of oil sector will then pressure on the banking system. Besides, the falling tax revenue on oil

have decreased the government revenue as well as government spending. This had affected the economy of Nigeria and thus affect the bank profitability.

Also, the result from forecast-error variance decompositions for the Panel VAR has showed the downward trends on the effect of oil price on bank profitability from 1 year to 10 years' horizon. This may due to the measures have been taken by the banks in order to improve the performance during the oil price shocks (Hawaldar et al., 2017).

The results also demonstrate that the rise in oil prices results increase in countries' earnings and hence boost the economic growth and further upsurge the bank profitability. By solely looking at the relation between oil price and economic growth, there are many studies that have proved the oil price would affect the economic growth in a positive direction. Alkhathlan (2013), Stober (2016) as well as Chang et al., (2017) showed that oil revenues positively and significantly affect the real gross domestic product because countries with abundant natural resources has rapid economic growth due to the greater income, wealth and investment opportunities. The consumers also have higher disposable income to be used for their consumption. Besides, Ferderer (1996) discovered that the output growth usually increases as a result of an oil price shock. In addition, this may be due to the fact that the monetary policy of the country is resistant to the oil price shocks as shown in the study conducted on China (Du et al., 2010).

On the other hands, the individual, positive and significant relationship between economic growth and bank profitability had been proved by Gul et al. (2011) and Sufian (2009). Net interest income, loan losses, and operating costs channel the impact of the real GDP growth to the banking profitability in a positive and significant way. Economic expansion caused the bank profitability to increase while the recession causes the bank profitability to decline. Thus, a bank makes more bank loans and receives more deposits when the GDP growth is high. This in return will make the net interest income and loans losses of the banks to improve. Higher GDP growth normally implied that the citizen of the country has higher disposable income and the unemployment rate in this kind of country is usually lower. With the higher disposable income and being employed, the

borrower would normally not to default on their loans. However, the lower GDP growth rates may decrease bank deposits and loans and its managing costs. These conditions may also increase the debt collection costs but consequently reduce the bank profitability. The role of GDP growth to control cyclical output, bank loans and deposits has also been discovered by Flamini et al. (2009) in which their research showed that the lending and bank profitability increases during the cyclical upswing. However, the lending and bank profitability decreases during economic downturn because the banks may have raising nonperforming loans and decrease in profits. Athanasoglou et al. (2008) also found that economic growth moves in the same direction and is strongly related with bank profitability.

CHAPTER 5: CONCLUSION

5.1 Summary

Oil price movement is the concern of the public as it is known as the main source of government revenue for the oil exporting countries. The high volatility of oil prices will affect the economy growth of the countries. Most of the researchers are solely focus on the effect of oil price on the economic performance of the countries or the influence of macroeconomic factors on bank profitability. However, there is lack of concerns on the influence of oil price on bank profitability. Therefore, this study is aimed to investigate the impact of oil price on bank profitability through oil-macro-financial linkages.

This study applied Panel Vector Autoregression (PVAR) methodology as it allows for unobserved individual heterogeneity with the panel data approach. There are total 1,464 observations employed in this study, with the sample period from year 2006 to year 2017 involving 122 banks in top 16 oil exporting countries. Bank profitability is the dependent variable in the PVAR model which is denoted by ROA and ROE. Other than oil price, the selected independent variables are real gross domestic product, inflation rate and domestic credit to private sector.

As shown in the empirical results, oil price is positively related to bank profitability. This is consistent with the previous study in Chapter 2, which is the falling oil price will adversely affect the profitability of banking system, vice versa. As the backbone of the financial system in a country, the poor banking profitability of would adversely affect a country's economy and wealth. Therefore, the regulators and administrators should be concern on this issue in order to reduce the negative impact of falling oil price on bank profitability. They should make effort in maintaining a strong foundation of banking system as well as stay alert to tackle the uncertainty that may happen in the market.

In a nutshell, there is limitation on this study, which is the sample should be adopt from the countries which the gross domestic product (GDP) is highly dependent on the oil. This study recommends the future researcher to consider it for further study.

5.2 Policy implications

Oil crisis that burst out in year 2014 has left a deep lesson to policymakers as well as regulators around the world. The major findings of this study have several implications for policymakers to further improve the country practices and policies.

