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Article

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The determinants of conventional banks profitability in developing and underdeveloped OIC countries

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Abstract

Purpose – The purpose of this study is to investigate the effect of internal and external variables on the profitability of conventional banks operating on developing and underdeveloped countries, the Organization of Islamic Cooperation (OIC) states.

Design/methodology/approach – In this paper, the author uses ordinary least squares fixed-effects model on an unbalanced panel data set of all conventional banks operating in OIC countries (52 countries included from 57) over the period 1989-2008, 686 banks.

Findings – The results suggest that equity, foreign ownership, off-balance sheet (OBS) activities, real gross domestic product growth, real interest rate and concentration foster banks' profitability. In addition, the results showed that the banking sector development and loans will increase banks' profitability in the long run in the countries of the studies. In contrast, the study reported that deposits lower profitability. The study also revealed that GDP per capita, market capitalization and banks size have no impact on profitability.

Practical implications – The findings of this study have considerable policy implications. First, policymakers need to regulate nontraditional activities to avoid any financial crisis because banks in OIC countries are heavily engaged in nontraditional activities to boost its profit. Second, policymakers are advised to improve the deposit insurance system to insure the stability of the financial system as well as improving banks' profitability. Third, policymakers need to improve the efficiency of the stock market, maintain small banking system and encourage foreign investments in the banking system.

Originality/value – The paper adds to the literature on the commercial bank's profitability determinants. In particular, such study has not been conducted on OIC countries, and the study included all mainstream banks and incorporated the effect of deposit insurance system so far. Also, pure sample of conventional banks used as many conventional banks in OIC countries have Islamic windows or offer Islamic products. In addition, this study investigated the effect of OBS activities on net interest margin (NIM) because the studies that explored this interrelationship are limited especially for developing and under developed countries. The results showed that OBS activities contributed significantly and positively to return on assets and NIM. Moreover, this paper used a pure sample of conventional banks to avoid any biasness; see data section. Moreover, this study gives an idea about the economic situation and financial conditions of OIC countries during the period of the study.

Keywords Profitability, Conventional banks, External factors, Internal factors

Paper type Research paper

1. Introduction

The financial system has an outstanding role in channeling funds to investments efficiently to support economic growth resulting in the decrease of income inequality, especially in



developing and underdeveloped nations such as the members of Organization of Islamic Cooperation (OIC) countries[1].

The key component in a financial system is banks. They work as intermediate between funds provider and those in need of funds contributing to economic growth. Also, banks play a role in the implementation of a country monetary policy. Thus, profitable banks will ensure the continuity of economic growth as well as the stability of the financial system.

Developing and underdeveloped countries are characterized by low gross domestic product (GDP) per capita, low growth rate, lack of proper market, lack of capital formation[2], low level of technology and skills and weak economies and regulations. The contribution of this paper is that it explored the determinants of banks' profitability in those countries, especially there is a lack of cross-country studies that investigated banks' profitability in developing and underdeveloped countries using a sample of all conventional commercial banks operating in 52 countries, members in OIC, for a long period (20 years). Another motivation is that there is no study before this that examined the determinates of banks profitability in the OIC countries using a sample of all banks operating on those countries. The recent studies that investigated the determinants of banks' profitability in the OIC countries did not include all the member countries and/or did not comprise all conventional banks on it (Sun *et al.*, 2017; Rezik and Kalai, 2018; Yanikkaya *et al.*, 2018). In addition, this study uses two measures of profitability and many explanatory variables. Also, OIC countries are the home of more than 90 per cent of Islamic banks in the world, and many of its conventional banks provide Islamic products; thus, other studies that used cross-country data could include banks with Islamic windows or Islamic banks which make their results bias. Moreover, the financial sector in OIC countries is still dominated by conventional banks (excluding Iran and Sudan, as their financial system is Islamized), even though Islamic banks share is increasing progressively. For instance, Islamic banking assets represent less than 10 per cent of total banking assets in Algeria, Egypt, Indonesia, Oman, Tunisia and Azerbaijan as of 1H2014 (Islamic Financial Services Board, 2015)[3]. The number of banks in a single country is small; see data section. Therefore, a cross-country study allows us to bring in more information to form a bigger data set of bank information. Accordingly, this considered additional motivation behind this study.

The factors affecting banks' profitability are categorized into two groups: endogenous and exogenous elements. In view of the above, I believe that the following internal factors need to be examined which are capital adequacy, loans, deposits, foreign ownership, overhead costs and off-balance sheet (OBS) activities. Regarding external factors, it is widely believed that GDP growth, GDP per capita, real interest rates, regulations and financial structure are the significant external factors that may affect banks' profitability.

This study found that deposits lower banks' profitability in contrast to that in developed countries. Also, the factors such as deposit insurance, market capitalization and banks size have no impact on banks' profitability which contradicts the majority literature on banks' profitability in developed countries. Moreover, the results indicate that the development of the banking sector will increase profitability in the long run.

Another important contribution of this study is that it investigated the interrelationship between non-tradition activities and net interest margin (NIM). This attributed to the limited number of studies that explored this interrelationship between NIM and non-tradition activities. The results of this study showed that non-tradition activities and NIM linked positively which contradicts the study conducted on developed countries. This study also gives an idea about the economic and financial environments of OIC countries during the study period (Table IV).

The rest of the paper is organized as follows. Section 2 presents a literature review and theoretical development. Section 3 describes data and methodology. Sections 4 and 5 represent results and discussion, respectively, and finally, conclusion presented.

2. Literature review and theoretical development

The empirical literature divides factors that affect bank profitability into two categories: internal and external factors. For both categories, numerous explanatory variables have been proposed, depending on the type and aim of each study. Internal determinants of profitability can be classified into financial-statement variables and non-financial-statement variables, both of which fall under the control of bank management (Haron, 2004). External variables are beyond the control of bank management but reflect factors from the economic and financial structure and legal environment. According to Haron (2004), competition, regulation, concentration, market share, ownership, scarcity of capital, money supply, inflation and bank size are the most widely discussed external variables.

However, studies on the determinants of banks' profitability are conducted on banks in developing countries mainly on the banking sectors in the USA and Europe. For example, Berger (1995a, 1995b), Abreu and Mendes (2001), Athanasoglou *et al.* (2006), Chiorazzo and Milani (2011), Growe *et al.* (2014), Petria *et al.* (2015), Menicucci and Paolucci (2016), Korytowski (2018) and Yüksel *et al.* (2018). While the studies that explored the determinates of commercial banks' profitability in OIC countries are limited and mainly are single country studies. For example, Ben Khedhiri *et al.* (2008; Tunisia), Ferrouhi (2017; Morocco) and Yao *et al.* (2018; Pakistan). Table I lists the results of some of the studies that conducted on commercial banks' profitability.

2.1 Theoretical development

2.1.1 Internal factors

2.1.1.1 Capital adequacy. Banks with a high capital ratio are considered to be insured against bankruptcy, to have access to cheap funds, to be more flexible in pursuing business opportunities and to have the ability to absorb any unexpected losses. Thus, higher profitability can be expected for these banks, and this is confirmed by many studies (Table I). However, a negative relationship between profitability and the high capital ratio can be expected given that well-capitalized banks are considered safer because they take less risk, and therefore, according to financial theory, produce lower returns. The study conducted by Saona (2016) found a negative relationship between profitability and capital adequacy.

