The Effect of Crude Oil Price on Islamic and Conventional Banks' Profitability Case Study: OPEC Countries

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ABSTRACT

This study investigates the effect of crude oil price variation on bank profitability. Examining 170 banks 36 Islamic banks and 134 conventional banks located in 13 OPEC countries from 2011 to 2016. Using panel data the study highlight bank-specific as well as macroeconomic variables. Moreover, it compares between Islamic and conventional banks, regarding their profitability and their sensitivity to the fluctuations of oil price.

By using ROA, ROE, NIM and NNIM as proxies for bank profitability, our estimation analysis displays that there is positive relationship between oil price and bank profitability. Furthermore, our findings shows that oil price and bank profitability relationship is more significant in conventional banks than the Islamic ones. The results also disclose that cost efficiency is the most effecting variable on the profit of OPEC countries banks. Whereas, GDP growth this the least one.

Keywords: Oil price, Islamic banks, Conventional banks, Bank profitability, OPEC, Panel data.

ÖZ

Bu çalışma, ham petrol fiyat değişiminin banka kârlılığına yansıyan etkisini araştırmaktadır. Çalışma 2011'den 2016'ya kadar 13 OPEC ülkesinde yer alan 170 bankanın, 36 İslam bankasnın ve 134 geleneksel bankanın incelenmesi ile tamamlanmıştır. Panel verilerin kullanılımıyla gerçekleşen çalışmada, bankaya özgü ve makroekonomik değişkenlere vurgular yapılmıştır . Dahası, İslami bankalar ve geleneksel bankalar arasında, kârlılıkları ve petrol fiyatlarındaki dalgalanmalara karşı duyarlılıkları açısından karşılaştırmalar yapılmıştır.

ROA, ROE, NIM ve NNIM'i banka kârlılığı için vekiller olarak kullanarak tahmini analizimizi gerçekleştirmiş bulunmaktayız. Sonuç olarak petrol fiyatı ile banka kârlılığı arasında pozitif bir ilişki olduğu görülmüştür. Ayrıca, bulgularımıza göre banka kârlılığı ve petrol fiyatının etkisi geleneksel bankalarda İslami bankalara göre daha fazla olduğu görülmüştür. Sonuçlar aynı zamanda maliyet verimliliği etkisinin, OPEC ülkeleri bankalarının kârlılığı üzeride büyük rol oynadığını ortaya koymaktadır. Buna karşılık olarak GSYH büyüklüğün en az etkisi olduğu görülmüştür.

Anahtar kelimeler; Petrol fiyatı, İslami bankalar, Geleneksel bankalar, Banka kârlılığı, OPEC, Panel veri.

DEDICATION

Praise and thank to Allah the creator of earth and heavens, for giving me the chance and blessings to achieve this work.

I dedicate this work to my parents for their infinite support and prayers. To my sister Alya'a for being the sister with a heart of mother to me. To the best siblings ever and my niece Taleen for being a main source of motivation. To Marwa and her family for making me feel as a member of their lovely family and for all the unforgettable memories. May Allah keep you all safe and give you limitless happiness.

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LIST OF ABBREVIATIONS

CARP	Capital Ratio
CB	Conventional Bank
CI	Cost Management
CR	Credit Risk
CR2	Credit Risk
EQU	Equation
FE	Fixed effect
GDPG	Gross Domestic Product Growth
IB	Islamic Bank
LIQR	Liquidity Ratio
INF	Inflation Rate
LNO	Crude Oil Price
LNS	Size
NIM	Net Interest Margin
NNIM	Net Noninterest Margin
OLS	Ordinary least squared
OPEC	Organization of the Petroleum Exporting Countries
RE	Random effect
ROA	Return on Asset
ROE	Return on Equity
VIF	Variance inflation factor

Chapter 1

INTRODUCTION

1.1 Aim and Background of Study

In this study, we are investigating the effect of oil prices fluctuations on banks' profitability. Our aim is to define the relationship between prices of crude oil and banks' profitability, also determining the economy–specific and bank-specific factors that may affect banks' profitability in the chosen countries. Our sample represents banks that located in OPEC (organization of the petroleum exporting countries), taking into account the two types of banks the Islamic and the conventional ones, as well as how the two types respond differently to the oil price changes? Also we are trying to determine the factors behind the variation between the two types of banks' reactions. We believe this study will add benefit to the literature regarding such topic as according to our knowledge there is no previous studies exploring this topic distinctively in OPEC countries.

Since the discovery of the crude oil in the early years of 20th century, the oil market is playing an enormous role on the world economy; it represents a superior part of many countries' income, which directed to many political problems and conflicts between the countries and even between regions in the same country. For example one of the main factors that raise the conflict that separated and divided Sudan into two, was the civil wars on places that is rich with crude oil.

In the global economy oil become a political, economic and financial key that the countries play with it to maintain their own interest. Prices of oil plays a herculean role in economic and financial markets in the world, a tragic change in the prices lead a serious crises and financial distress in the trading countries which may lead to bankruptcies economy wide. M. Radetzki (2012), exhibited on her study that after the 2008-2010 financial crises the average price for oil per barrel increased by 800% than what it was in 1970-1972.

As the crisis of 2008-2010 may express an expected relationship between crude oil prices and banks activities, in this study we are focusing in the effect of this relationship on the banks profitability among the OPEC members. The OPEC's members are 13 countries, 5 in Africa (Algeria, Angola, Libya, Nigeria and Gabon), two in South America (Ecuador and Venezuela) and finally 6 in Middle East (Iran, Iraq, Kuwait, Saudi Arabia, Qatar and United Arab Emirates). (Member countries, OPEC website 4 July, 2016).

1.2 Hypothesis

Ho: there is no relationship between oil prices and banks' profitability.

H1: there is a relationship between oil prices and banks' profitability.

Ho: there is no difference on the effect of oil prices between conventional banks' and Islamic banks profitability.

H1: there is a difference on the effect of oil prices between conventional banks' and Islamic banks profitability.

1.3 Data

The sample in this study covers 170 banks selected from the 13 OPEC's countries, 36 banks from those banks are Islamic once. We used historical panel data for OPEC banks' financial statements from the Bankscope website, and time series crude oil prices. The study period begins 2011 and ends 2016. By using banks' specific ratios and external variables to evaluate and monitor the profitability and stability of the banks.

1.4 Methodology and Limitation

We will determine the effective variables and theoretical concepts and then use regression analysis to test the study hypothesis to specify the significant variables that affect banks' profitability.

One of the limitation we faced during the investigation is that some countries don't have Islamic banks in their system, which are Ecuador, Gabon, Venezuela and Angola. Also Iran doesn't support conventional banks in the country's banking system, so the comparative analysis between the two types of banks is not available for those countries.

1.5 Structure of the Paper

The second chapter contains some past researches and studies about the banks' profitability and stability as well as some reviews about fluctuations in crude oil price and the factors that causes these fluctuations. Third chapter is data and methodology. Chapter four present the empirical analysis. Estimated results and results discussion. Finally chapter five concludes the study.

Chapter 2

LITERATURE REVIEW

2.1 Background of OPEC and Oil Prices

Generally, volatility of oil prices has been attributed to fluctuations in different factors such as, technological, political, and economic, …, etc. In this respect, the recent rise in the importance of other energy substitutes, may buttressed oil price elasticity and compounded the problem of oil price fluctuations relative to other commodities such as metals and agricultural products. Stabilizing this worldwide upheaval of oil prices is at the core of the ongoing debate among oil-exporting countries' policymakers.

The Organization of Petroleum Exporting Countries (OPEC) was initially established in a conference in Baghdad in September 1960 by five oil exporting countries: Saudi Arabia, Venezuela, Iran, Iraq, and Kuwait. The number of OPEC members has been continually changing. There are currently thirteen countries in OPEC (Saudi Arabia, Kuwait, Qatar, United Arab Emirates, Iraq, Islamic republic of Iran, Algeria, Libya, Gabon, Nigeria, Angola, Venezuela, and Ecuador).

Oil is the mainstay of oil-exporting economies. As such, volatility of oil prices could impinge on other sectors of the economy, one of the important sectors is the financial sector. The rudimentary nature of financial markets in OPEC countries may indicates

that financial mobilization is carried out mainly through the banking system. Declining oil prices may raise the inflation rate through the increase in imported products, the sovereign risk (country level) due to the decrease in the oil earnings which plays large role on the oil exporting countries, liquidity risk, and capital risk (institutional level) in these countries.

Theoretically, according to the available literature the determinants of bank profitability are classified into two categories: Internal and external factors. Internal factors emphasize the variables under the bank management's control such as capital adequacy, equity, loans, bank size, etc. On the other hand, external variables are affected by governmental regulations and the economy's status.

2.2 Bank-Specific Variables

The internal variables generally are easier to anticipate in comparison to the external variables due to the high sensitivity of external variables in regard to different factors. This philosophy works best in a stable environment. Political and economic instability makes it difficult to forecast any of the two categories of variables. Internal variables include:

Liquidity ratio reveals the cash or the amount of assets that can easily be converted to cash by the bank. This ratio shows the bank’s capability not just to meet their short-term obligations, but also to meet the unexpected ones. It also gives some idea about the bank’s growth, for example high liquidity ratio may indicate less money invested in a form of loans and products in a bank which could lead to less growth. Liquidity ratio can be calculated by cash divided by total assets, or liquid assets divided by total assets. Curak, Poposki, and Pepur, (2012), argued that through adjusting loans- deposits ratio liquidity ratio can be controlled. Banks also have the

option of selling more securities or liquidating fixed assets with lower transaction costs.

The relationship between liquidity ratio and profitability could vary depending on the level of liquidity in the banks. Bourke (1989) argued the relationship can be positive. A high liquidity ratio signals to investors the bank's ability to manage its obligations, which reflects positively on expected profitability. By looking at recessionary periods in industry, banks may face liquidity risk, this force them to increase their liquid asset holdings and diminish risk by diversifying their portfolios. Inefficient management of liquidity ratio causes insolvency, which eventually will raise the possibility of bankruptcy. This can be exemplified by what happened to Nigerian banks in the last years of the past century where the banking sector faced financial distress due to illiquidity problem and other factors that led to trust deficiency among banks' customers, Ikpefan, (2013).

Interestingly, Molyneuxs and Thornton (1992) and Peter S. Rose et al (2005) have shown that the relationship can be negative. An excess in liquidity ratio cuts the investment ability of the bank, this will affect bank's profitability in a negative manner.

Liquid assets have lower risk than illiquid ones, following the theory of "risk needs compensation" liquid assets hold less risk which means less return, this may conclude to us holding significant liquidity ratio may eventually lower return on assets ROA. However, the nature of the relationship between liquidity ratio and profitability is differ between banks relying on the amount of liquid assets needed to

be hold by the bank, banks optimal level of liquidity varies from another bank's optimal liquidity ratio a cause for such difference could be many factors such as size, the status of the economy, bank's risk, and specialization. The amount of liquidity in banks rely on the natures of activities and products of the bank, Bashir and Hassan (2005) tested Islamic banks (IBs) in comparison to conventional banks (CBs) among twenty-one countries. Interestingly, they found that CBs are more liquid than IBs.