The findings indicated the presence of oil-macro-financial linkages in the related countries. Thus, it is suggested that counter-cyclical policies that minimize the probability of GDP slowdown can be implemented to stimulate financial stability efficiently. With the aim of financial stability, policymakers are recommended to observe the growths in international oil markets and smooth the possible impacts to the banking systems. The policymakers may build up a great quantity of oil stabilization buffers in order to have fiscal space for minimizing any adverse effect to the real economy. In other words, banks could accumulate buffers during good times and release them during challenging times. Therefore, the stability of financial system can be maintained even though there is unfavourable oil price movement.

Besides, this study suggested that macro-prudential policies could play a vital role in mitigating the systemic risks. Oil price shocks could be utilized in the macro-prudential policies as the oil prices are easier to monitor as compared to those commonly used measures of business cycle such as the deviations of GDP from its expected level. For example, binding bank capitalization to oil price shocks will have the benefit of alleviating the pro-cyclical bank lending as well as enable banks to utilize their capital cushions generated during boom periods for the purposes of lending during economic downturns. Policymakers are proposed to

build a well-defined macro-prudential policy framework in order to provide effective guidance for the countercyclical use of macro-prudential policy tools, and ultimately strengthen the resilience in the banking system.

Yet another implication of this study is the needs for policymakers to provide financial sector credit into productive investment industry that encourage economic growth in order to decrease the oil dependency and promote diversification in the economic activities. For instance, promoting development in non-oil sectors and enhancing the environment to attract for foreign investment in terms of accessibility to finance. Thus, a diversified economy will enable the banking system to be more defensive to the oil price shocks. Policymakers are also suggested to recognize that adverse oil prices movements will bring heterogeneous effect across banks.

5.3 Limitations of study

This study directly employs the top 16 oil exporting countries in the world which may include countries which its oil export only occupies a minority part in proportion to the total export of the country. This may result in oil price contribute little impact to the GDP of the country as economic diversification of the country may affect the country growth as well as its bank profitability.

5.4 Recommendation

Future researchers are recommended to categorize oil exporting countries according to the level of significance of the impact of oil price contribute to GDP of the country. It is important to do so as to examine the obvious impact result from oil price movements.

REFERENCES

Abdelaziz, H., Mouldi, D., & Helmi, H. (2011). Financial liberalization and banking profitability: A panel data analysis for Tunisian banks. *International Journal of Economics and Financial Issues, 1*(2), 19-32.

Abreu, M., & Mendes, V. (2002). Commercial bank interest margins and profitability: Evidence from EU Countries. *University of Porto Working*.

Abrigo, M., & Love, I. (2015). *Estimation of panel vector autoregression in stata: A package of programs*. Retrieved from http://paneldataconference2015.ceu.hu/Program/Michael-Abrigo.pdf

Akinkunmi, M. (2017). Determinants of banks' profitability in Nigeria: Does relative market power matter? *Journal of Finance and Bank Management , 5*(1), 42-53. doi:10.15640/jfbm.v5n1a4

Alkhathlan, K. (2013). Contribution of oil in economic growth of Saudi Arabia. *Applied Economics Letters*, *20*(4), 343-348. Retrieved from https://doi.org/10.1080/13504851.2012.703310

Alodayni, S. (2016). Oil prices, credit risks in banking systems, and macro-financial Linkages across GCC Oil Exporters. *International Journal of Financial Studies*. doi:10.3390/ijfs4040023

Alper, D., & Anbar, A. (2011). Bank specific and macroeconomic determinants of commercial bank profitability: Empirical evidence from Turkey. *Business and Economics Research Journal, 2*(2), 139-152.

Alvarex, L. J., Hurtado, S., Sanchez, I., & Thomas, C. (2011). The impact of oil price changes on Spanish and euro area consumer price inflation. *Economic Modelling, 28*(1-2), 422-431. Retrieved from https://doi.org/10.1016/j.econmod.2010.08.006

Andrew, H. (2019). *Pricing differentials between Brent crude and WTI*. Retrieved from https://www.thebalance.com/crude-oil-brent-versus-wti-808872

Andrews, D., & Lu, B. (2001). Consistent model and moment selection procedures for GMM estimation with application to dynamic panel data models. *Journal of Econometrics*, 123-164. Retrieved from https://doi.org/10.1016/S0304-4076(00)00077-4

Arezki, R., & Van der Ploeg, F. (2010). Trade policies, institutions and the natural resource curse. *Applied Economics Letters, 17*(15), 1443-1451. doi:10.1080/13504850903035881

Arinze, P. E. (2011). The impact of oil price on the Nigerian economy. *Journal of Research in National Development, 9*(1), 211-215.