Although the empirical evidence on the relationship between the capital ratio and profitability is not conclusive, it seems to lean toward a positive effect. Therefore, for this study, a positive relationship between capital adequacy and profitability is hypothesized.

2.1.1.2 Loans. The effect of loans on profitability is expected to be positive, as the greater the number of loans, the higher the income for banks. A large body of banking literature, namely, Heffernan and Fu (2008), Sufian (2012) and Menicucci and Paolucci (2016) showed that loans contribute to banks' profitability. However, the increase in loans could escalate the costs of funds leading to a negative correlation between profitability and loans. Furthermore, banks' lending activities are sensitive to economic conditions and during slow periods more loans are expected to default leading to a negative impact on profitability. Therefore, there are reasonable theoretical reasons to expect either a positive or negative effect on loans on profitability. Kosmidou *et al.* (2005) and Heffernan and Fu (2008) found a negative relationship between loans and profitability.

Based on the above, there are reasonable theoretical reasons to expect a negative effect for loans on profitability.

Explanatory variable	Positive relation with	Negative relation with	No relation with	
Capital adequacy	*** Abreu and Mendes (2001) ^{NC} , Athanasoglou <i>et al.</i> (2008) ^A , ** Demirgüç-Kunt and Huizinga (1999) ^{NC} , **** Flaminio <i>et al.</i> (2009) ^{AC} , Kosmidou <i>et al.</i> (2005) ^{A,N} , Ben Naceur (2003) ^{A,N} , Nguyen (2011) ^{E,C} , Pasiouras and Kosmidou (2007) ^{AC} , Ben Khedhiri <i>et al.</i> (2008) ^N , Ben Ameur and Mhiri (2013) ^{A,N} , Sufian (2012) ^{AC} , Chirwa (2003) ^{A,E,C} , Saona (2016) ^{NC} , Menicucci and Paolucci (2016) ^{CE} , Demirgüç-Kunt and Huizinga (1999) ^{NC} , Kosmidou <i>et al.</i> (2005) ^A , Mamatzakis and Remoundos (2003) ^{A,E,C} , Ben Naceur (2003) ^N , Heffernan and Fu (2008) ^{A,N} , Sufian (2012) ^A , Menicucci and Paolucci (2016) ^{CE} , Demirgüç-Kunt and Huizinga (1999) ^{A,C} , Nguyen (2011) ^{N,C} , Valverde and Fernández (2007) ^{NC} , Sufian (2012) ^{AC} , vithyea (2014) ^N , Petria <i>et al.</i> (2015) ^{C,AE}	Demirgüç-Kunt and Huizinga (1999) ^{A,C} , Akbaş (2012) ^A , Tariq <i>et al.</i> (2014) ^E , Demirgüç-Kunt and Huizinga (1999) ^{A,C} , Kosmidou <i>et al.</i> (2005) ^N , Heffernan and Fu (2008) ^E , *** Rektik and Kalai (2018) ^{C,AE}	Demirgüç-Kunt and Huizinga (1999) ^{N,C} , Soyemi <i>et al.</i> (2013) ^N , Tariq <i>et al.</i> (2014) ^N , Athanasoglou <i>et al.</i> (2006) ^{A,E} , Yanikkaya <i>et al.</i> (2018) ^{N,AC}	Ben Ameur and Mhiri (2013) ^F , Mungly <i>et al.</i> (2016) ^E , Sufian (2012) ^{AC} , Yanikkaya <i>et al.</i> (2018) ^{N,AC} , Yüksel <i>et al.</i> (2018) ^{CE}
Deposit				
Loans				
Nontraditional activities/OBS activity				
Overhead	Dietrich <i>et al.</i> (2015) ^{NC}	Demirgüç-Kunt and Huizinga (1999) ^{N,C} , Chen and Liao (2011) ^{A,E,N,C} , Heffernan and Fu (2008) ^N , Rahman <i>et al.</i> (2015) ^{A,N} , *** Wahidudin <i>et al.</i> (2012) ^{A,E,PBT,C} , Saona (2016) ^{NC} , Mamatzakis and Remoundos (2003) ^{A,E} , Kosmidou <i>et al.</i> (2005) ^{A,N} , Pasiouras and Kosmidou (2007) ^{A,C} , Ben Khedhiri <i>et al.</i> (2008) ^N , Athanasoglou, Delis and Staikouras (2006) ^{A,E,C} , *** Sufian (2012) ^A , Mungly <i>et al.</i> (2016) ^E	Demirgüç-Kunt and Huizinga (1999) ^{N,C} , Heffernan and Fu (2008) ^{A,E} , Islam and Nishiyama (2016) ^{C,AE}	
Foreign Ownership	Demirgüç-Kunt and Huizinga (1999) ^{N,C} , Athanasoglou <i>et al.</i> (2006) ^{A,E,C} , Yanikkaya <i>et al.</i> (2018) ^{N,AC}		Mungly <i>et al.</i> (2016) ^A	
GDP growth	Al-Bertazzi and Gambacorta (2009) ^N , Claeys and Vennet (2008) ^{NC} , Mungly <i>et al.</i> (2016) ^E , Sufian (2012) ^A , Saona (2016) ^{C,N}	Dietrich <i>et al.</i> (2015) ^{NC} , Demirgüç-Kunt <i>et al.</i> (2004) ^{NC} , Gelos (2009) ^{NC} , Huseynov (2009) ^N , Ben Ameur and Mhiri (2013) ^{E,N} , Ben Naceur and Omran (2011) ^A , Yanikkaya <i>et al.</i> (2018) ^{N,AC}	Ben Khedhiri <i>et al.</i> (2008) ^N , *** Ben Ameur and Mhiri (2013) ^A , Mungly <i>et al.</i> (2016) ^A , Ben Naceur and Omran (2011) ^N , *** Yüksel <i>et al.</i> (2018) ^{CE}	

(continued)

Determinants of conventional banks' profitability

Table I. Results from other empirical studies related conventional banks' profitability

Table I.