Usually Banks use inter-bank markets to facilitate very short-term bank's obligations. During the financial crisis period 2007-2008, the inter-bank markets were shut down and many banks faced dramatic credit-risk problems, especially in mortgage and credit lines loans, thus made banks unable to meet their obligations. Led to raise the cost of capital to a very high level that majority of the banks could not afford, which required the intervention of government agencies to maintain liquidity (Lee and Rose, 2010; Fleming, 2012). Liquidity problems may exist at both the firm level and market level. What compounded the recent financial crisis in Greece is the co- existence of the two levels which eventually exacerbated the solvency problem and persistence of sovereign debt.

Maria and Batrancea (2013) studied liquidity management in Romanian banks during and after the financial crisis (2007-2011). They calculated different liquidity ratios and indicators including the liquid assets ratio, immediate liquidity ratio, own fund, and permanent resources ratio. Although the expected standard liquid assets ratio is between 2 to 2.5, the calculated ratios were below 1.2. The highest were 1.13 and 1.14 in 2007 and 2011, respectively. This indicates, as discussed previously, during

the financial crisis Romanian banks faced solvency problems which affected their profitability.

As the solvency problem is expected to raise where, the paucity of liquidity, and the ensuing lower demand for bank assets, during and right after a financial crisis encourages some banks to practice **fire-sales** to increase their profitability. Prudent banks may try to forecast such crises and save cash before a crisis to buy suffering banks' assets at fire-sale prices to increase their profitability.

Furthermore, Achary, Shin, and Yorulmazer (2011) studied the crisis resolution and bank liquidity in 2008. Their analysis showed that banks working in a low accounting standard environment, are more likely to hold more liquid assets to meet unexpected losses, as they have less liquidity in equity markets.

Nwosn (2013), studied the pre- and post-consolidation performance of Nigerian banks in a sample of sixteen banks from 1998 to 2011. His empirical analyses showed that statistically in the pre- consolidation period, liquidity ratio had no significant effect on ROA ratio.

Credit risk is the risk that a fragment of bank asset values may decline, especially loans. Any change in bank assets may have significant impact on bank profitability. Hempel and Simonson (1999), mentioned that credit risk contains two types of risks: (i) Transaction risk, which may arise when banks accumulate loans at one period and commit an error in the process of selecting the borrower or underwriting and operating the loan. (ii) Portfolio risk, divided into concentration risk which is the

risk of concentrating bank loans into one borrower or industry rather than diversifying them to more than one, and intrinsic risk, which is the risk attached to a specific industry or borrowers.

By reviewing the related literature, researchers argued about the relationship between credit risk and bank profitability. Some studies showed a positive relationship, while the others support the opposite. Coming back again to the concept of "risk-needs compensation" some studies justified that the relationship between credit risk and bank profitability is positive. As risk increases, return is expected to increase. Ghodrati and Ghasemi (2014) studied the determinants of Iranian bank profitability of eighteen banks in the period 2002-2011. Their study showed that there is a direct relationship between credit risk and bank profitability. This is consistent with the study of Boahene (2012), which studied a sample of six Ghanaian banks between the years 2005-2009, and proved a positive relationship between credit risk and bank performance. A justification for such results could be the increase in the income generated from loans fees and commissions as well as the increase in interest rates. On the other hand, several researchers proved the opposite, that the credit risk-bank profitability relationship is negative. As the credit ratio increases the bank will be more exposed to losses and non-performing loans. Kosmidou (2008), Gizaw, Kebede and Selvaraj (2015) tested the impact of credit risk on Ethiopian banks using sample of eight commercial banks between the period of (2003-2014). Their analysis took nonperforming loans as the major indicator of credit risk. The regression results showed a negative relationship between nonperforming loans and ROA for Ethiopian banks. A negative relationship between credit risk and bank profitability may exist when the quantity of loans increases, because banks are more likely to perform an

error in loan processing, which will lead to higher transaction risk (underwriting or selecting risk), especially while banks follow cost-cutting strategies to minimize transaction costs. These cost-cutting strategies may lead to a poor monitoring process for loans. This theory is supported by Berger and DeYoung (1997).

Noman el al. (2015), studied the effect of credit risk in Bangladesh bank profitability. Their sample contained eighteen private commercial banks. They used four ratios as proxies for credit risk (nonperforming loans, loan and loss reserve to gross loan, loan and loss reserve to nonperforming loan, and capital adequacy ratio) and three ratios for banks profitability (return on average assets, return on average equity, and net interest margin ratio). The results showed that for nonperforming loans, loan and loss reserve to gross loan ratios have a negative impact on the profitability of the bank while the capital adequacy ratio has positive impact on bank profitability. On the other hand, the loan and loss reserve to nonperforming loan ratio showed direct effects on the return on average assets and on the return on average equity, and inverse effects on the net interest margin ratio. This proves that the selection of the type of proxies for the ratios is very crucial for the interpretation of the data.

Another issue raised that may affect the credit risk ratio in a bank, is the bank's specialization, in general IBs and CBs are both exposed to credit risk, as both of them are loan providers. Regardless of whether the loan is provided in a monetary base (CBs) or service base (IBs), the probability of the borrower to default exists. Some papers that compared CBs to IBs argued that the specialization of banks is one of the determinants of credit risk in banks. How et al. (2005) compared the IBs and CBs on the basis of risk using a sample of Malaysian banks over the period 1988-

1996. Their analysis proved that IBs are less exposed to credit risk than CBs. This can be explained by the concept of profit-loss sharing that IBs follow.

Interestingly, Kithinji (2010) studied the impact of credit risk on commercial Kenyan bank profitability from 2004 to 2008, and revealed that credit risk is not a big determinant of bank profitability in Kenyan banks, i.e. managers of Kenyan commercial banks should not spend effort on credit risk as much as other profitability determinants.

This ambiguity of the relationship between credit risk and bank profitability can be clarified by comparing interest income to the risk of the borrower. Profitability curves will be bell- shaped. That is, as risk increases, interest income will increase making upward changes in the profitability curve, until it reaches a certain point when the risk is too high and the interest rate is too expensive for the borrower to handle, making the probability of default of the loan very high. This will shift the profitability curve downward, incurring more losses to the bank**.**

Another determinant of bank profitability is the **capital ratio**. This ratio reflects two main issues about the bank: Firstly, it gives an idea about the funding strategy adopted by the bank, such as, the equity-assets ratio, or the amount of leverage the bank engaged in. Secondly, the capital ratio reflects the volume of insolvency risk the bank carries. In other words, the ability of the bank's capital to absorb losses and sudden unpleasant shocks before it gets in leverage and insolvency problems.

Obtaining optimal level of capital is different between countries and also between banks in the same country. Banks in developing countries need to hold more funds as capital, because they face higher risks due to lower regulatory standards and higher economic instability. Ayodele (1988) stated that, comparatively, a significant number of banks failed in the period of 1952 to 1975 due to insufficient capital. To eliminate the risk banks should meet the minimum capital requirement, which is a percentage of the risk-weighted assets that policy makers and regulatory agencies have stipulated. In most countries it is eight percent, but there is still an argument about the optimal percentage that will ensure solvency for banks. Abul basher et al (2017) mentioned that, by reviewing the 2007-2008 global financial crisis, many banks suffered and some even bankrupted and failed to maintain the minimum capital requirement.

Generally speaking, the impact of capitalization is known to be positive on bank profitability, as it reduces the risk of bank failure and makes the bank more attractive to investors and depositors. This is supported by the empirical results of Berger (1995) and Kosmidou (2008) in their study of the capital-profitability relationship in the bank by occupying it with availability of symmetric information between banks and public. Lower agency costs as well as more symmetric information in a well-capitalized bank, provide a positive signal about the bank's strength and risk. This will increase the expected earnings of the bank.

Conversely, some studies argued that the increase in capital ratio of a bank affects bank profitability in a negative manner. This can be either by reducing the size of the bank, which will reduce profitability, or having the bank invest in risky assets to get

higher returns in order to compensate for the capital that has been held. Gennotte and Pyle (1991) investigated capital control and banks and contend that an increase in capitalization will raise risk as well as reduce size. Another rationalization for this opinion is that the increase in capitalization reduces a bank's growth, such as, the more money that is held without investment, the less the growth and development of the bank. Moreover, a diminution in the leverage effect will occur as a result of greater solvency, and such a situation may lead to higher funding costs (Akbas, 2012).

Ezike and Oke (2013) investigated the effect of capital adequacy standards on bank performance in Nigeria. Their analysis supported the concept of a positive relationship between capitalization and profitability. Also they argued that over-capitalization may negatively affect the efficiency and profitability of banks. Thus, effective management of a bank's capitalization strategy affects the cost and profitability of the bank. The need to obtain optimal capital is crucial for the efficiency and productivity of the banking sector.

The **size** of a bank plays a vital role in its profitability. The bigger the bank, the more market strength it will have. Size enhances the reputation and goodwill of the bank. As the bank expands, its chances of differentiating products and acquiring economies of scale increases. As such, the size-profitability relationship is expected to be positive. This is supported by Pervan and Guadagino (2010). The more a bank increases its economies of scale, the less the cost per unit and the higher the profitability.

Bank size also gives an idea about the diversification of the risk in the bank. Haan and Poghosyan (2011) studied the relationship between bank-size market concentration, and bank earnings in non-investment banks located in United States over the periods 2004 to 2009. They found that the relationship between bank size and earning volatility is inverse, i.e. the increase in a bank's size, decreases its earnings volatility, which stabilizes bank profitability. AKhavein et al. (1997) investigated the effect of mega-mergers on efficiency and price, linking them with bank profitability. They found a positive relationship between bank size and profitability on the premise that increasing asset portfolios in banks could be restricted due to market scope and governing issues. Short (1979) linked the size of a bank to the capital adequacy ratio. Large banks are more likely to have lower costs of capital and higher profitability.

However, some studies support the negative size-profitability relationship of banks, (Stiroh and Rumble, 2006; Naceur and Goaied, 2008) given that an increase in size could lead to a rise in administrative costs as well as other noninterest costs. Also, the relationship might be negative as a result of increases in risk diversification, which lead to lesser credit risk and lower returns in some theories. Molyneux and Wilson, (2004) investigated European bank profitability in the 1990s. They found that the size-profitability relationship is relatively weak. Notwithstanding, the foregoing discussion indicates that the size of a bank is linked to many determinants of bank profitability, as size can affect cost, risk and earnings of the bank.