Athanasoglou, P., Brissimis, S., & Matthaios, D. (2008). Bank-specific, industry-specific and macroeconomic determinants of bank profitability. *Journal of International Financial Markets, Institutions and Money, 18*(2), 121-136. Retrieved from https://doi.org/10.1016/j.intfin.2006.07.001

Athanasoglou, P., Delis, M., & Staikouras, C. (2006). Determinants of profitability in the South Eastern European. *Journal of Financial Decision Making, 2*, 1-17.

Ayaydin, H., & Karaaslan, Ý. (2014). Stock market development, bank concentration, ownership structure, and bank performance: Evidence from Turkey. *Journal of Economics, 1*(1), 49-67.

Baldwin, J., & Brown, W. (2004). Regional manufacturing employment volatility in Canada: The effects of specialisation and trade. *Economics of Governance, 83*(3), 519-541. Retrieved from https://econpapers.repec.org/article/sprecogov/v_3a83_3ay_3a2004_3ai_3a3_3ap_3a519-541.htm

Blanchard, O. J., & Gali, J. (2007). The macroeconomic effects of oil price shocks: Why are the 2000s so different from the 1970s? *National Bureau of Economic Research*. Retrieved from http://www.nber.org/papers/w13368

Boyd, J., & Champ, B. (2006). Inflation, banking, and economic growth. *Federal Reserve Bank of Cleveland*, 1-4.

Central Bank of UAE. (2017). *Annual report*. Retrieved from https://www.centralbank.ae/sites/default/files/2018-10/CBUAEAnnualReport-2017_En.pdf

Chang, Y., Gozgor, G., & Bilgin, M. (2017). Crude oil price shocks and macroeconomic performances in the ASEAN economies. *Journal of Banking and Management, 5*(1), 253-265. doi:10.1007/978-3-319-39919-5_20

Chen, M., & Wen, Y. (2011). *Oil price shocks and inflation risk*. Retrieved from https://files.stlouisfed.org/files/htdocs/publications/es/11/ES1119.pdf

Chou, K. W., & Tseng, Y. H. (2011). Oil price pass-through into CPI inflation in Asian emerging countries: the discussion of dramatic oil price shocks and high oil price periods. *Journal of Economics, Finance and Management Sciences, 2*(1), 1-13.

Chuku, C., Effiong, E., & Sam, N. (2010). Oil price distortions and their short and long-run impacts on the Nigerian economy. *MPRA Paper*. Retrieved from http://mpra.ub.uni-muenchen.de/24434/

Citigroup. (2015). *Annual report*. Retrieved from https://www.citigroup.com/citi/investor/quarterly/2016/annual-report/

Corden, W., & Neary, J. (1982). Booming sector and de-industrialization in a small openeconomy. *Economic Journal, 92*, 825–848. Retrieved from https://core.ac.uk/download/pdf/52943901.pdf

Cunado, J., & Gracia, F. P. (2005). Oil prices, economic activity and inflation: Evidence for ome Asian Countries. *The Quarterly Review of Economics and Finance, 45*(1), 65-83. Retrieved from https://doi.org/10.1016/j.qref.2004.02.003

Daniel, K. (2018). *Benchmark oils: Brent blend, WTI and Dubai*. Retrieved from https://www.investopedia.com/articles/investing/102314/understanding-benchmark-oils-brent-blend-wti-and-dubai.asp

Davydenko, A. (2011). Determinants of Bank Profitability in Ukraine. *Undergraduate Economic Review, 7*(1), 1-30. Retrieved from http://digitalcommons.iwu.edu/uer/vol7/iss1/2

Deloitte. (2018). *The impact of plummeting crude oil prices on company finances*. Retrieved from https://www2.deloitte.com/ng/en/pages/energy-and-resources/articles/crude-awakening-the-impact-of-plummeting-crude-oil-prices-on-company-finances.html?fbclid=IwAR0FvJFmWbS5DKMaDYNHBdoxTkMycwCAoh3f-WNvRPLDf2SjOthgAGi7OUg

Dias, F. C. (2013). Oil price shocks and their effects on economic activity and prices: an application for Portugal. *Economic Bulletin and Financial Stability Report Articles and Banco de Portugal Economic Studies*.