Explanatory variable	Positive relation with	Negative relation with	No relation with
GDPPC	Bogdan and Roman (2015) ^{A, E}	Demirgüç-Kunt and Huizinga (1999) ^{N, C} , Ben Naceur and Omran (2011) ^N	Athanasoglou <i>et al.</i> (2006) ^{A, E, C} , Flamini <i>et al.</i> (2009) ^{A, C} , Ben Naceur and Omran (2011) ^{A, C} , Yüksel <i>et al.</i> (2018) ^{CE}
RI	Alper and Anbar (2011) ^E , Chen and Liao (2011) ^{A, E, N, C} , Demirgüç-Kunt and Huizinga (1999) ^{N, C} , Gelos (2009) ^{N, C} , Maudos and Fernandez de Guevara (2004) ^{N, C} , Aburime (2008) ^{A, PBT}	Noman <i>et al.</i> (2015) ^{A, N} , Staikouras and Wood (2003) ^{A, C} , Islam and Nishiyama (2016) ^{C, A}	
OIL	Aburime (2008) ^{A, PBT} , Essayvad and Madani (2003) ^(PBT, before tax profit/equity) , Yanikkaya <i>et al.</i> (2018) ^{C, A}	Huseynov (2009) ^N	
Deposit insurance	Bouheni <i>et al.</i> (2014) ^{A, C}	Davis and Obasi (2009) ^{A, C} , Demirgüç-Kunt and Huizinga (1999) ^N	Demirgüç-Kunt and Huizinga (1999) ^{PBT, C}
Explicit tax	Demirgüç-Kunt and Huizinga (1999) ^{PBT, N, C} , Demirgüç-Kunt and Huizinga (2000) ^{PBT, N, C} , Chiorazzo and Milani (2011) ^{PBT, C}	Aburime (2008) ^A	Aburime (2008) ^{PBT} , Wahidudin <i>et al.</i> (2012) ^{A, E, PBT, C}
Implicit tax	Ben Khedhiri <i>et al.</i> (2008) ^N , Saona (2016) ^{N, A, C}	Demirgüç-Kunt and Huizinga (1999) ^{PBT, N, C}	
Banking sector development (industry size)	****Ghosh (2016) ^{A, C}	Ghosh (2016) ^{N, C} , Demirgüç-Kunt and Huizinga (1999) ^{P, T, N, C} , Yao <i>et al.</i> (2018) ^{A, E, N}	
Market capitalization	Demirgüç-Kunt and Huizinga (1999) ^{N, C} , Demirgüç-Kunt and Huizinga (2008) ^{PBT, N, C}	Borroni <i>et al.</i> (2016) ^{A, E, C}	Demirgüç-Kunt and Huizinga (1999) ^{PBT, C} , Aburime (2008) ^{A, PBT} , Borroni <i>et al.</i> (2016) ^{N, C}
Size	Demirgüç-Kunt and Huizinga (1999) ^{N, C} , Athanasoglou, Delis and Staikouras (2006) ^{A, C} , Saona (2016) ^{N, C}	Ben Ameur and Mhiri (2013) ^{A, N} , Mungly <i>et al.</i> (2016) ^E	Demirgüç-Kunt and Huizinga (1999) ^{A, C} , Ben Ameur and Mhiri (2013) ^{A, E} , Wahidudin <i>et al.</i> (2012) ^{A, E, PBT, C} , Yanikkaya <i>et al.</i> (2018) ^{N, A, C} , Islam and Nishiyama (2016) ^{C, A, E}
Concentration	Athanasoglou <i>et al.</i> (2006) ^{A, C} , Dietrich <i>et al.</i> (2015) ^{N, C} , Demirgüç-Kunt and Huizinga (1999) ^{PBT, N, C} , Saona (2016) ^{N, A, C}	Ben Ameur and Mhiri (2013) ^{A, N} , Ben Naceur and Omran (2011) ^A	Ben Ameur and Mhiri (2013) ^E , Ben Naceur and Omran (2011) ^N , Korytowski (2018) ^{C, A, E} , Petria <i>et al.</i> (2015) ^{C, A, E}

Notes: The letter after year means the dependent variable. (N = NIM, A = ROA, E = ROE, PBT = profit before tax to total asset and C = Cross-country); *Table adapted from Chen and Liao (2011); **profit before tax/total assets; ****results for developing countries; *****the study conducted on low-income countries

2.1.1.3 Deposits. Deposits are banks' primary sources of funds and perhaps the cheapest, so this variable can be expected to affect banks' profitability positively as long as there is a demand for loans. [Chirwa \(2003\)](#), [Saona \(2016\)](#) and [Menicucci and Paolucci \(2016\)](#) show evidence that deposits improve banks' profitability. On the other hand, the lack of loan demand or poor management of the bank's liquidity could lead to a negative effect because these deposits would be costlier for banks in terms of the required branch networking and remuneration. The results of [Akbaş \(2012\)](#) and [Tariq et al. \(2014\)](#) is in line with this. Literature also reported an insignificant relationship between deposits and profitability ([Demirgüç-Kunt and Huizinga, 1999](#); [Soyemi et al., 2013](#); [Tariq et al., 2014](#)). In this study, I hypothesize a negative relation between profitability and deposits.

2.1.1.4 Cost management. The results of previous studies on the effect of this variable on banks' profitability are mixed. A negative correlation indicates that efficient banks are expected to operate at lower costs, but a positive relationship can be expected, as banks with high operating costs are more likely to have high-interest spread. Also, a positive relationship can be achieved if banks manage to transfer part of their cost to their customers. See [Table I](#) for the studies that included cost management in their investigation of banks' profitability.

In this study, I predict a negative relationship between cost management and profitability because many of the countries in this study have weak economies, meaning that banks must pass their operating costs on to their depositors and lenders over the long run.

2.1.1.5 Off-balance sheet activities. Banks engage in OBS activities hoping to earn additional income to compensate for the decline of its earnings from traditional activities. The empirical findings of [Valverde and Fernández \(2007\)](#), [Nguyen \(2011\)](#), [Sufian \(2012\)](#), [Vithyea \(2014\)](#) and [Petria et al. \(2015\)](#) provide evidence for that. Conversely, banks that are heavily involved in nontraditional activities are subject to higher risks (market and macroeconomic) which may lead to lower profitability. This supported [Chen and Liao \(2011\)](#), [Wahidudin et al. \(2012\)](#), [Rahman et al. \(2015\)](#) and [Saona's \(2016\)](#) study.

In this study, other operating income to total assets (OOI) used as a proxy of OBS[4], I predict a positive relationship between OBS and profitability (return on assets [ROA] and NIM).

2.1.1.6 Foreign ownership. Foreign ownership could affect banks' profitability positively because foreign banks possess superior technology, have high governance standards, are better in mitigating risk and benefit from special tax breaks. The cross-country study conducted by [Yanikkaya et al. \(2018\)](#) provide evidence for this argument. In contrast, foreign ownership could affect banks' profitability negatively because foreign banks are affected not only by the economic and financial conditions in the countries where they operate but also by the situations in their home countries. [Mungly et al. \(2016\)](#) reported a negative relationship between foreign ownership and banks' profitability.

Furthermore, the foreign-owned banks in this study come mainly from developing countries, which tend to have lesser technology and lower governance standards. From the above, I expect this variable to have a negative effect on profitability.

2.1.2 External factors

2.1.2.1 Real gross domestic product growth. Economic development is measured by GDP per capita (2005 prices, in thousands, USD) and reflects differences in many factors that may omit from regression and affect banks' profitability such as the mix of banking opportunities and regulations. Higher economic efficiency can be associated with economic development, thus leading to better profitability ([Table I](#)). From another perspective, higher competition can decrease bank profits, and therefore, a negative correlation between GDP

per capita and banks' profits can be expected. Numerous studies reported a negative correlation between profitability and GDP growth (Ben Ameer and Mhiri, 2013; Ben Naceur and Omran, 2011; Yanikkaya *et al.*, 2018).

In this study, it is expected that the relationship between profitability and GDP per capita will be positive because of low competition in the countries of this study, developed and less developed countries.

2.1.2.2 Economic development. The GDP per capita growth proxies' business cycle fluctuations. The effect of this variable is not restricted; during recessions, the quality of loans deteriorates, which increases defaults and leads to lower profitability. The negative association between economic development and banks' profitability is reported by Demirgüç-Kunt and Huizinga (1999) and Ben Naceur and Omran (2011). However, the upturn of the economy increases the demand on loans causing bank profitability to improve. Bogdan and Roman (2015) results are in line with this. I expect this variable will affect banks' profitability positively.