The last variable in bank-specific determinants is the **cost-efficiency ratio.** This ratio gives an idea about the bank's management ability to operate efficiently in

monitoring and governing bank's outlays and risks. Generally, the effect of the cost-management ratio (overhead/total assets) on bank profitability is expected to be negative. Profitability of the bank increases as the overhead ratio decreases. Guru (2002) in studying seventeen Malaysian commercial banks, showed that efficient cost management is highly significant for the increase of bank profitability. In this regard, some papers showed a positive relationship between the cost-management ratio and bank profitability. Molyneux and Thornton (1992) argued that the increase in cost stimulates the productivity of a bank. For example, increasing payroll costs may bolster labor productivity, and eventually raise the profitability of the bank.

Pasiouras and Kosmidou (2006) studied the profitability of domestic and foreign banks located in fifteen EU countries over the period 1995-2001. Their analysis indicated that expense management plays a significant role among the factors affecting bank profitability. A rise in the cost-management ratio could drastically erode the profitability of a bank.

Aminu (2013) investigated the profitability of Nigerian commercial banks over the period 2005-2011. Nigerian banks were found to be highly productive during the sample period buttressed by a positive and highly significant cost management-profitability ratio relationship.

2.3 Macroeconomics Variables

The profitability of a bank is not just affected by the internal factors of the bank but also by external economic factors, such as, GDP, inflation rate, and etc. That may affect the bank's risk, profitability, and performance. Specifically, in an active economy, the demand for bank products may rises with availability of more

investment opportunities, which in turn stimulates consumption in the economy. This encourages banks to lend and raise product fees, leading to an upsurge in bank profitability. Likewise, during recessions, demand for bank products declines followed by an increase in default risk.

GDP affects bank profitability through changing the loans and the deposits of banks between recessions and booms in the economy. Hassan and Bashir (2003) support the existence of a positive relationship between GDP and profitability.

Sufian and Chong, (2008) investigated the determinants of bank profitability in the Philippines, over the period 1990-2005. They asserted a positive and significant association between the performance of the banking sector and economic growth. Conversely, Tan & Floros (2012) investigated the effect of 101 Chinese banks between 2003 and 2009 and found a negative relationship between GDP and bank profitability. This could be a result of dramatic increases in market competition among financial institutions. While Naceur (2003) studied the determinants of profitability in Tunisian banks during the period 1980 to 2000. The results showed a statistically insignificant relationship between GDP growth and bank profitability.

The second external variable we are studying is inflation rate. Inflation affects the economy of a country through varying the value of the country's currency, this could also affects the financial industry through fluctuating liquidity ratios, interest rates, and operating costs in the market. Perry (1992) argued that the effect of inflation on bank profitability depends on the accuracy of anticipated inflation. When a bank fully anticipates the inflation rate, it will make decisions according to expected

inflation and minimize probable risk. With higher inflation expectations, nominal interest rates are likely to increase and bolster banks' interest income. In such cases, the effect of inflation on bank profitability is positive. Contrarily, if there is an inaccuracy in forecasting inflation rates, banks will fail to adjust interest rates. This may cause bank costs to rise to higher levels and deplete revenues, which may eventually lead to losses in profitability.

Staikouras and Wood (2003), argued that inflation affects bank performance directly through labor wages, and indirectly through asset values and interest rates. Bourke's (1989) analysis affirms a positive relationship between profitability and inflation. By contrast, Sufian and Kamarudin (2012), studied determinants of profitability over the period of 2000-2010, on thirty-one commercial banks in Bangladesh. Their analysis showed a negative relationship between inflation and profitability. This suggests that banks in Bangladesh during the period studied failed to accurately forecast the inflation rate. Hoggarth et al. (1998) stated that increases and fluctuations of inflation rates could lead to complications in writing and negotiating loans contracts.

Islamic Versus the Conventional Banking Systems

The Islamic finance system is defined as a financial system that follows the concept of the Islamic legal code (Shariah law), which relies on profit/loss sharing (risk sharing) as well as the free-interest-rate concept. In Shariah law interest payments (Riba) are considered to be usury, which is forbidden in Islam. Islamic banks also participate in microfinance to help diversify portfolios for small investors. IBs use many types of contracts to provide funds and share risk such as Musharka (business partnership and joint stock ownership), Murabahah (installment of cost-plus profit which is not to be confused with interest payments), Mudharabah (profit- and loss-

sharing contracts) and Takkaful (a cooperative system of reimbursement in case of loss, an alternative to conventional insurance) contracts.

Hassan and Deridi (2010) compared the impact of the recent global financial crisis between IBs and CBs. Regarding profitability, they found that during and after the crisis, IBs performed better than CBs, except in Qatar, UAE and Malaysia. By comparing credit and asset growth, their study showed IBs had stronger growth than CBs. Darrat and Suliman (1990) argued that IBs seem to be meritorious on efficiency and stability basis. Bashir et al (1993) demonstrated that financial position of the firm (equity capital) and profit-sharing ratio are strongly related to the bank's reputation and business activities. Nevertheless, Chapra (2009) stated that the Islamic principles practiced by IBs do not make them insusceptible to financial crises. The amount of leverage and the quality of their portfolios are the main factors that determine their vulnerability to financial crisis. Al-Tamimi (2010), argued that concentration and liquidity ratio are the supreme significant variables for conventional banks profitability, while cost ratio and number of bank's branches are the most significant for the Islamic once.

The main variable in our study is **oil price,** as OPEC countries capital relay significantly on oil exports change in oil prices is expected to effect the economy in general. Variation in oil price is expected to affect banks sector directly through the value and type of assets or indirectly through the macroeconomic variables. Poghosyan and Hessse (2016), examined oil price direct and indirect effect on banks profitability in MENA countries, their results revealed that investment banks are

more sensitive to oil price changes than Islamic and commercial banks, by a positive relationship with bank's profitability.

Chapter 3

METHODOLOGY

3.1 Data and Methodology

For constructing this study, we used secondary Panel data for the period between, 2011 until 2016 to investigate banks' profitability among OPEC countries. The selection of banks was depending on the availability of the data in the bankscope database website. For external variables, we got GDP growth and inflation rate data from: World Bank, trading economics and ereport.RU websites. The annual average crude oil price data used is from, inflation.com website. We considered 134 conventional banks and 36 Islamic banks located in the 13 OPEC countries.

3.2 Study Variables

3.2.1 Dependent Variables

Return on assets (ROA), it's a percentage that indicate by how much the bank succeeds to earn from each dollar of bank's assets. It reflect the capability of bank's management to efficiently and effectively use bank's assets. We add this variable as a proxy for OPEC's banks profitability.

Return on equity (ROE), it's a profitability ratio indicator that express the amount of funds raised from using shareholder's investment. We selected ROE as a profit indicator for the bank.

Net interest margin (NIM), it reflect the level of efficiency and productivity of the interest activities in the bank, a negative NIM shows that the funds that have been collected by the bank are more expensive than the one its providing to customers. As Islamic banks are interest free, bankscope website report the net interest income for IBs includes all the funds generated from the Islamic financial activities of the banks such as; MURABHAT, IJARA, WAKALA …etc. minus the profit share paid to depositors combined with any activates' costs and losses. This variable also added as profitability pointer for the banks.

Net noninterest margin (NNIM), it displays how efficient the bank management is in spending on noninterest activities comparing to the earnings expanded from noninterest deeds. NNIM is usually less than zero as the net noninterest expenses usually more than the net noninterest income. In this study, we took this variable as a representative for banks' profitability.

3.2.2 Independent Variables

Capital ratio (CAPR), it reflects the amount of internal funds that the bank can rely on in case of raise in obligations in comparison with external resources of funds. It gives an idea about bank's ability to meet its obligations. We added this variable to see how the increase in banks reserves can affect bank's profitability.

Credit risk (CR) and (CR2), it reflects the amount and the quality of loans the bank engaged in. A high ratio means the bank is suspected to have higher default risk and unpaid loans. Depending on the way the ratio calculated the relationship bank's profitability is specified, for more investigation we calculated the ratio through two

formulas. For the formulas check table (1). We intruded these two variables to see how the increase in the risk of defaults loans may affect banks' profit.

Liquidity ratio (LIQR), it imitates the volume of cash and assets that can easily rehabilitated to cash held by the bank. High ratio indicates that the bank is capable to meet short-term obligations. The addition of this variable shows us the way that bank's profitability will change due to variation in liquid asset of the bank

Cost efficiency ratio (CI), it gives an image of how efficient the bank in spending and effective in earning from those costs. We introduce this variable to investigate by how much cost management and control in the bank may affects bank's profit.

Size (LNS), it's the volume of assets held by the bank, reflecting the philosophy of economics of scale and diseconomies of scale in the bank. This will show us the level of variation in bank's profitability due to change in the cost of per unit in the bank.

Crude oil price (LNO), it displays the worthiness of crude oil per barrel word wide. As OPEC countries economy relies profoundly on the exportation of oil we add this variable to our models to see, how change in oil price could affects banks' profitability.

GDP growth (GDPG), the gross domestic product of the country, it indicates the performance of the economy in raising funds domestically. In this variable we are

interested to highlight the effect of overall economy performance on profitability of banks.

Inflation rate (**INF),** it reflects the variation in the overall level of the value of the commodities and services provided in the economy. We added this variable to investigate the relationship between change in general level of prices of a specific country and the profitability of the banks located on that country.

In the following table we define our selected variables, formulas for calculating them and furthermore the hypothesized relationship between independent variables and banks' profitability.

Table 1: Variables definition

Variables	Symbolization	Formulas	Expected effect
Dependent variables			
Return on assets	ROA	Net income/ total assets	
Return on equity	ROE	Net income/ total equity	
Net interest margin	NIM	Net interest income/ total assets	
Net noninterest margin	NNIM	Net noninterest income/ total assets	
Independent variables			
Capital risk	CAPR	Equity/ total assets	+
Credit risk	CR	Loans/ total assets	-/+
	CR2	Nonperforming loans / total loans	-
Liquidity risk	LIQR	Liquid assets/ total assets	-/+
cost efficiency	CI	Overhead/ total assets	-
Size	LNS	Logarithm of size	+
External variables			
Oil price	LNO	Logarithm of oil price	+
Macroeconomic variables			
GDP growth	GDPG	Real GDP growth	-/+
Inflation rate	INF	Inflation rate	-/+

3.3 Analysis Application

In this study, we applied different tests to insure the quality and accuracy of our data. Firstly, we did unit root test to inspect the stationarity of our selected data**.** Moreover, we did the OLS Hausman test to specify the most suitable model for our estimation process, either random effect model or fixed effect model. Additionally, to scan for multicollinearity problem, we applied variance inflation factor test and also Correlation matrix test**.** Also a descriptive analysis took place to compare variables' means among IBs and CBs. Finally we estimated our models using linear regression model, for the investigation of the relationship between the definite dependent and explanatory variables. Moreover, to reflect the true values of R^2 we used AREG command rather than XTREG, FE command.