Driver, R., & Windram, R. (2007). Public attitudes to inflation and interest rates. *Bank of England, Quarterly Bulletin, 47*(2), 208-223.

Du, L., He, Y., & Wei, C. (2010). The relationship between oil price shocks and China's macro-economy: An empirical analysis. *Energy Policy, 38*(8), 4142-4151. Retrieved from https://doi.org/10.1016/j.enpol.2010.03.042

Egan, M. (2016). *U.S. oil bankruptcies spike 379%*. Cable News Network. Retrieved from https://money.cnn.com/2016/02/11/investing/oil-prices-bankruptcies-spike/index.html

Farzanegan, M. R., & Markwardt, G. (2009). The effects of oil price shocks on the Iranian economy. *Energy Economics, 31*, 134-151.

Ferderer, P. (1996). Oil price volatility and the macroeconomy. *Journal of Macroeconomics, 18*(1), 1-26. Retrieved from https://doi.org/10.1016/S0164-0704(96)80001-2

Firtescu, B., & Roman, A. (2015). Internal and external determinants of commercial banks profitability: Empirical evidence from Bulgaria and Romania. *The Annals of the University of Oradea*.

Flamini, V., McDonald, C., & Schumacher, L. (2009). The determinants of commercial bank profitability in Sub-Saharan Africa. *IMF Working paper WP/09/15*. Retrieved from https://www.imf.org/external/pubs/ft/wp/2009/wp0915.pdf

Gregorio, J. D., Landerrectche, O., & Neilson, C. (2007). Another pass-through bites the dust? Oil prices and inflation. *Economía, 7*(2), 155-208. Retrieved from https://www.jstor.org/stable/20060494

Gul, S., Irshad, F., & Zaman, K. (2011). Factors affecting bank profitability in Pakistan. *The Romanian Economic Journal, 14*(39), 61-87. Retrieved from http://www.rejournal.eu/sites/rejournal.versatech.ro/files/articole/2011-02-28/2101/guletal-je39.pdf

Habibullah, M. S., & Sufian, F. (2009). Determinants of bank profitability in a developing economy: Empirical evidence from Bangladesh. *Journal of Business Economics and Management, 10*(3), 207-217.

Hamilton, J. D. (1994). *Time series analysis.* Princeton: Princeton University Press.

Hawaldar, I. T., Rohit, B., Pinto, P., & Rajesha, T. (2017). The impact of oil price crisis on financial performance of commercial banks in Bahrain. *Banks and Bank Systems, 12*(4), 4-16. Retrieved from http://dx.doi.org/10.21511/bbs.12(4).2017.01

Hooker, M. A. (1999). Are oil shocks inflationary? Asymmetric and nonlinear specifications versus changes in regime. *Journal of Money, Credit and Banking*(2), 540-561. Retrieved from http://www.jstor.org/stable/3270701

Husain, A., Tazhibayeva, K., & Ter-Martirosyan, A. (2008). Fiscal policy and economic cycles in oil-exporting countries. *IMF Working Paper WP/08/253*. Retrieved from https://www.imf.org/external/pubs/ft/wp/2008/wp08253.pdf

Ibrahim, M. (2015). Oil and food prices in Malaysia: a nonlinear ARDL analysis. *Agricultural and Food Economics, 3*(2), 1-14. doi:10.1186/s40100-014-0020-3

Idris, I., & 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, 6*(3), 522-528. Retrieved from http://dergipark.gov.tr/download/article-file/361649

Jiranyakul, K. (2015). Oil price shocks and domestic inflation in Thailand. *MPRA Paper no. 62797*. Retrieved from https://mpra.ub.uni-muenchen.de/62797/1/MPRA_paper_62797.pdf

Khandelwal, P., Miyajima, K., & Santos, A. (2016). The impact of oil prices on the banking system in the Gulf Cooperation Council. *Journal of Governance and Regulation, 6*(2). Retrieved from http://dx.doi.org/10.22495/jgr_v6_i2_p4

Khrawish, H. A. (2011). Determinants of commercial banks performance: Evidence from Jordan. *International Research Journal of Finance and Economics, 81*, 148-159.