2.1.2.3 Real interest rate. The large volume of literature, Table I, shows that there is a positive relationship between interest rate and banks' profitability. Meanwhile, the increase of interest rate discourages firms and people from borrowing resulting in the decrease in banks' profits in the long run. Staikouras and Wood (2003), Noman *et al.* (2015) and Islam and Nishiyama's (2016) results are in line with this argument. This study predicts that the interest rate will affect banks' profitability positively in developing and underdeveloped countries.

2.1.2.4 Tax. This paper follows Demirgüç-Kunt and Huizinga (1999) and Hassan and Bashir's (2003) study in using explicit and implicit taxes to show the ability of banks to allocate their portfolios to minimize their taxes. Also, this variable is included to capture the effects of regulations on the banking industry:

- Explicit taxes (TAX) are measured by dividing taxes by profit before tax.
- The variable for the implicit tax effect (RESDA) is calculated by multiplying consumer and short-term funds divided by total assets and then by reserve of the banking system (IFS Line 20) over the deposit of the banking system [IFS, Line 24 + 25]. As indicated in Table I, most of the studies found a positive correlation between profitability and taxation. This study as well as expects the same results.

2.1.2.5 Deposit insurance. The deposit insurance (INR) variable is a dummy variable that is coded 1 if there is an explicit deposit insurance scheme and 0 otherwise even if the country's legislation offers some type of implicit insurance. The expected effect of deposit insurance schemes on banks' profitability is unclear because most of the countries in this study have an implicit insurance scheme, which implies that banks' deposits might not be secure if banks run into financial problems. Thus, banks will be more averse to risk which leads to lower profitability.

However, even under an implicit insurance scheme, many banks' managers are certain that the governments would not allow their banks to fail based on previous experiences (some banks in Egypt, Kuwait and Saudi Arabia did have problems in the past, and their governments bailed them out). This would, theoretically, lead banks to take more risks to increase their profits causing a positive effect. However, a negative impact is expected on profitability in this study because of the combined effect of no explicit deposit insurance scheme and the risk-taking behavior of banks.

Based on the aforementioned argument, I predict a negative correlation between deposit insurance and banks' profitability.

2.1.2.6 Oil shocks. Oil prices are an important determinant here because about 50 per cent of the countries in this study are oil producers, and some of them such as Nigeria and some countries in the Middle East and North Africa (MENA) region are major oil producers. Many of those countries rely heavily on oil exports, and thus, a relationship between the oil variable and banks' profitability is expected.

However, this variable is not included in previous country studies (Ben Khediri and Ben Khedhiri, 2009; Demirgüç-Kunt and Huizinga, 1999; Hassan and Bashir, 2003). Only three studies have considered this variable in an international investigation of bank profitability. The first study is by Poghosyan and Hesse (2009) on countries in the MENA region. The sample is divided into conventional, Islamic and investment banks. The second study is by Zantioti (2009) and focuses on Islamic banks. The third study is by Imam and Kpodar (2010) and examines the diffusion of Islamic banks. It seems intuitive that the impact of oil prices would be positive for banks located in countries that are net exporters because the financial position of banks and their customers tends to improve with high oil prices. Furthermore, countries located in MENA region that are net oil importers experience positive influences on their GDP and higher profitability in their banking systems because of increases in deposits and financial activities.

Many of these deposits come indirectly via trade with net-oil-exporting countries and money transfers from expats working in those countries (Abeyasinghe, 2001; Berument *et al.*, 2010). Net-oil-importing countries, which are not located in the MENA region, face challenges in controlling the effects of high oil prices. As a result, businesses, consumers and the government's budget are affected adversely, contributing to slow economic growth and lower bank profits because of more loan defaults and less demand for them. Moreover, the decline in oil prices in net-oil-exporting countries may not reduce banks' profitability because governments and major national companies borrowing in deficit times may create "oligopsony" (Essayad *et al.*, 2003).

On the other hand, low oil prices could make banks more averse to risk, which generally can lead to lower profits for banks located in oil-exporting countries, and the opposite may occur in net oil-importing countries. Poghosyan and Hesse (2009) find an indirect relationship between oil shocks and the profitability of conventional, Islamic and investment banks in major oil-producing MENA countries, and in that study, the indirect relationship is channeled through macroeconomic and institutional variables. Additionally, in studies of Saudi banks, Essayad and Madani (2003) and Essayad *et al.* (2003) find a positive relationship between profitability and oil prices. Imam and Kpodar (2010) support their findings. In the present study, I hypothesize a positive relationship between oil shocks and banks' profitability.

2.1.2.7 Stock market capitalization. The ratio of stock market capitalization to GDP is used to capture the effect of the development of a country's stock market on bank profitability. A positive effect is expected for this variable because developed stock markets increase the information available to banks which will allow them to improve their risk assessments of the borrowers. Furthermore, in developing and underdeveloped countries, the growth of stock markets tends to encourage people to obtain loans from banks to speculate in the stock market, and this eventually increases banks' profits. Also, banks benefit from the fees that come from managing their customers' portfolios which are mainly composed of stocks.

On the other hand, the stock market could affect banks' profitability negatively, as the stock market substitutes banks as a source of finance. The study conducted by Borroni *et al.* (2016) revealed that after the recent financial crisis, stock market linked negatively to banks' profitability (ROA, return on equity [ROE] and NIM), and the results were significant in case

of ROA and ROE. I predict a negative relationship between banks' profitability and stock market capitalization.

2.1.2.8 Banking sector development (industry size). The banks' assets scaled by GDP ratio is used to capture the banking sector development. The larger the banking sector, the higher the competition among banks leading to lower profitability and margins. [Demirgüç-Kunt and Huizinga \(1999\)](#) found a negative relation between profitability (ROA and NIM) and banking sector development, especially in developing countries. On the other hand, large banking sectors bring more opportunities and reduce costs leading to higher profitability and margins. [Ghosh \(2016\)](#) reported a positive relationship between profitability (ROA) and industry size but the opposite for margin.

Based on the aforementioned arguments, I expect a positive relation between banks' profitability and the banking sector development.

2.1.2.9 Size. This variable is used to capture the effects of economies or diseconomies of scale in the banking sector. The former lead to a positive relationship between size and profitability, whereas the later lead to a negative relation. In the literature, in general, the influence of the bank's size on profitability is positive ([Demirgüç-Kunt and Huizinga, 1999](#); [Athanasoglou et al., 2006](#); [Saona, 2016](#)). Thus, this study predicts a positive correlation between profitability and size, especially that the banks in the sample are small.

2.1.2.10 Concentration. The term concentration originated from structure-conduct-performance theory, which indicates that high concentration is positively related to profitability. The efficient-market or efficient-structure hypothesis contradicts structure-conduct-performance theory; specifically, the efficient-structure hypothesis suggests that firms with superior efficiency will obtain a large market share, and as consequence, the market will become more concentrated. Therefore, higher concentration does not necessarily imply market power, and consequently, the relationship between concentration and profitability does not have to be positive.

Both sides of this debate are reflected in the empirical literature. For instance, [Demirgüç-Kunt and Huizinga \(2000\)](#) find positive and significant relationships between profitability (ROA and NIM) and concentration. However, [Ben Ameer and Mhiri \(2013\)](#) find a significant but negative relationship (ROA and NIM). This study predicts a positive relationship between profitability and concentration.