3.4 Models Estimation

In this study, we define bank profitability as:

Bank profitability = *f* (capital risk, credit risk, liquidity risk, cost management, size, oil price, GDP, inflation) from the above functional model, our regression estimation models are:

$$\gamma_{it} = \alpha + \beta_1 x_{it} + \beta_2 D_i + \beta_3 x_{et} + \beta_4 \text{oil price}_t + \varepsilon_{it}$$

Where **i** represent observed bank, **t** indicates the studied period, $\boldsymbol{\gamma_{it}}$ shows the profitability of **i** at the specific time **t**. **α** refers to the constant intercept of the equation, $\boldsymbol{\beta_1 x_{it}}$ is the coefficient of the bank-specific variable **x** of bank **i** at time **t**. $\boldsymbol{\beta_2 D_i}$ = is the coefficient of the dummy variable $\boldsymbol{D}$ in bank **i.** $\boldsymbol{\beta_2 x_{et}}$ is the coefficient

of external variable **x** in country **e** at time **t**, while $\boldsymbol{\beta_3 oil\ price_t}$, is the coefficient of oil price at year **t**. Finally, the $\boldsymbol{\varepsilon_{it}}$ is the standard error of bank **i** at time **t**.

By entering the study variables into our models:

$$ROA_{it} = \alpha + \beta_1 capr_{it} + \beta_2 cr_{it} + \beta_3 liqr_{it} + \beta_4 ci_{it} + \beta_5 lns_{it} + \beta_6 lno_t + \beta_7 gdpg_t + \beta_8 inf_t + \beta_9 bs_i + \varepsilon_{it}$$

EQU. (1)

$$ROE_{it} = \alpha + \beta_1 capr_{it} + \beta_2 cr_{it} + \beta_3 liqr_{it} + \beta_4 ci_{it} + \beta_5 lns_{it} + \beta_6 lno_t + \beta_7 gdpg_t + \beta_8 inf_t + \beta_9 bs_i + \varepsilon_{it}$$

EQU. (2)

$$NIM_{it} = \alpha + \beta_1 capr_{it} + \beta_2 cr_{it} + \beta_3 liqr_{it} + \beta_4 ci_{it} + \beta_5 lns_{it} + \beta_6 lno_t + \beta_7 gdpg_t + \beta_8 inf_t + \beta_9 bs_i + \varepsilon_{it}$$

EQU. (3)

$$NNIM_{it} = \alpha + \beta_1 capr_{it} + \beta_2 cr_{it} + \beta_3 liqr_{it} + \beta_4 ci_{it} + \beta_5 lns_{it} + \beta_6 lno_t + \beta_7 gdpg_t + \beta_8 inf_t + \beta_9 bs_i + \varepsilon_{it}$$

EQU. (4)

The past four equations represent our main models in this study, where we hypothesized that bank's profitability affected by, bank-specific variables (capital ratio, credit risk, liquidity ratio, cost efficiency and size of the bank), plus macroeconomic variables (GDP growth, and inflation rate), plus oil price. We used our selected proxies for profitability of banks, ROA, ROE, NIM, and NNIM for equation (1), (2), (3) and (4) respectively. Moreover the equations also include dummy variable for bank specialization and lastly the standard error.

Chapter 4

ANALYSIS

4.1 Empirical Analysis and Results

In this section, we display the executed analysis and the empirical results of our data. Followed by discussion of the estimated results and a comparison between OPEC Islamic and conventional banks.

4.2 Econometric Analysis

For running the analysis, we used data for the period 2011-2016 for 170 banks located in the OPEC countries. Classifying the data as to be unbalanced panel data. As a first step, we transformed the two variables bank's size "LNS" and oil price "LNO" into logarithm form to linearize the data and avoid Skewness problem in data distribution. Then to examine the stationarity of the data we made unit root test, finding that our data is stationary in level form.

Secondly, we used the ordinary least squares "OLS" regression method to apply Hausman test for choosing the appropriate estimation model between fixed and random effect. With chi2 probability 0.0001, we rejected null hypothesis random effect model is appropriate and we adopted fixed effect model to estimate our regression models. The concept of FE model is that the intercept varies between banks but it's static through the years in each bank. For example, if we take the effect of two banks let's say QNB and QIIB, the intercept of QNB will be different the

intercept of QIIB, while the QNB's intercept in 2011 will not vary than the one in 2014. Gujarati (2003), discussed that, a significant advantage of FE model is that, it diminishes the possibility of getting bias estimation through controlling more the features in each bank that it's invariant through time. A disadvantage of FE model is the exclusion of the effect of the variables that have a very slight effect inside the observed entities. This pitfall can be solved by adding dummy variables representing those variables to the model. That is why it also called least square dummy variables model

4.3 Empirical Results

4.3.1 Descriptive Analysis

The following table shows the number of observations for each variable as well as the mean, standard deviation, minimum number and the maximum number in our sample.

Table 2: Summery of descriptive analysis

Variable	Obs.	Mean	Std. Dev.	Min	Max
roa	804	.020	.031	-.23	.242
roe	804	.131	.196	-1.505	1.909
nim	794	.031	.074	-.25	.724
nnim	802	.007	.083	-.62	1.615
gdpg	804	.032	.046	-.24	.14
inf	804	.131	.582	-.01	8
capr	804	.195	.172	.024	.982
cr	804	.489	.201	.002	.943
cr2	561	.092	.330	0	5.227
liqr	804	.254	.163	0	.912
ci	804	.035	.035	.001	.487
lns	804	9.781	.723	7.54	12.064
lno	804	4.217	.381	3.54	4.51

4.3.2 Multicollinearity Tests

To insure there is no multicollinearity between the tested variables we applied variance inflation factor test (VIF) through exploring appendix (A) we can say that our data is multicollinearity free, as the VIF values for the variables in our main estimated models rely between 1.08 until 2.21. Whereas the consideration of multicollinearity availability is when VIF value is > 10.

For more exactness, we applied the Correlation matrix test. Through viewing table (3) we can say there is no high correlation between the observed variables in our study, is insure to for us that there's no multicollinearity problem in our data.

Table 3: Correlation matrix

	roa	roe	nim	nnim	gdpg	inf	capr	cr	Cr2	liqr	ci	lns	lno	Bs
roa	1.00													
roe	0.76	1.00												
nim	0.03	0.13	1.00											
nnim	0.72	0.44	-0.27	1.00										
gdpg	-0.05	-0.19	-0.04	0.05	1.00									
inf	0.01	0.17	0.09	-0.11	-0.64	1.00								
capr	0.20	-0.13	-0.16	0.36	0.03	-0.12	1.00							
cr	-0.22	-0.06	-0.05	-0.25	0.06	-0.06	-0.41	1.00						
cr2	-0.01	-0.12	-0.09	0.15	-0.04	-0.04	0.40	-0.35	1.00					
liqr	0.07	0.09	-0.11	0.18	-0.09	0.13	0.21	-0.47	0.15	1.00				
ci	-0.04	-0.09	0.19	-0.18	-0.14	0.14	0.11	-0.40	0.16	0.11	1.00			
lns	0.02	-0.18	-0.08	-0.01	-0.07	0.09	-0.39	0.37	-0.24	-0.24	-0.49	1.00		
lno	0.01	0.02	0.09	-0.04	0.44	-0.17	-0.04	-0.09	-0.02	0.08	0.07	-0.08	1.00	
bs	0.16	0.06	-0.26	0.39	0.09	-0.09	0.01	0.13	-0.04	0.16	-0.04	0.05	-0.03	1.00

4.3.3 Estimation Results

The estimation process took place in three stages, first we did analysis only for IBs 36 banks, then for CBs 134 banks in our sample, and finally we combined the two types of banks, which are 170 banks with introducing dummy variable to the models for differentiating between IBs and CBs. The three steps were made to insure robustness of our results.

4.3.3.1 Results for Islamic Banks

The next table presents coefficients and significance of our analyzed models for 36 Islamic banks located in OPEC countries. The analysis are conducted from around 188 observations for the most of the variables.

Table 4: Islamic banks estimation results

Islamic banks																
	ROA				ROE				NIM				NNIM			
Model NO.	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	**(13)**	**(14)**	**(15)**	**(16)**
CAPR	-.024 (0.691)	-.025 (0.660)	-.097 (0.301)	-.099 (0.292)	.050 (0.889)	.037 (0.911)	-.078 (0.809)	-.120 (0.711)	-.005 (0.826)	-.006 (0.790)	.011 (0.458)	.009 (0.455)	-.013 (0.859)	-.013 (0.858)	-.077 (0.383)	-.079 (0.369)
CR	.030*** (0.076)	.023 (0.152)			.220*** (0.130)	.160 (0.223)			.080 (0.154)	.068 (0.163)			-.041 (0.378)	-.043 (0.326)		
CR2			-.143*** (0.056)	-.142** (0.031)			-.950** (0.040)	-.918** (0.023)			-.020*** (0.090)	-.017*** (0.059)			-.130 (0.149)	-.130*** (0.082)
LIQR	.048 (0.195)	.046 (0.190)	.022 (0.697)	.022 (0.705)	.358 (0.144)	.344 (0.145)	-.007 (0.972)	-.005 (0.979)	-.001 (0.983)	-.006 (0.927)	.002 (0.832)	.003 (0.762)	.061 (0.365)	.060 (0.342)	.008 (0.899)	.006 (0.913)
CI	-.009 (0.755)	-.003 (0.902)	-.477*** (0.072)	-.468*** (0.113)	1.088 (0.227)	1.142 (0.221)	-2.255 (0.215)	-2.266 (0.291)	.215** (0.041)	.224* (0.014)	.056 (0.469)	.049 (0.480)	-.246* (0.004)	-.244* (0.004)	-.677** (0.029)	-.659*** (0.055)
LNS	.004 (0.594)	.003 (0.727)	-.059*** (0.125)	-.070*** (0.105)	.176 (0.248)	.171 (0.303)	-.128 (0.446)	-.231 (0.273)	-.057 (0.013)	-.055** (0.027)	.005 (0.532)	.005 (0.536)	.057* (0.008)	.058** (0.024)	-.058*** (0.087)	-.072*** (0.070)
LNO	.005 (0.303)	.004 (0.430)	-.004 (0.611)	-.004 (0.595)	.089*** (0.073)	.082 (0.104)	.015 (0.471)	.016 (0.492)	.0003 (955)	-.002 (0.739)	.003*** (0.096)	.003*** (0.078)	.005 (0.521)	.005 (0.434)	-.006 (0.374)	-.007 (0.334)
GDPG		-.035 (0.564)		-.058 (0.304)		-.323 (0.434)		-.624*** (0.086)		-.030 (0.531)		-.011 (0.485)		.003 (0.976)		-.071 (0.258)

INF		.014 (0.557)		-.168 (0.264)		.124 (0.519)		-.318 (0.778)		.034 (0.470)		.092** (0.044)		.009 (0.909)		-.298*** (0.082)
R^2	0.9315	0.9325	0.9411	0.9426	0.7790	0.7815	0.9568	0.9589	0.8419	0.8442	0.9588	0.9610	0.8589	0.8589	0.9302	0.9340
F value **Prob.**	1.58 (0.1562)	1.46 (0.1782)	3.51 (0.0038)	2.91 (0.0068)	2.84 (0.0121)	2.33 (0.0220)	6.10 (0.0000)	5.20 (0.0000)	6.10 (0.0000)	4.84 (0.0000)	2.49 (0.0291)	2.47 (0.0190)	4.06 (0.0008)	3.01 (0.0037)	3.18 (0.0075)	3.04 (0.0049)

Hint: ***, ** and *, represent significance of **10%**, **5%** and **1%** respectively. Robust standard errors for heteroscedasticity and autocorrelation are reported.