Kiganda, E. O. (2014). Effect of macroeconomic factors on commercial banks profitability in Kenya: Case of Equity Bank Limited. *Journal of Economics and Sustainable Development, 5*(2). Retrieved from https://www.iiste.org/Journals/index.php/JEDS/article/download/10697/10902

Kilian, L. (2014). Oil price shocks: Causes and consequences. *Annual Review of Resource Economics, 6*, 133-154. Retrieved from https://doi.org/10.1146/annurev-resource-083013-114701

Kimberly, A. (2018). *How high will oil prices rise in 2019 and 2050?* Retrieved from https://www.thebalance.com/oil-price-forecast-3306219

Leamer, E. (1985). Vector autoregressions for causal inference. *Carnegie-Rochester Conference Series on Public Policy 2, 22*, 255-304. Retrieved from http://pages.stern.nyu.edu/~dbackus/Identification/id/Leamer_CR_85.pdf

Lee, C. C., & Lee, C. C. (2018). Oil price shocks and Chinese banking performance: Do country risks matter? *Energy Economics*. doi:https://doi.org/10.1016/j.eneco.2018.01.010

Long, H. (2016). *Red flag: Oil company defaults are spiking.* Cable News Network. Retrieved from https://money.cnn.com/2016/01/22/investing/oil-crisis-defaults-rise/index.html

Lütkepohl, H. (2005). *New introduction to multiple time series analysis.* New York: Springer.

Magda , E., & Minko , M. (2018). UAE banks' performance and the oil price shock: Indicators for conventional and islamic banks. *Economic Research Forum.* Retrieved from https://erf.org.eg/wp-content/uploads/2018/02/Magda-Minko.pdf

Malik, K., Ajmal, H., & Zahid, M. (2017). Oil price shock and its impact on the macroeconomic variables of Pakistan: A structural vector autoregressive approach. *International Journal of Energy Economics and Policy, 7*(5), 83-92.

Messai, A. S., Gallali, M. I., & Jouini, F. (2015). Determinants of bank profitability in Western European countries: Evidence from system GMM estimates. *International Business Research, 8*(7).

Mikesell, R. (1997). Explaining the resource curse, with special reference to mineral exporting countries. *Resources Policy, 23*(4), 191-199. Retrieved from https://doi.org/10.1016/S0301-4207(97)00036-6

Mirzaei, A., & Mirzaei, Z. (2011). Bank-specific and macroeconomic determinants of profitability in Middle Eastern banking. *Iranian Economic Review, 15*(29), 101-128. Retrieved from https://ier.ut.ac.ir/article_32725_9ea8890f680d18b167b255126427d251.pdf

Narayan, P. (2018). *The Middle East petro state with the most riding on rising oil prices isn't Saudi Arabia — it is Kuwait*. Retrieved from https://www.cnbc.com/2018/07/12/kuwait-has-more-on-line-with-rising-oil-prices-than-saudi-arabia.html

Olomola, P., & Adejumo, V. A. (2006). Oil price shock and macroeconomic activity in Nigeria. *International Research Journal of Finance and Economics*(3). Retrieved from http://www.eurojournals.com/finance.htm

Ong, T. S., & Teh, B. H. (2013). Factors affecting the profitability of Malaysian commercial banks. *African Journal of Business Management, 7*(8), 649-660. Retrieved from http://www.academicjournals.org/app/webroot/article/article1380811107_Ong%20and%20Teh.pdf

Osamah , M. K., & Ali , M. (2017). The impact of oil price movements on bank non-performing loans: Global evidence from oil-exporting countries.

Emerging Markets Review, 31, 193–208. Retrieved from https://doi.org/10.1016/j.ememar.2017.05.006

Otuori, O. H. (2013). Influence of exchange rate determinants on the performance of commercial banks in Kenya. *European Journal of Management Sciences and Economics, 1*(2), 86-98.