3. Data, methodology and variables

In this section, all the issues related to the data, methodology and variables will be discussed.

3.1 Data and methodology

This study extracts cross-country bank-level data from the income statements and balance sheets of 730 banks drawn from the commercially available (and widely used) BankScope database ([Table II](#)). The period of the study, 1989-2008, is chosen to omit the effect of the world financial crisis[5].

The sample reduced from 730 to 686 banks. This is related to the unavailability of data for some countries, and other countries have only Islamic banks (Iran and Sudan); the number of countries included is 52 out of 57 because of the aforementioned constraints[6]. Also, mainstream banks with Islamic windows and converted banks (converted period) are excluded from our sample.

To be noted that this study used different sources such as banks websites and data from central banks to make sure that our sample is made of pure conventional banks because BankScope database is not comprehensive on its classification. For instance, it classifies

No.	Country	Islamic banks	Conventional banks	Total no. of banks ^a
1	Afghanistan		3	3
2	Albania		11	11
3	Algeria	1	12	13
4	Azerbaijan		16	17
5	Bahrain	6	6	17
6	Bangladesh	5	27	33
7	Benin		8	8
8	Brunei	1	1	2
9	Burkina Faso		9	9
10	Cameroon		11	11
11	Chad		3	3
12	Djibouti		2	2
13	Egypt	2	18	26
14	Gabon		5	5
15	Gambia	1	6	7
16	Guinea		5	5
17	Guyana		3	3
18	Indonesia	2	47	53
19	Iran	16		16
20	Iraq	2	7	9
21	Ivory Coast		11	11
22	Jordan	2	12	14
23	Kazakhstan		22	22
24	Kuwait	3	7	9
25	Kyrgyzstan		7	7
26	Lebanon	2	44	47
27	Libya		8	8
28	Malaysia	12	24	36
29	Maldives		1	1
30	Mali		9	9
31	Mauritania	1	6	7
32	Morocco		10	10
33	Mozambique		9	9
34	Niger		5	5
35	Nigeria		11	11
36	Oman		6	6
37	Pakistan	6	24	30
38	Palestine	1	2	3
39	Qatar	3	5	8
40	Saudi Arabia	3	7	11
41	Senegal	1	10	11
42	Sierra Leon		8	11
43	Sudan	24		24
44	Suriname		2	2
45	Syria	2	9	11
46	Tajikistan		3	3
47	Togo		6	6
48	Tunisia	1	16	17
49	Turkey	4	34	38

Determinants of
conventional
banks'
profitability

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Table II.

Number of banks by
country

(continued)

No.	Country	Islamic banks	Conventional banks	Total no. of banks ^a
50	Turkmenistan		1	1
51	Uganda		11	11
52	UAE	5	8	19
53	Uzbekistan		14	14
54	Yemen	4	4	8
Total		110	576	699

Notes: ^aIncludes the windows of conventional banks and the years before and during conversion for banks converted to Islamic banking. Banks with less than two years of data excluded

Source: Author's calculations based on BankScope data

Table II.

some Islamic banks as conventional banks and vice versa and does not indicate if a bank is converted from conventional banking to Islamic banking.

Regarding methodology, this study adopted, with some modification, the model and methodology used by [Demirgüç-Kunt and Huizinga \(1999\)](#)[7].

A linear equation is used to perform the regression analysis[8]. The model used for this analysis is represented by [equation \(1\)](#):

$$P_{ijt} = \alpha_0 + \alpha_i B_{ijt} + B_j X_{jt} + \gamma_t T_t + \delta_j C_j + \varepsilon_{ijt} \quad (1)$$

where P_{ijt} is performance (either ROA or NIM) for bank i in country j at time t ; B_{ijt} represents bank variables for bank i in country j at time t ; X_{jt} represents country variables for country j at time t ; T_t and C_j are time and country dummy variables; ε_{ijt} is an error term.

The two-way fixed-effects (FE) model has been chosen because the Hausman test shows that the FE (cross-section and time) model is consistent. Further, our sample is not random and contains almost all the conventional banks in the countries of the study.

Heteroscedasticity is not present in our sample based on white test[9], and the data cleaned from outliers. In addition, Durbin–Watson's results indicated that multicollinearity is not significant.

In selecting variables, to avoid multicollinearity problems, if any variable has a multicollinearity problem will be dropped.

3.2 Measures of bank profitability

In this study, two measures of performance are used: ROA and NIM. ROA is defined as profit after tax to total assets and shows the profit earned per dollar of assets[10]. For this study, NIM is defined as the net interest revenue income over earning assets and measures interest spread for conventional banks.

3.3 Determinants of bank profitability

This section describes the determining factors of bank profitability, which is divided into internal and external factors. External factors are further divided into variables encompassing macroeconomic factors, oil shocks, taxation, deposit insurance schemes and

financial structure. Following Bourke's (1989) who included internal variables in his cross-country study on banks' profitability, many researchers followed his footsteps and used internal variables in their studies on banks' profitability in single or multiple countries (Table I). Following these studies, numerous internal variables are used in this paper to investigate the profitability of banks in OIC countries.

The literature suggests that external factors such as macroeconomic trends, stock market development and policy influence banks just like they affect any other type of firm. In this study, several sets of external determinants are examined: national macroeconomic conditions, oil shocks, taxation, deposit insurance and financial structure. Table III displays the variables used to measure banks' profitability as well as the variables employed to examine the determinants of banks' profitability.

The variables used in this study illustrated in Table III.

Variable	Description	Expected sign
<i>Dependent variables</i>		
ROA	Bank's before-tax profits divided by total assets	
NIM	Net interest income divided by total assets	
<i>Independent variables</i>		
<i>Bank characteristics</i>		
EQ/TA _{t-1}	Equity divided by lagged total assets	+
LOTA	Loans divided by total assets	-
DSTA	Consumer and short-term funds divided by total assets	-
OHTA	Overhead divided by total assets	-
OOI	Other operating income divided by total assets	+
FRGN	Dummy, equal 1 if a bank has at least 50% foreign ownership otherwise 0	-
<i>Macroeconomic</i>		
GDPPC	GDP per capita (constant 2005 [USD] prices)	+
Growth rate	GDP per capita (constant 2005 [USD] prices) growth rate	+
<i>Oil shock</i>		
OIL	Annual change on oil prices (constant 2005 [USD] prices)	+
<i>Taxation</i>		
TAX	Tax divided by before tax profit	+
RES	Reserve of the banking system over deposit of the banking system multiplied by customer and short-term funding over assets for each bank	+
<i>Deposit insurance</i>		
INR	Dummy, equal one if the country has explicit deposit insurance and zero otherwise	-
<i>Financial structure</i>		
MACP	Market capitalization over GDP	-
BNK	Bank's assets over GDP	+
Assets	Bank's total assets (constant 2005 [USD] prices)	+
C3	The assets of the largest three banks divided by the assets of the banking system	+

Note: *All independent variables interacted with GDP per capita (constant 2005 [USD] prices) except for inflation