By looking at model (1) in table (4) we see that, all the variables in the model are statistically insignificant except CR is significant at 10% with a positive effect on ROA as loans increase profitability of the bank raise. The intervention of macroeconomic variables in the model increase the statistical insignificancy as it appears in model (2) where CR effect on ROA declined by .007 and became insignificant. Interestingly when we changed the way we calculate credit risk from CR (loans/total assets) to CR2 (nonperforming loans/ total loans) in model (3), CI, LNS along with CR2 become significant at 10%, showing that as the size, cost management and credit risk raise, profitability of the Islamic banks diminishes. However model (4) doesn't look much different than model (3), the introduction of INF and GDPG into the model had a slight decimal decrease of significance as well as the volume of the effect of CI and LNS on ROA, while making raising the statistical significance of CR2 at less than 5%.

Unlike ROA, model (5) explore to us that ROE, is statistically positively affected by LNO and CR with significance of 10%, however other variables in the model are insignificant. When we added macroeconomic variables in the model (6) CR and LNO become no more significant. exchanging CR in model (7) with CR2 reduced the number of significant variables that affecting ROE in comparison to model (5), model (7) shows that the ratio of (nonperforming loans/total loans) plays visible role on Islamic banks' profitability when ROE used as a proxy, where a observable increase in CR2 can lead to noticeable drop in banks profitability. When we added GDPG and INF to the estimation process model (8) shows GDPG is negatively effecting ROE with significance 10%, the significance of GDPG while LNO is insignificant, could be a sign of indirect effect of oil price on banks' profitability.

Moreover CR2 is statistically significant with probability value less than 5%, even though this addition reduced the effect of CR2 by .032, but still we can consider it as dominated variable that effect ROE in a negative manner.

Considering NIM as a profitability indicator, we can see in model (9) among all variables CI is the only significant variable holding positive effect on NIM. Interestingly when we included macroeconomic variables in model (10) CI and LNS became positively significant at 1% and 5% respectively. Thu, LNS has negative relationship with banks' profitability. Model (11) displays a negative relationship between CR2 and NIM with significance less than 10%, furthermore it shows that LNO has positive effect on NIM and significant at 10%. Placing macroeconomic variables in model (12) show a positive relationship between INF and LNO with a significance level 5% and 10% respectively, while CR2 is still negatively related to NIM with raise in effect by .003.

Using NNIM as a proxy for IBs profitability leave us with the last four models in this stage, model (13) expresses to us, CI and LNS are the only statistically significant variables with level less than 1%, where increases in CI has negative impact on NNIM, however LNS has a 6% positive one. As we introduced the macroeconomic variables in model (14) we can say the model is still the same with the same significance and effect of the variables on NNIM as in model (13) except LNS its significance reduced to 5%. Model (15) tell us as CI increases by one unit banks profitability decreased by .677, while a one percent change in the size of Islamic bank can cut the profitability of the bank by .058. Finally model (16) shows that INF,

CR2, CI and LNS are significant at 10% with negative relationship with IBs profitability.

4.3.3.2 Results for conventional banks

The subsequent table grants significance as well as coefficients of analyzed models for 134 conventional banks in OPEC countries. With data conducted from around 610 observations.

Table 5: Conventional banks estimation results

CBs																
	ROA				ROE				NIM				NNIM			
Model No.	**(17)**	**(18)**	**(19)**	**(20)**	**(21)**	**(22)**	**(23)**	**(24)**	**(25)**	**(26)**	**(27)**	**(28)**	**(29)**	**(30)**	**(31)**	**(32)**
CAPR	-.045 (0.453)	-.041 (0.490)	.096** (0.023)	.095** (0.025)	-.023 (0.904)	.019 (0.923)	.680*** (0.085)	.679*** (0.086)	-.016 (0.227)	-.014 (0.281)	-.004 (0.910)	-.003 (0.915)	.11323 (0.331)	.128 (0.245)	.094* (0.012)	.093* (0.011)
CR	.046* (0.003)	.046* (0.003)			.475** (0.016)	.477* (0.013)			.039* (0.003)	.039* (0.003)			.022 (0.671)	.023 (0.664)		
CR2			-.005** (0.052)	-.005** (0.046)			.009 (0.709)	.009 (0.713)			-.004* (0.005)	-.004* (0.004)			-.009* (0.001)	-.010* (0.001)
LIQR	.023 (0.262)	.023 (0.257)	.004 (0.728)	.006 (0.616)	.298** (0.020)	.291** (0.020)	.036 (0.701)	.038 (0.702)	.010 (0.278)	.009 (0.307)	-.001 (0.885)	-.002 (0.836)	.017 (0.520)	.016 (0.561)	.022*** (0.076)	.024*** (0.066)
CI	-.570* (0.000)	-.585* (0.000)	-.497* (0.003)	-.497* (0.004)	-3.402* (0.004)	-3.574* (0.003)	-5.114* (0.010)	-5.099* (0.011)	.077 (0.294)	.072 (0.324)	.136 (0.161)	.130 (0.179)	-.510* (0.004)	-.576** (0.062)	-.490* (0.000)	-.484* (0.000)
LNS	-.003 (0.326)	-.001 (0.783)	-.003 (0.300)	-.002 (0.458)	-.001 (0.974)	.017 (0.548)	.017 (0.625)	.016 (0.679)	-.002 (0.563)	-.002 (0.595)	-.001 (0.720)	-.001 (0.869)	.001 (0.933)	-.008 (0.403)	.008*** (0.058)	.008*** (0.091)
LNO	.009* (0.000)	.008* (0.002)	.004** (0.014)	.004** (0.046)	.030** (0.027)	.021 (0.159)	.025*** (0.090)	.026*** (0.120)	-.001 (0.426)	-.001 (0.347)	-.001 (0.234)	-.002 (0.072)	-.007 (0.609)	-.010 (0.528)	.003*** (0.082)	.004*** (0.064)
GDPG		.028 (0.262)		.001 (0.963)		.338*** (0.092)		-.055 (0.792)		.012 (0.280)		.021*** (0.064)		.114 (0.183)		-.024 (0.284)

INF		-.001 (0.625)		-.001 (0.448)		.005 (0.416)		-.002 (0.820)		.001 (0.118)		.001 (0.377)		.001 (0.588)		-.001 (0.354)
R^2	0.5916	0.5932	0.6663	0.6672	0.6758	0.6786	0.7050	0.7051	0.9394	0.9396	0.9363	0.9366	0.2524	0.2535	0.8667	0.8673
F value **Prob.**	17.32 (0.0000)	13.21 (0.0000)	12.71 (0.0000)	9.61 (0.0000)	14.49 (0.0000)	11.43 (0.0000)	9.50 (0.0000)	7.09 (0.0000)	9.23 (0.0000)	7.14 (0.0000)	1.91 (0.0792)	1.63 (0.1145)	0.44 (0.8535)	0.41 (0.9127)	14.87 (.0000)	11.33 (.0000)

Hint: ***, ** and *, represent significance of **10%**, **5%** and **1%** respectively. Robust standard errors for heteroscedasticity and autocorrelation are reported.

By Adjusting ROA as profitability indicator, model (17) in table (5) display to us that CR, CI and LNO are highly significant at less than 1%, while CR and LNO have a positive relationship with ROA, CI has a negative one. Enforcing INF and GDPG in model (18) didn't really change the significance of the model as the only significant variables in the model are the same ones in model (17), interestingly considering INF and GDPG made the effect of CI rise by .015 even though they are not significant in the model. Through changing the way we calculate credit risk in Model (19) from CR to CR2. CAPR, CR2 and LNO become significant at less than 5% while CI is significant at less the 1%, depending of the current estimation, CAPR and LNO have positive relationship IBs profitability, however CR2 and CI increase affects ROA in a negative manner. Applying macroeconomic variables in model (20) didn't make any visible difference than model (19).

Model (21) exhibit ROE as proxy for CBs profitability, showing that CR, LIQR, and LNO are significant at less than 5%, with positive effect on CBs profitability. Interestingly in this model as each unit change in CI effects ROE in a negative way by 3.402, with significance less than 1%. Through adding macroeconomic variables to model (22) GDPG, LIQR and CR are significant at 10%, 5% and 1% with a positive relationship with ROE. While CI is significant at 1% its effect on CBs profitability grew by 0.172 in comparison to model (21). The positive relationship of GDPG with ROE, might be an indication of indirect effect of oil price on banks' profitability. Exploring model (23) CAPR and LNO are significant at 10% level with a positive relationship with ROE. However a unit increase in CI lead to around 5 units decline in CBs profitability. Nevertheless the addition of GDPG and INF in model (24) didn't show clear difference than model (23).

Taking NIM as banks' profitability proxy in model (25) showed that all the observed variables are in significant with the profitability of OPEC banks except CR is affecting NIM in a positive way, with significant of 1%. Moreover model (26) showed that the enforcement of macroeconomic variables into our model didn't ensure any visible change in the effect and significance of the variables than model (25). In model (27) all the variables are insignificant except CR2, is significant at 1* with negative effect on NIM (28) the analysis showed a positive relationship between GDPG and NIM with significance less than 10%. A clue of indirect effect of oil price on banks' profitability might be deducted. However the rest of the variables have the same effect and significance as in model (27).

Displaying NNIM as banks' profitability shows in model (29) all observed variable are insignificant except CI which is 1% significant with a negative relationship with NNIM. The intervention of macroeconomic variables in model (30) decreased the significance of CI from 1% to 5%, yet it increased its effect on NNIM by .066. Surprisingly when we shifted CR by CR2 in model (31) the whole observable variables became significant, LIQR, LNS and LNO at 10% while CPAR, CR2 and CI at 1%. Also the model showed that CR2 and CI have negative relationship with NNIM, while CPAR, LIQR, LNS and LNO are positively affecting CBs' profitability. Including macroeconomic variables in model (32) didn't add any clear difference on the effect and significance of the variables than the ones in model (31).