Parente, P. M., & Silva, J. S. (2012). A cautionary note on tests of overidentifying restrictions. *Economics Letters, 115*(2). doi:10.1016/j.econlet.2011.12.047

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

Peersman, G., & Van Robays, I. (2009). Oil and the Euro Area Economy. *Economic Policy, 24*(60), 603-651. Retrieved from https://www.jstor.org/stable/40272533

Perry, P. (1992). Do banks gain or lose from inflation. *Journal of Retail Banking, 14*(2), 25-30. doi:10.12691/jfe-4-3-2

Poghosyan, T., & Hesse, H. (2009). Oil prices and bank profitability: Evidence from major oil-exporting countries in the Middle East and North Africa. *International Monetary Fund* . doi:10.5089/9781451873672.001

Revell, J. (1980). Costs and margins in banking: An international survey. *Organisation for Economic Co-operation and Development*.

Sachs,, J., & Warner, A. (2001). The curse of natural resources. *European Economic Review, 45*, 827–838. Retrieved from http://www.earth.columbia.edu/sitefiles/file/about/director/pubs/EuroEconReview2001.pdf

Said, A. (2015). The influence of oil prices on Islamic banking efficiency scores during the financial crisis: Evidence from the MENA area. *Journal of Finance & Banking Studies, 4*(3). Retrieved from http://dx.doi.org/10.2139/ssrn.2666096

Sargan, D. (1988). *Lectures on advanced econometric theory.* Oxford: Basil Blackwell.

Sek, S. K., Teo, X. Q., & Wong, Y. N. (2015). A comparative study on the effects of oil price changes on inflation. *Procedia Economics and Finance, 26*, 630-636. Retrieved from https://doi.org/10.1016/S2212-5671(15)00800-X

Sigmund, M., & Ferstl, R. (2017). Panel vector autoregression in R with the package panelvar. *SSRN Electronic Journal*. doi:10.2139/ssrn.2896087

Sims, C. A. (1980). Macroeconomics and reality. *Econometrica, 48*(1), 1-48. doi:10.2307/1912017

Smith, M. (2016). *2 key lessons from the Pacific Exploration and Production Corp. train wreck*. Retrieved from https://www.fool.ca/2016/05/02/2-key-lessons-from-the-pacific-exploration-and-production-corp-train-wreck/

Statista. (2017). *Oil price of Dubai Fateh 1973-2017*. Retrieved from https://www.statista.com/statistics/266660/price-development-of-dubai-fateh-oil/

Statista. (2018). *Brent crude oil price annually 1976-2018*. Retrieved from https://www.statista.com/statistics/262860/uk-brent-crude-oil-price-changes-since-1976/

Statista. (2018). *OPEC oil price annually 1960-2018*. Retrieved from https://www.statista.com/statistics/262858/change-in-opec-crude-oil-prices-since-1960/

Stober, E. (2016). Crude oil price shocks and macroeconomic behavior in Nigeria. *Journal of Social and Economic Statistics, 5*(1), 56-66. Retrieved from https://www.researchgate.net/publication/307922832_Crude_Oil_Price_Shocks_and_Macroeconomic_Behavior_in_Nigeria

Sufian, F. (2009). Determinants of bank profitability in a developing economy: Empirical evidence from the China banking sector. *Journal of Asia-Pacific Business, 10*(4), 281-307.

Tan, Y., & Floros, C. (2012). Bank profitability and GDP growth in China: a note. *Journal of Chinese Economic and Business Studies, 10* (3), 267-273.

Tan, Y., & Floros, C. (2012). Bank profitability and inflation: the case of China. *Journal of Economic Studies, 39*(6), 675-696.

Trang, N. T., Tho, T. N., & Hong, D. T. (2017). The impact of oil price on the growth, inflation, unemployment and budget deficit of Vietnam. *International Journal of Energy Economics and Policy, 7*(3), 42-49.

Waqas , T., Muhammad , U., Inam , A., Imran , A., & Haseeb , Z. (2014). Determinants of commercial banks profitability: Empirical evidence from Pakistan. *International Journal of Accounting and Financial Reporting, 4*(12), 1-22. Retrieved from http://www.macrothink.org/journal/index.php/ijafr/article/view/5939

Yu, H., & Gan, P. T. (2010). The determinants of banking sector development: Malaysian experience. *International Research Journal of Finance and Economics* (35), 29-35.

Yves , C., & Mizeroyabade , A. (2017). The influence of economic factors on profitability of commercial bank. *International Journal of Management and Applied Science, 3*(1), 14-18. Retrieved from http://www.iraj.in/journal/journal_file/journal_pdf/14-340-148921102414-18.pdf