Table III.
Study variables*

Table IV.
Economic and
institutional
indicators in OIC
countries

No.	Country	GDP/PC (USD) 2005)	GDP growth	Real interest	Tax	RES	Deposit insurance (establishment date)	Concentration	MACP	Oil production (net exporting)	BNK
1	Afghanistan	208.67	8.2	2.04	8.99	10.07		100	NA	None	6.63
2	Albania	2,029.44	5.9	-6.72	22.63	8.65	2002	85.25	NA	None	43.34
3	Algeria	2,771.07	3.0	3.51	28.21	10.93	1997	86.36	NA	Producer	38.39
4	Azerbaijan	1,243.81	5.7	11.92	40.67	15.84	2006	85.68	0.077	Producer	17.40
5	Bahrain	15,001.49	5.5	9.59	19.51	6.32	1993	91	108.70	Producer	58.79
6	Bangladesh	322.91	5.3	9.34	30.15	8.11	1984	54.95	4.41	None	38.61
7	Benin	545.00	4.4	-2.46	20.68	18.33		86.58	NA	None	13.75
8	Brunei	8,736.47	1.9	5.18	-25.19	5.98		NA	NA	Producer	47.26
9	Burkina Faso	358.09	5.3	-0.05	20.68	17.49		72.68	NA	None	13.17
10	Cameroon	873.04	2.7	14.47	15.92	33.34		76.80	NA	Producer	12.03
11	Chad	429.39	6.0	14.87	31.44	25.14		100	NA	Since 1998	6.05
12	Djibouti	901.15	2.7	7.39	23.75	1.81		NA	NA	None	33.56
13	Egypt	1,183.19	4.8	6.91	17.64	17.69		62.04	38.56	Since 2000	77.00
14	Gabon	6,772.94	1.7	14.24	29.42	11.66		98.16	NA	Producer	14.08
15	Gambia	432.04	3.5	21.48	23.37	10.91		90.55	NA	None	15.00
16	Guinea	331.76	3.7	14.85	24.74	13.11		NA	NA	None	5.37
17	Guyana	1,651.91	3.16	8.92	33.15	14.84		100	20.27	None	46.16
18	Indonesia	1,187.83	4.5	7.07	23.86	6.39	1998	74.63	26.13	Until 2008	46.70
19	Iraq	1,294.28	7.2	-24.39	12.94	56.74		80.59	NA	Producer	134.90
20	Ivory Coast	966.47	2.3	-1.42	24.15	6.94		80.57	13.56	Since 1998	22.63
21	Jordan	2,026.67	6.0	6.36	29.69	25.55	2000	85.66	115.60	None	91.33
22	Kazakhstan	2,863.47	3.1	-15.06	13.26	12.17	1998	70.61	16.51	Since 1992	0.93
23	Kuwait	31,148.52	9.2	5.40	3.73	4.42		60.62	86.94	Producer	86.34
24	Kyrgyzstan	5,093.21	0.8	24.99	11.47	12.50		84.52	1.44	None	36.69
25	Lebanon	5,117.77	4.4	7.25	15.70	18.66	1967	38.08	17.58	None	139.64
26	Libya	7,043.31	3.1	5.14	31.61	38.11		90.41	NA	Producer	30.59
27	Malaysia	4,678.78	6.1	5.11	26.04	7.98	1998	58.89	173.37	Producer	129.71
28	Maldives	2,231.57	8.5	10.09	22.22	32.86		NA	NA	None	35.55
29	Mali	455.96	4.3	0.12	23.55	17.00		84.53	NA	None	15.84
30	Mauritania	564.05	3.7	2.66	28.83	16.65		78.48	NA	None	24.25

(continued)

No.	Country	GDPPC (USD) 2005)	GDP growth	Real interest	Tax	RES	Deposit insurance (establishment date)	Concentration	MACP	Oil production (net exporting)	BNK
31	Morocco	1,733.74	3.5	9.90	29.56	7.40		65.40	36.85	None	66.98
32	Mozambique	250.62	7.5	11.63	21.38	11.54		95.71	NA	None	16.98
33	Niger	263.28	3.3	-0.84	21.07	14.27		85.95	NA	None	19.74
34	Nigeria	638.61	5.5	-2.77	19.64	14.27	1988	66.69	14.18	Producer	7.72
35	Oman	11,216.98	4.7	7.26	11.26	4.65	1995	79.23	25.95	Producer	37.69
36	Pakistan	596.01	4.3	1.87	23.24	9.72		67.02	21.25	None	38.64
37	Qatar	1,520.44	-4.42	4.13	35.04	10.18		100.00	30.264	None	30.54
38	Saudi Arabia	43,530.22	11.00	-1.27	0.74	4.12		79.30	85.04	Producer	63.70
39	Saudi Arabia	12,914.50	2.80	1.23	1.28	5.93		51.13	62.59	Producer	44.31
40	Senegal	732.64	3.7	-0.23	20.25	9.52		75.70	NA	None	22.11
41	Sierra Leon	212.09	1.5	10.32	35.57	9.65		92.05	NA	None	7.87
42	Suriname	4,538.36	-15.74	-42.88	28.82	15.50		NA	NA	Since 2007	22.37
43	Syria	1,492.74	4.4	3.00	26.15	9.11		77.83	NA	Producer	41.28
44	Tajikistan	292.09	-1.6	2.33	24.54	19.89		100	NA	None	13.81
45	Togo	387.67	1.6	-1.55	30.37	9.39		99.23	NA	None	19.96
46	Tunisia	2,470.78	4.8	3.21	15.56	3.96		48.23	12.92	Since 2000	61.39
47	Turkey	6,148.58	4.3	3.87	17.52	5.90	1983	93.31	21.93	None	35.12
48	Turkmenistan	3,209.44	2.9	NA	3.10	18.43	2000	NA	NA	Since 1992	NA
49	Uganda	304.19	7.2	15.04	51.10	11.01	1994	71.78	0.84	None	10.15
50	UAE	31,315.46	6.2	7.13	10.20	11.80		47.40	55.45	Producer	69.06
51	Uzbekistan	455.96	3.2	NA	17.50	NA		97.30	1.41	None	NA
52	Yemen	787.09	4.8	6.87	31.88	23.30	2008	80.15	NA	Producer	9.49

Notes: Comoros, Guinea-Bissau and Somalia not included. All variables except deposit insurance are averaged from 1992 to 2008 (or available years). Real interest rate is the nominal interest rate minus rate of inflation. Nominal rate is the lending rate when available; otherwise, deposit rate is used (because of an unavailability of data, for Tunisia, the interest rate is the money market rate; for Pakistan, the interest rate is the treasury bill rate; and for Sudan, the interest rate is the *mushtarakah sukuk*). The concentration ratio is calculated using a C3 method. RES is the reserve of the banking system over deposit of the banking system (time, saving and demand deposits) multiplied by customer and short-term funding/total asset for each bank. MACP is the ratio of market capitalization to GDP. A country is considered an oil producer if it has produced oil for a long time