4.3.3.3 Results for all banks

The following table displays the significance and coefficient of all 170 banks placed in OPEC countries. Directed from around 804 observations.

Table 6: Banks estimation results

All BANKS																
	ROA				ROE				NIM				NNIM			
Model No.	**(33)**	**(34)**	**(35)**	**(36)**	**(37)**	**(38)**	**(39)**	**(40)**	**(41)**	**(42)**	**(43)**	**(44)**	**(45)**	**(46)**	**(47)**	**(48)**
CAPR	-.038 (0.325)	-.038 (0.321)	.020 (0.637)	.020 (0.635)	-.014 (0.932)	-.020 (0.914)	.379*** (0.110)	.384*** (0.096)	-.006 (0.660)	-.007 (0.593)	.001 (0.932)	.001 (0.941)	.059 (0.369)	.064 (0.328)	.026 (0.574)	.026 (0.560)
CR	.032* (0.009)	.031* (0.010)			.356** (0.021)	.354 ** (0.023)			.044* (0.007)	.045* (0.006)			.010 (0.789)	.012 (0.752)		
CR2			-.009** (0.028)	-.009** (0.024)			-.025 (0.530)	-.024 (0.545)			-.004* (0.008)	-.004* (0.008)			-.013* (0.003)	-.013* (0.002)
LIQR	.023 (0.176)	.024 (0.164)	-.002 (0.908)	.001 (0.964)	.276** (0.014)	.277** (0.014)	-.035 (0.696)	-.027 (0.766)	.018 (0.321)	.016 (0.369)	.004 (0.625)	.003 (0.680)	.0130 (0.568)	.014 (0.535)	.008 (0.676)	.010 (0.586)
CI	-.119*** (0.124)	-.119*** (0.133)	-.462* (0.002)	-.455* (0.003)	.189 (0.812)	.198 (0.805)	-4.367* (0.008)	-4.301* (0.010)	.201** (0.047)	.206** (0.033)	.132 (0.104)	.129 (0.110)	-.302* (0.000)	-.314* (0.000)	-.492* (0.000)	-.482* (0.000)
LNS	.001 (0.789)	.002 (0.596)	-.004 (0.225)	-.004 (0.135)	.045*** (0.125)	.043 (0.168)	.023 (0.484)	.013 (0.714)	-.008 (0.256)	-.010 (0.192)	-.001 (0.696)	-.001 (0.781)	.008 (0.528)	.012 (0.263)	.007 (0.149)	.006 (0.207)
LNO	.008* (0.000)	.008* (0.001)	.002 (0.198)	.003 (0.193)	.047* (0.003)	.048* (0.003)	.020*** (0.118)	.028** (0.051)	.001 (0.539)	.002 (0.438)	-.0004 (0.624)	-.001 (0.433)	-.006 (0.590)	-.007 (0.545)	.001 (0.532)	.002 (0.296)
BS	-.008*** (0.105)	-.008*** (0.095)	-.023* (0.000)	-.023* (0.000)	-.088* (0.002)	-.088 * (0.002)	-.217* (0.000)	-.217* (0.000)	.004 (0.336)	.004 (0.193)	-.001 (0.547)	-.001 (0.561)	-.033* (0.000)	-.033* (0.000)	-.026* (0.000)	-.027* (0.000)
GDPG		-.0002 (0.994)		-.024 (0.470)		-.046 (0.775)		-.310 (0.164)		-.019 (0.446)		.010 (0.243)		.059 (0.296)		-.045 (0.221)
INF		-.001 (0.210)		-.002*** (0.132)		-.001 (0.839)		-.008 (0.275)		.002** (0.050)		.0004 (0.507)		-.001 (0.608)		-.002 (0.192)
R^2	0.7938	0.7941	0.8680	0.8687	0.7108	0.7109	0.8189	0.8199	0.9081	0.9088	0.9479	0.9480	0.3913	0.3918	0.9079	0.9088
F value Prob.	9.15 (0.0000)	7.18 (0.0000)	7.40 (0.0000)	6.01 (0.0000)	5.90 (0.0000)	4.59 (0.0000)	8.07 (0.0000)	6.53 (0.0000)	11.11 (0.0000)	9.17 (0.0000)	2.11 (0.0418)	1.71 (0.0847)	0.69 (0.6770)	0.59 (0.8034)	9.82 (0.0000)	8.12 (0.0000)

Hint: ***, ** and *, represent significance of **10%**, **5%** and **1%** respectively. Robust standard errors for heteroscedasticity and autocorrelation are reported.

Through exploring table (6), we estimated our models combining all banks together with adding dummy variable BS to differentiate between IBs and CBs, IB = 1 and CB = 0.

Model (33) show LNO and CR are significant at 1% and positively affecting ROA, also CI and BS are significant at 10% with negative relationship with banks' profitability. The addition of macroeconomic variables in model (34) didn't clearly change the significance and the way variables affect ROA than model (33). Model (35) proved that CI and BS are significant at less than 1% and CR2 at less than 5%, yet the three variables have negative relationship with ROA however other variables are insignificant. Applying INF and GDPG on model (36) showed that the significance and effect of variables remained the same, except with INF where it's significant at 10% with a negative effect on ROA.

Through adjusting ROE as proxy for banks' profitability model (37) estimates that CR and LIQR have positive relationship with ROE at a significance less than 5%, however LNS and LNO affecting ROE in the same manner but with significance 10% and 1% respectively, BS also has 1% significance nevertheless it affect ROE negatively. After adding GDPG and INF the results in model (38) remain almost the same as the ones in model (37) except that LNS is no more statistically significant. Model (39) display that through replacing CR by CR2 in the model, LNO and CAPR became significant at 10% CR2, LIQR and LNS became insignificant, also BS and CI are 1% significant thru they have negative relationship banks' profitability. With a coefficient of 4.367 CI plays the chief in this model. Adding macroeconomic variables in model (40) diminished the effect of CI by 0.066, however LNO

significance at 5% while its effect increased my .08. Other variables almost remain the same as in model (39).

Considering NIM as proxy for banks' profitability, model (41), display CR and CI are significant at less than 1% and 5%, respectively, also they has positive relationship with banks' profitability. The addition of macroeconomic variables in model (42) adding INF and GDPG didn't shift mush in our model except it boosted the effect of it on NIM by .002 compared to model (41). Furthermore it shows that INF is significant at 5% and has positive relationship with NIM. Model (43) express all the variables observed in the model are insignificant except CR2 is significant at less than 1%, rise in CR2 of OPEC banks lead to decrease in NIM by .004 unit. However when we added INF and GDPG in model (44) the effect and significance of CR2 on NIM still the same, while all other observed variables are statistically insignificant.

Taking NNIM as indicator for banks profitability, model (45) while other variable are insignificant, CI and BS are significant at less than 1% holding negative effect on banks' profitability. Even though INF and GDP are insignificant in model (46) thou adding them to our model raise the effect of CI on NNIM by .012 unit, however other variables visibly remained the same. Model (47) and (48) display that CR2, CI, and BS are less than 1% significant and carrying negative effect on NNIM of OPEC countries.

4.4 Results Discussion

In the first stage we analyzed 36 Islamic banks the estimation of our models determined that, CAPR, LIQR and GDPG are insignificant, this means capital

adequacy, liquidity ratio management and GDP growth are not a main determinate of banks profitability for OPEC IBs.

CR which refer to credit risk (loans divided by total assets) has a positive relationship with banks' profitability when we take ROA and ROE as proxies, however it's insignificant when NIM and NNIM represent banks' profitability. The positive relationship is logical, an increase in loans raise the earnings of the banks, but only if associated with fair assessment of the borrower, in other word poor assessment may lead to higher default risk and losses. These findings are consistent with Ghasemi (2014) who studied Iranian banks. Furthermore when we observed credit risk with CR2 (nonperforming loans/Total loans), the models estimated negative relationship with the profitability of OPEC IBs, as credit risk rise the profitability of Islamic banks decline, the logic behind that as the default loans increase the losses will be deducted from bank's reserves and profit, therefore profitability ratio falls. This outcome is supported by Kosmidou (2008) results.

Cost efficiency CI, appeared to be one of the main determinants of IBs' profitability in OPEC countries, holding negative relationship with banks' profitability consistent with the hypothesized relationship in table (1). This indicates that, IBs don't spend their monetary resources efficiently to raise their productivity and profit. Which is inconsistent with Pasiouras and Kosmidou (2006) findings.

LNS, the logarithmic form of size seems to have negative effect on IBs' profitability, as the size of Islamic bank increase this could lead to increase in administrative and

overhead cost which reduce the profitability of IBs, opposite of what we expected in table (1). Similar results showed by Naceur and Goaied (2008).

LNO which refer to the logarithmic form of oil price, exposed a positive relationship with Islamic banks' profitability even though it doesn't hold big effect but an increased in oil prices lead to increase in Islamic banks profitability.Inflation showed a small and unclear relationship with profitability as the estimations display that it has positive relationship with NIM and negative one with NNIM.

In the second stage of our estimation process we analyzed 143 conventional banks located in OPEC countries, our results showed that, CAPR has positive relationship with CBs' profitability which sustenance with the conjectured effect raised in table (1). The logic behind that well capitalized banks are more preferable to depositors and investors as capital works as insurance in case of losses, this gives bank good image and eventually increase bank's earnings. This consistent with Berger (1995).

LIQR showed positive effect on banks' profitability, as liquidity ratio of the bank rise profit will grow. Similar to capital ratio, liquidity ratio reflects the ability of a bank to cover losses and meet their obligations, high liquidity make it safer for the investor to invest in. Bourke (1989) also found positive liquidity-profitability relationship in their study.

LNO in CBs showed positive relationship with banks' profitability parallel to what we found with IBs estimated results, remarkably analysis revealed that LNO is more statistically significant and affects conventional banks in OPEC more than the Islamic ones, a justification for that could be the improved amount of crude oil

related assets and activities that are adopted by CBs and are against the IBs implemented principles. This is similar Poghosyan and Hessse (2016) findings.

Similar to IBs' estimation results CR is holding positive effect on CBs' profitability. Whereas CR2 has negative relationship with banks' profitability.

Same as IBs, CBs estimations showed negative relationship between CI and profitability of banks. According to our sample CI plays huge role on OPEC banks and it's visibly clear that it affect CBs more than IBs, this could be as result of the more activities that CBs are engaged in that may lead to increase in cost in a way that reducing the banks' profitability.

Unlike IBs. CBs, estimation analysis showed small yet as we anticipated in table (1) a positive relationship between profitability and LNS of CBs, a rationalization for that could be the adoption of the economies of scale strategy in the bank may lead to lower per unit cost which eventually affects profitability of banks in positive way. Pervan, and Guadagino (2010), disclosed similar findings.

The estimation analysis disclosed that INF, and GDPG for CBs in OPEC countries are insignificant with banks' profitability

In the final stage we did estimation analysis for the whole banks in our sample combining Islamic and conventional banks together with a dummy variable for banks' specialization.

The results displayed that CR, and LNO have positive relationship we profitability of OPEC countries. While CR2 and CI are having negative relationship with banks' profitability which support the expected relationship we raised in table (1), yet among the three sages CI appears to be the strongest determinants of profitability in OPEC banks. Furthermore INF showed a negative relationship with profitability, this may indicates that banks in our samples fail to anticipate the changes in the future inflation rates accurately and adjust their rates and activities according the anticipated rates to benefit from those fluctuations. This consistent with the results of, Sufian and Kamarudin (2012).

Adding BS as a dummy variable, giving IBs =1 and CBs = 0, the results exhibited that Islamic banks in OPEC countries are less profitable than the conventional ones. Justification for that could be the type of assets and activities that IBs are holding as well as the restrictions of free interest policy that thy are following which consider to be a double-edged sword, as it may diminish the risks that can a bank face but at the same time it restrict the funding sources for the bank, that may lead to some risks during recessions.

Lastly regarding CAPR, LIQR, and GDPG the results exposed that they are statistically insignificant in our models.

4.5 A Comparison between IBs and CBs in OPEC Countries

To compare the performance of Islamic to its counterparty conventional banks, we have to check their profitability ratios and furthermore the amount of risk held by these banks as well as the level of cost control the bank engaged in. This directed us

to compare the averages of each bank-specific variable in both samples. Check appendix (B) to see the numerical results.

Which ones are more profitable?

Through comparing the averages of ROA, ROE and NNIM as proxies for profitability we can see that IBs in OPEC countries are more profitable than CBs. However averages of NIM shows the opposite. A justification for that could be, CBs rely more on interest activities as source of funds more than IBs which are considered to be interest free, who calculate their NIM ratio through the amount of profits and losses shared from invested projects.

Which ones are riskier?

Considering the insolvency risk, our descriptive analysis showed that CBs are more exposed to insolvency problem as they hold less liquid assets and they are less capitalized in contrast to IBs.

Through associating the credit risk ratios considered by the study, the analysis shows that IBs have higher CR ratio and lower CR2 ratio in regard to CBs. This may indicate to us that IBs prospers more in offering more loans CBs and at the same time avoid transaction risk and portfolio risk through accurately monitor and assesses prospective borrowers.

Which ones are more efficient?

The analysis disclosed that IBs have more LNS and CI ratio than CBs, as they are bigger in size and spend more than CBs, this show us that IBs are less efficient than

CBs. The acquisition of more assets in Islamic banks led to higher costs, which eventually decreased the profit of the banks. Going back to table (4) which displayed a negative relationship between size and profitability of IBs in OPEC countries.

Which ones are more sensitive to oil prices variation?

Our estimation results showed that OPEC countries banks' profitability are affected positively by increase in oil prices, remarkably the results disclosed that the relationship between oil prices and profitability of banks in CBs is statistically highly significant, while in IBs the relationship is significant at 10%. A rationalization for such results could be the nature of assets and activities that the banks associate with. Financial activities CBs are performing could be more related to crude oil or its derivatives than IBs.

Chapter 5

CONCLUSION

Since its discovery crude oil has become a crucial element in the economic development of oil exporting countries. Shocks in oil prices may shake the economic status of those countries. As such, fluctuations in oil prices are a worldwide concern. Not only do they affect the financial and economic status of countries, but they could pose calamitous alterations in the political, technological strategies and techniques of the countries. However, the present literature has a substantial deficiency in the ramification of oil prices changes on banks performance. This study is attempt to investigate the effect of oil price changes on banks' profitability of OPEC countries.

We studied 170 Islamic and conventional banks located in the 13 OPEC countries. The estimation analysis has been performed in three stages. First, we applied analysis for 36 Islamic banks, then 134 conventional banks. Lastly, we analyzed all banks with the addition of dummy variable for banks' specialization in our models.

Based on existing literature, profitability of banks is affected by bank- specific financial ratios, macroeconomic variables and oil prices. The analysis proved that OPEC countries banks' profitability is affected by oil price variation, where a decline in oil prices will diminish profitability of OPEC banks. Furthermore, our findings revealed that the oil price and banks' profitability relationship is more substantial in

conventional banks than in the Islamic ones, a justification for this might be the nature of assets and activities adopted by the banks. CBs in OPEC countries hold more assets and activities associated with crude oil than IBs. Also the Islamic principles that the IBs follow may forbid them from executing some financial transactions and assets, this could narrow their trading options regarding crude oil correlated financial assets and activities.

The study results showed that cost efficiency ratio, plays chief role in OPEC countries banks' profitability, holding negative relationship. Moreover, credit risk (nonperforming loans\total loans) has also inverse significant relationship with banks profitability. Also the results exposed that in their endeavor to achieve economies of scale by increasing the size of the bank, their profit is likely to diminish.

Interestingly, estimation analysis CBs displayed that raising reserves, either through more capitalizing or increase in liquid asset, raises banks' profitability of OPEC countries. This results only applies to CBs analysis, while in others no evidence appears for such relationship. Furthermore, an increase in credit risk (loans\total assets) appears to also boost banks' profitability.

However, macroeconomic variables statistically appear to not have the most important relationship with the profit of the banks, particularly GDP growth. Yet we have slight evidence that increase in general level of prices will diminish OPEC countries banks' profitability.

OLS linear regression analysis indicated that specializing as Islamic bank will decrease banks' profit. Nevertheless, our descriptive analysis displayed that the average of all profitability ratios except NIM, are greater in IBs than CBs. The study also showed that IBs are larger than CBs.

Finally, we recommend to go further in this study by investigating different specializations of banks as well as various countries.

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APPENDICES

Appendix A: Variance Inflation Factor Results

ROA			ROE		NIM		NNM	
Variable	VIF	1/VIF	VIF	1/VIF	VIF	1/VIF	VIF	1/VIF
cr	1.99	0.50	1.99	0.50				
Cr2					1.22	0.82	1.22	0.82
lns	1.69	0.59	1.69	0.59	1.66	0.60	1.66	0.60
liqr	1.60	0.63	1.60	0.63	1.17	0.85	1.17	0.85
capr	1.53	0.65	1.53	0.65	1.39	0.72	1.39	0.72
gdpg	1.34	0.75	1.34	0.75	2.21	0.45	2.21	0.45
inf	1.26	0.79	1.26	0.79	1.80	0.56	1.80	0.56
ci	1.24	0.81	1.24	0.81	1.43	0.70	1.43	0.70
bs	1.15	0.87	1.15	0.87	1.06	0.94	1.06	0.94
Lno	1.08	0.92	1.08	0.92	1.34	0.75	1.34	0.75
Mean VIF		1.43		1.43		1.48		1.48

Appendix B: Descriptive analysis for Islamic and Conventional Banks

	IBs					CBs				
Variable	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
Roa	188	.0297827	.0499812	-.0397544	.2424984	610	.0171715	.0215496	-.2296967	.1769375
Roe	188	.1770015	.2901489	-.5828916	1.908747	610	.1167313	.1549242	-1.505249	.9948817
Nim	187	-.012393	.0496231	-.1997206	.095729	601	.0337867	.0246164	-.0351587	.1543508
Nnim	188	.0438406	.0672861	-.0890663	.2323983	607	-.0051262	.0838725	-.6200771	1.614872
Gdpg	188	.0324404	.0385993	-.0661	.1394	610	.0316046	.0475989	-.24	.1394
Inf	188	.0902406	.1055616	-.007	.3926636	610	.1446021	.6644471	-.007	8
Capr	188	.1782016	.1455415	.0285027	.79931	610	.2007499	.1792283	.0239359	.9822736
Cr	188	.5577559	.1962958	.0230654	.9432063	610	.4664969	.1984415	.0016141	.8353536
cr2	109	.0683555	.1086951	.0004012	.5663889	446	.09737	.3660251	5.28e-06	5.227334
Liqr	188	.2745297	.140661	.0648278	.8725225	610	.2476635	.1690564	.0000632	.9115013
Ci	188	.0429865	.0557695	.0068184	.486563	610	.0326026	.0250527	.000543	.1563717
Lns	188	9.893139	.5634244	8.423507	11.32364	610	9.7392	.7622089	7.539934	12.064
lno	188	4.191045	.3979084	3.537766	4.512726	610	4.225883	.3750771	3.537766	4.512726

Appendix C: Hausman test

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. hausman fe re

                 ---- Coefficients ----
              |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
              |       fe           re         Difference          S.E.
--------------+----------------------------------------------------------------
         capr |  -.0383449     .0158574      -.0542023        .0118234
           cr |   .0315407     .0183941       .0131465        .0066769
         liqr |   .0228444     .0126607       .0101837        .0064938
           ci |  -.1181771    -.1113477      -.0068294        .0156474
          lns |   .0009017     .0022736       -.001372        .0031434
          lno |   .0082669     .0083986      -.0001317        .0003429
------------------------------------------------------------------------------
                          b = consistent under Ho and Ha; obtained from xtreg
           B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =       27.70
                Prob>chi2 =      0.0001
                (V_b-V_B is not positive definite)
```

Appendix D: EQU. (1)

```
. xtreg roa gdpg inf capr cr liqr ci lns lno bs, fe vce(cluster bid)

Fixed-effects (within) regression               Number of obs      =       804
Group variable: bid                             Number of groups   =       170

R-sq:                                           Obs per group:
     within  = 0.0937                                         min =         3
     between = 0.0299                                         avg =       4.7
     overall = 0.0095                                         max =         6

                                                F(8,169)           =         .
corr(u_i, Xb)  = -0.4902                        Prob > F           =         .