Table V.
Determinants of
ROA

	1	2	3	4	5	6
EQ/TAT-1	0.28 (2.77)***	0.02 (4.01)***	0.01 (2.43)**	0.02 (2.57)**	0.01 (2.44)**	0.02 (2.03)**
EQAGDP ⁽⁻¹⁾	0.00 (1.01)	-0.000 (-0.07)	0.00 (0.95)	0.00 (0.82)	0.00 (0.96)	0.015 (0.73)
LOTA	-0.01 (-1.20)	-0.01 (-1.81)*	-0.01 (-1.15)	-0.01 (-1.09)	-0.01 (-1.07)	0.00 (0.09)
LOAGDP	0.009 (0.76)	-0.009 (-0.64)*	-0.009 (-0.97)	-0.009 (-0.97)	-0.01 (-0.99)	-0.00 (-0.56)
DSTA	0.01 (1.06)	0.01 (0.66)	0.01 (0.75)	0.01 (0.95)	0.01 (0.88)	0.01 (0.79)
DSTGDP	0.00 (1.06)	-0.00 (-1.30)	-0.00 (-1.59)	-0.00 (-1.68)*	-0.00 (-1.64)	-0.00 (-1.52)
OHTA	-1.05 (-25.90)***	-1.01 (-22.67)***	-0.96 (-20.38)***	-0.95 (-19.34)***	-0.96 (-20.39)***	-1.13 (-15.1)***
OHAGDP	0.00 (0.39)	0.00 (0.10)	-0.00 (-0.27)	-0.00 (-0.39)	-0.96 (-0.25)	0.00 (0.03)
OOI	0.90 (41.48)***	0.58 (34.27)***	0.87 (35.22)***	0.86 (32.69)***	0.87 (35.17)***	0.89 (26.77)***
OIOGDP	0.00 (2.26)**	0.00 (0.93)	0.00 (0.62)	0.00 (0.94)	0.00 (0.59)	0.00 (1.26)
FRNG	-0.12 (-1.63)*	-0.06 (-0.81)	-0.06 (-0.841)	-0.05 (-0.81)	-0.06 (-0.84)	1.74 (3.65)
FRNGDP	0.00 (0.96)	0.00 (0.21)	0.00 (0.13)	0.00 (0.10)	0.00 (0.12)	-0.00 (-3.05)***
GDPPC		0.00 (0.92)	0.00 (1.09)	0.00 (1.14)	0.00 (1.14)	-0.00 (-0.05)
GDPCR		0.01 (2.65)	0.01 (2.65)	0.02 (2.70)	0.02 (2.79)***	0.05 (3.02)***
RI		0.01 (0.93)	0.02 (2.57)	0.02 (2.37)**	0.02 (2.52)**	0.04 (3.44)***
RIGDP		0.00 (0.41)	0.00 (0.22)	0.00 (0.11)	0.00 (0.24)	-0.00 (-0.43)
TAX			0.00 (1.12)	0.00 (1.13)	0.00 (1.151)	0.04 (2.23)**
TAXGDP			-0.000 (-0.23)	-0.00 (-0.25)	-0.00 (-0.26)	-0.00 (-1.46)
RES			0.00 (0.38)	0.00 (0.32)	0.00 (0.36)	-0.00 (-0.09)
RESGDP			-0.00 (-0.07)	-0.00 (-0.11)	-0.00 (-0.08)	0.02 (0.99)
OILGDP			0.00 (0.22)	-0.00 (-0.57)	-0.00 (-0.89)	
INSUR						-0.00 (-0.50)
MCAP						0.00 (0.78)
MCPGDP						-0.03 (-4.42)***
BNK						0.00 (2.63)***
BNKGDP						0.00 (0.14)
Assets						0.00 (0.34)
C3						0.78
Adjusted R ²	0.72	0.71	0.75	0.75	0.75	12.35***
F-STA	15.166***	14.01***	15.92***	16.16***	15.88***	2.28
DW	2.12	2.18	2.15	2.16	2.15	1,135
Observations	2,527	2,234	1,942	1,919	1,942	

Notes: *t*-statistics are in parentheses; ****p* < 0.01; ***p* < 0.05; **p* < 0.10

	1	2	3	4	5	6
EQ/TAt-1	0.01 (3.41)***	0.01 (2.84)***	0.01 (1.98)**	0.01 (1.32)	0.01 (1.96)**	0.02 (3.43) ***
EQAGDP ₍₋₁₎	0.00 (0.12)	0.00 (1.09)	0.00 (1.78)*	0.00 (2.25)**	0.00 (1.76)*	-0.00 (-0.06)
LOTA	0.01 (3.32)**	0.00 (2.14)**	0.00 (1.04)	0.00 (0.774)	0.00 (0.93)	-0.00 (-0.03)
LOAGDP	-0.00 (-0.32)	0.00 (1.82)*	0.00 (1.95)*	0.00 (2.16)**	0.00 (1.97)**	0.00 (0.90)
DSTA	-0.00 (-0.83)	-0.01 (-0.91)	-0.01 (-1.02)	-0.01 (-1.75)*	-0.01 (-1.19)	0.00 (0.45)
DSTGDP	0.00 (0.43)	0.00 (1.09)	0.00 (0.58)	0.00 (1.07)	0.00 (0.67)	-0.00 (-0.52)
OHTA	-0.058 (-1.80)***	-0.128 (-3.66)***	-0.161 (-3.85)***	-0.211 (-4.20)***	-0.159 (-3.78)***	-0.204 (-3.25)***
OHAGDP	0.00 (3.77)***	0.00 (4.12)***	0.00 (4.54)***	0.00 (5.04)***	0.00 (4.51)***	0.00 (4.78)***
OOI	0.42 (24.97)***	0.00 (29.29)***	0.59 (27.06)***	0.63 (27.75)***	0.59 (26.87)***	0.65 (22.42)***
OIOGDP	-0.00 (-3.34)***	-0.00 (-4.45)***	-0.00 (-5.21)***	-0.00 (-6.10)***	-0.00 (-5.17)***	-0.00 (-7.39)***
FRGN	0.15 (2.73)***	0.15 (2.62)***	0.14 (2.45)**	0.14 (2.43)**	0.14 (2.45)**	0.38 (0.92)
FRNGDP	-0.00 (-2.84)***	-0.00 (-2.74)***	-0.00 (-2.53)**	-0.00 (-2.51)***	-0.00 (-2.51)**	-0.00 (-2.63)***
GDPPC	-0.00 (-1.01)	-0.00 (-1.01)	-0.00 (-0.44)	-0.00 (-0.89)	-0.00 (-0.50)	0.00 (1.28)
GDPR	-0.00 (-0.44)	-0.00 (-0.44)	-0.01 (-1.34)	-0.01 (-1.00)	-0.01 (-1.65)*	-0.02 (-1.78)*
RI	0.02 (1.28)	0.02 (1.28)	0.02 (2.62)***	0.02 (3.03)***	0.02 (2.68)***	0.03 (3.47)***
RIGDP	0.00 (1.10)	0.00 (1.10)	0.00 (0.51)	0.00 (0.85)	0.00 (0.49)	0.00 (0.69)
TAX			0.00 (0.32)	0.00 (0.14)	0.00 (0.27)	0.02 (0.08)
TAXGDP			-0.00 (-0.15)	0.00 (0.02)	-0.00 (-0.14)	0.00 (0.114)
RES			-0.00 (-0.30)	-0.00 (-0.15)	-0.00 (-0.27)	-0.00 (-0.31)**
RESGDP			0.01 (2.20)**	0.01 (2.19)**	0.01 (2.22)**	0.01 (0.51)
OILGDP				0.00 (1.65)*		
MCAP					0.01 (1.17)	
MCAPGDP						-0.00 (-0.37)
BNK						0.00 (1.64)
BNKBDP						0.00 (0.67)
Assets						-0.00 (-2.59)***
C3						-0.00 (-1.48)
Adjusted R ²	0.80	0.83	0.81	0.81	0.81	0.78
F-STA	23.65***	26.72***	22.13***	22.09***	22.08***	18.33***
DW	1.18	1.15	1.10	1.11	1.10	1.12
Observations	2,503	2,213	1,922	1,899	1,922	1,332

Notes: *t*-statistics are in parentheses; ****p* < 0.01; ***p* < 0.05; **p* < 0.10

4. Results

[Table IV](#) represents the descriptive statistics of the variables, and [Tables V](#) and [VI](#) represent the regression results of ROA and NIM, respectively.