                                  (Std. Err. adjusted for 170 clusters in bid)
------------------------------------------------------------------------------
             |               Robust
         roa |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        gdpg |  -.0001502   .0207017    -0.01   0.994    -.0410174     .040717
         inf |  -.0010672   .0008474    -1.26   0.210    -.0027401    .0006057
        capr |  -.0375537   .0376924    -1.00   0.321    -.1119623     .036855
          cr |   .0313231   .0120179     2.61   0.010     .0075985    .0550477
        liqr |   .0238245    .017056     1.40   0.164    -.0098458    .0574948
          ci |  -.1188896   .0788032    -1.51   0.133     -.274455    .0366758
         lns |   .0019141   .0036059     0.53   0.596    -.0052042    .0090325
         lno |   .0081194    .002342     3.47   0.001      .003496    .0127428
          bs |  -.0080853   .0048209    -1.68   0.095    -.0176023    .0014317
       _cons |  -.0406212   .0406862    -1.00   0.320    -.1209399    .0396974
-------------+----------------------------------------------------------------
     sigma_u |  .03163704
     sigma_e |   .0159554
         rho |  .79722861   (fraction of variance due to u_i)
------------------------------------------------------------------------------

. areg roa gdpg inf capr cr liqr ci lns lno bs, absorb(bid)

Linear regression, absorbing indicators         Number of obs      =       804
                                                F(   9,    625)    =      7.18
                                                Prob > F           =    0.0000
                                                R-squared          =    0.7941
                                                Adj R-squared      =    0.7354
                                                Root MSE           =    0.0160

------------------------------------------------------------------------------
             |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        gdpg |  -.0001502   .0209036    -0.01   0.994       -.0412    .0408995
         inf |  -.0010672   .0013441    -0.79   0.428    -.0037068    .0015724
        capr |  -.0375537   .0158468    -2.37   0.018    -.0686731   -.0064342
          cr |   .0313231   .0110445     2.84   0.005     .0096343     .053012
        liqr |   .0238245   .0111984     2.13   0.034     .0018334    .0458156
          ci |  -.1188896   .0360809    -3.30   0.001    -.1897441    -.048035
         lns |   .0019141   .0043895     0.44   0.663    -.0067058    .0105341
         lno |   .0081194   .0016492     4.92   0.000     .0048808     .011358
          bs |  -.0080853   .0176191    -0.46   0.646    -.0426851    .0265145
       _cons |  -.0406212   .0461089    -0.88   0.379    -.1311683    .0499258
-------------+----------------------------------------------------------------
         bid |         F(169, 625) =     12.202   0.000          (170 categories)
------------------------------------------------------------------------------
```

Appendix E: EQU. (2)

```
. xtreg roe gdpg inf capr cr liqr ci lns lno bs, fe vce(cluster bid)

Fixed-effects (within) regression               Number of obs      =       804
Group variable: bid                             Number of groups   =       170

R-sq:                                           Obs per group:
     within  = 0.0620                                         min =         3
     between = 0.0119                                         avg =       4.7
     overall = 0.0116                                         max =         6

                                                F(8,169)           =         .
corr(u_i, Xb)  = -0.3259                        Prob > F           =         .

                                  (Std. Err. adjusted for 170 clusters in bid)
------------------------------------------------------------------------------
             |               Robust
         roe |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        gdpg |  -.0458391   .1600885    -0.29   0.775    -.3618698    .2701916
         inf |  -.0010192   .0049939    -0.20   0.839    -.0108778    .0088393
        capr |  -.0175382   .1630823    -0.11   0.914    -.3394791    .3044027
          cr |   .3537619   .1546654     2.29   0.023     .0484368    .6590869
        liqr |    .276547    .111318     2.48   0.014     .0567942    .4962998
          ci |   .1977002   .8014413     0.25   0.805    -1.384426    1.779826
         lns |   .0430445   .0310895     1.38   0.168    -.0183294    .1044184
         lno |   .0475398   .0159281     2.98   0.003     .0160962    .0789835
          bs |  -.0881378   .0281431    -3.13   0.002    -.1436952   -.0325805
       _cons |  -.7141504   .3764779    -1.90   0.060    -1.457356    .0290548
-------------+----------------------------------------------------------------
     sigma_u |  .16799082
     sigma_e |  .11953423
         rho |  .66387552   (fraction of variance due to u_i)
------------------------------------------------------------------------------

. areg roe gdpg inf capr cr liqr ci lns lno bs, absorb(bid)

Linear regression, absorbing indicators         Number of obs      =       804
                                                F(   9,    625)    =      4.59
                                                Prob > F           =    0.0000
                                                R-squared          =    0.7109
                                                Adj R-squared      =    0.6285
                                                Root MSE           =    0.1195

------------------------------------------------------------------------------
         roe |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        gdpg |  -.0458391    .156605    -0.29   0.770    -.3533747    .2616965
         inf |  -.0010192     .01007    -0.10   0.919    -.0207944     .018756
        capr |  -.0175382   .1187208    -0.15   0.883    -.2506783    .2156019
          cr |   .3537619   .0827429     4.28   0.000     .1912741    .5162496
        liqr |    .276547   .0838961     3.30   0.001     .1117945    .4412994
          ci |   .1977002   .2703102     0.73   0.465     -.333126    .7285264
         lns |   .0430445   .0328851     1.31   0.191    -.0215342    .1076232
         lno |   .0475398   .0123552     3.85   0.000     .0232772    .0718025
          bs |  -.0881378   .1319982    -0.67   0.505    -.3473516    .1710759
       _cons |  -.7141504    .345437    -2.07   0.039    -1.392508   -.0357926
-------------+----------------------------------------------------------------
         bid |        F(169, 625) =      7.777   0.000          (170 categories)
------------------------------------------------------------------------------
```

Appendix F: EQU. (3)

```
.  xtreg nim gdpg inf capr cr liqr ci lns lno bs, fe vce(cluster bid)

Fixed-effects (within) regression               Number of obs      =       794
Group variable: bid                             Number of groups   =       170

R-sq:                                           Obs per group:
     within  = 0.1183                                         min =         2
     between = 0.0022                                         avg =       4.7
     overall = 0.0035                                         max =         6

                                                F(8,169)           =         .
corr(u_i, Xb)  = -0.3721                        Prob > F           =         .

                                  (Std. Err. adjusted for 170 clusters in bid)
------------------------------------------------------------------------------
             |               Robust
         nim |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        gdpg |   -.019766   .0258508    -0.76   0.446    -.0707981    .0312661
         inf |   .0014314   .0007237     1.98   0.050     2.63e-06    .0028601
        capr |  -.0079136   .0147906    -0.54   0.593    -.0371117    .0212846
          cr |   .0445289   .0160036     2.78   0.006     .0129362    .0761215
        liqr |   .0153784   .0170865     0.90   0.369    -.0183521     .049109
          ci |   .2054716    .095348     2.15   0.033     .0172451    .3936981
         lns |   -.010464   .0079885    -1.31   0.192    -.0262341    .0053062
         lno |   .0015566   .0020035     0.78   0.438    -.0023984    .0055117
          bs |   .0038304   .0029293     1.31   0.193    -.0019524    .0096131
       _cons |   .0867414   .0728984     1.19   0.236    -.0571674    .2306501
-------------+----------------------------------------------------------------
     sigma_u |  .03699913
     sigma_e |  .01293612
         rho |  .89107247   (fraction of variance due to u_i)
------------------------------------------------------------------------------

. areg nim gdpg inf capr cr liqr ci lns lno bs, absorb(bid)

Linear regression, absorbing indicators         Number of obs      =       794
                                                F(    9,    615)   =      9.17
                                                Prob > F           =    0.0000
                                                R-squared          =    0.9088
                                                Adj R-squared      =    0.8824
                                                Root MSE           =    0.0129

------------------------------------------------------------------------------
         nim |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        gdpg |   -.019766   .0174555    -1.13   0.258    -.0540456    .0145136
         inf |   .0014314   .0010924     1.31   0.191     -.000714    .0035767
        capr |  -.0079136   .0133109    -0.59   0.552     -.034054    .0182268
          cr |   .0445289   .0090839     4.90   0.000     .0266897    .0623681
        liqr |   .0153784    .009395     1.64   0.102    -.0030718    .0338287
          ci |   .2054716   .0297338     6.91   0.000     .1470795    .2638636
         lns |   -.010464   .0035794    -2.92   0.004    -.0174934   -.0034346
         lno |   .0015566   .0013655     1.14   0.255    -.0011249    .0042382
          bs |   .0038304   .0142939     0.27   0.789    -.0242404    .0319011
       _cons |   .0867414   .0376404     2.30   0.022     .0128221    .1606606
-------------+----------------------------------------------------------------
         bid |        F(169, 615) =     23.624   0.000          (170 categories)
------------------------------------------------------------------------------
```

Appendix G: EQU. (4)

```
. xtreg nnim gdpg inf capr cr liqr ci lns lno bs, fe vce(cluster bid)

Fixed-effects (within) regression               Number of obs      =       802
Group variable: bid                             Number of groups   =       170

R-sq:                                           Obs per group:
     within  = 0.0085                                         min =         3
     between = 0.0229                                         avg =       4.7
     overall = 0.0087                                         max =         6

                                                F(8,169)           =         .
corr(u_i, Xb)  = -0.5126                        Prob > F           =         .

                                  (Std. Err. adjusted for 170 clusters in bid)
------------------------------------------------------------------------------
             |               Robust
        nnim |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        gdpg |   .0586013   .0559147     1.05   0.296      -.05178    .1689826
         inf |  -.0007139   .0013889    -0.51   0.608    -.0034558     .002028
        capr |   .0634349     .06471     0.98   0.328    -.0643092    .1911789
          cr |   .0119328   .0376748     0.32   0.752     -.062441    .0863065
        liqr |   .0141607   .0227758     0.62   0.535    -.0308009    .0591224
          ci |  -.3140804   .0752949    -4.17   0.000    -.4627202   -.1654406
         lns |   .0123325   .0109746     1.12   0.263    -.0093324    .0339974
         lno |  -.0065545   .0107995    -0.61   0.545    -.0278737    .0147647
          bs |  -.0330975   .0060866    -5.44   0.000    -.0451131    -.021082
       _cons |  -.0911155   .1567964    -0.58   0.562    -.4006474    .2184163
-------------+----------------------------------------------------------------
     sigma_u |   .0588955
     sigma_e |  .07298126
         rho |  .39439474   (fraction of variance due to u_i)
------------------------------------------------------------------------------

. areg nnim gdpg inf capr cr liqr ci lns lno bs, absorb(bid)

Linear regression, absorbing indicators         Number of obs      =       802
                                                F(   9,    623)    =      0.59
                                                Prob > F           =    0.8034
                                                R-squared          =    0.3918
                                                Adj R-squared      =    0.2180
                                                Root MSE           =    0.0730

------------------------------------------------------------------------------
        nnim |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        gdpg |   .0586013   .0960198     0.61   0.542    -.1299604     .247163
         inf |  -.0007139   .0061495    -0.12   0.908    -.0127902    .0113624
        capr |   .0634349   .0724984     0.87   0.382     -.078936    .2058058
          cr |   .0119328   .0505559     0.24   0.813    -.0873478    .1112134
        liqr |   .0141607   .0513259     0.28   0.783    -.0866321    .1149535
          ci |  -.3140804   .1653175    -1.90   0.058    -.6387275    .0105666
         lns |   .0123325   .0200827     0.61   0.539    -.0271056    .0517706
         lno |  -.0065545   .0075517    -0.87   0.386    -.0213843    .0082754
          bs |  -.0330975   .0805931    -0.41   0.681    -.1913645    .1251695
       _cons |  -.0911155   .2110265    -0.43   0.666    -.5055249    .3232939
-------------+----------------------------------------------------------------
         bid |  F(169, 623) =     1.595   0.000         (170 categories)
------------------------------------------------------------------------------

.
```