5. Discussion of results

This section provides the summary statistics of the variables used in the study, and the analysis of the performance of the banks in OIC countries.

5.1 Descriptive statistics

The ratios and indicators in [Table IV](#) give an idea about the economic and financial environments in which the banks in this study operate. Columns 2 through 3 in the table present the three macroeconomic variables: GDP per capita, GDP growth rate and real interest rate. GDP per capita was measured in 2005 prices (USD) and was highest in Qatar (43,530.22) followed by the UAE (31,315.46) and then by Kuwait (31,148.52). The lowest per capita GDP was for Afghanistan, with a value of 208.671. In general, the countries in this study had low per capita GDPs. GDP growth varies significantly throughout the sample, ranging from a high of 11 per cent per year in Qatar to a low of -15.74 in Suriname. The real interest rate is highest in Kyrgyzstan (24.99) and lowest in Suriname (-42.875). Albania, Benin, Burkina Faso, Iraq, the Ivory Coast, Kazakhstan, Niger, Nigeria, Qatar, Senegal and Togo have negative real interest rates.

Columns 4 and 5 of [Table IV](#) show the tax and reserve ratios. These ratios are indicators of the financial market's structure in each country. The tax ratio (tax values divided by profit before taxes for each bank) is highest in Uganda (51.10 per cent), followed by Azerbaijan (40.67 per cent), and Sierra Leon (35.57). The lowest ratios are negative in a direction primarily because BankScope counts deferred taxes in its tax data. Also, the ratio is related to the negative values of the profit-before-tax variable. Only one country has a negative sign (Brunei, -25.19). The reserve ratio (RES), which is used as a measure for implicit taxes, is calculated by dividing the reserves of the banking system by the deposits of the banking system (time, savings and demand deposits), and then multiplying the result by a customer and short-term funding over total assets for each bank. The highest RES value is observed in Iraq (56.72 per cent), followed by Libya (38.11 per cent) and then Cameroon (33.34 per cent). The lowest value is 1.811 (Djibouti). The RES values for Maldives, Jordan, Chad and Yemen range from 32.86 to 23.3 per cent. This is an indication that the majority of the countries in the study sample are experiencing financial repression.

The implementation year of the deposit insurance scheme is represented in Column 6 of [Table IV](#). In the estimation, the variable is coded 1 if such an insurance scheme is present (0 otherwise). Several countries offer some type of implicit insurance, and even when this is the case, the dummy variable is coded 0. Only 17 countries have a deposit insurance scheme, and some of them have just introduced the scheme toward the end of the study period. For this study, concentration ratio is defined as the ratio of the three largest banks' assets to total banking sector assets (as shown in Column 7 of the table). The concentration ratio is 100 per cent in Chad, Guyana, Palestine and Tajikistan, followed by 99.23 per cent in Togo and 98.16 per cent in Gabon. The ratio is lowest in Lebanon (38.08 per cent). The ratio for other countries in the sample ranges from 97 to 47 per cent. These figures are very high. The ratio of market capitalization to GDP is highest in Malaysia (173.37 per cent), followed by Jordan (115.70 per cent) and then Bahrain (108.70 per cent). The ratio is lowest in Azerbaijan (0.08 per cent).

The oil production situation for the countries in the sample is shown in the last column of the table. The countries producing oil for long more than 20 years are categorized as producers; otherwise, the date that a country became a producer is indicated.

The oil-producing countries comprise about half of the sample. However, the year when exporting began varies by country. Also, some countries such as Tunisia are not net exporters or net importers. All of those countries have been exporting oil since the 1980s.

The ratio of banks assets to GDP (BNK) is highest in Lebanon (139.64 per cent) and lowest in Kazakhstan (0.93 per cent), the majority of the countries has a low ratio.

Finally, it is clear from the descriptive statistics that the countries in the study sample have different economies, financial structures, banking regulations and levels of development. However, in general, they have low GDPPC, low GDP growth, lack of proper market and high concentrated banking sector, and the majority of the countries are oil producers.

5.2 Regression

The first variable Equity divided by lagged total assets (EQ/TAt-1; profits if not paid out in dividends will have a contemporaneous impact on bank equity, thus total assets lagged by one period to correct for this effect) has a highly significant and positive relationship with ROA and NIM. This finding supports the argument that well-capitalized banks can charge more for loans, pay less on deposits and pursue more business opportunities because they face a lower risk of bankruptcy (Srairi, 2009). This result is consistent with many studies findings such as Abreu and Mendes (2001) and Sufian (2012). The interaction of this variable with GDPPC has the same sign but only significant in the case of NIM.

On the other hand, loans (LOTA) have a weak negative effect on ROA (Column 2); nonetheless, the effect is positive and slightly highly significant for NIM (Columns 1 and 2). The interaction of LOTA with GDPPC is only significant in the case of NIM (Columns 3, 4 and 5), positive. The results here are parallel to Demirgüç-Kunt and Huizinga's (1999) findings. These outcomes suggest that weak economic conditions reduce the number of loans issued and increase loans default causing banks' profits to drop; however; the improvement in the economic settings will increase banks' profits in the long run.

The ratio of short-term funding to total assets (DSTA) in contrary to this paper predication has no meaningful relationship with ROA and NIM (weak negative relation with NIM in Column 4). This indicates that the banks in developing and low-income countries have low deposits, and it is costly to banks in term of branch network. Another reason that deposits lower banks interest margin that banks in developing and less developed countries offer high returns on deposits to attract customers. Moving to the effect of overheads on banks' profitability, the results show a negative correlation between this variable and profitability (ROA and NIM), and the improvement of the economic conditions allows banks to pass overhead costs to its customers. These results are in line with many studies as seen in Table I.

As expected, the impact of OOI on profitability (ROA and NIM) is positive and highly significant in all columns. It is also be noted that the interaction of this variable with GDPPC is significant with NIM and with a negative sign. This suggests that banks in developing and less developed countries depend on nontraditional activities to boost their profits because they operate in weak economies. Vithyea's (2014) study, Cambodian banks, suggested that there is a trade-off between non-interest income and interest margin as during economic downturns, banks depend on nontraditional activities and vice versa.

The final bank characteristic, foreign ownership, in general, has a positive link with profitability (ROA and NIM), and the same applies to the interaction of this variable with

GDPPC but with a negative sign. Thus, it can be said that banks with foreign ownership gain profit in developing and less developed countries because they bring better management techniques and technologies, and this advantage declines with the economic development of those countries. The results are consistent with [Demirgüç-Kunt and Huizinga's \(1999\)](#) conclusions.

Moving to the effect of macroeconomic variables on banks' profitability. The first macroeconomic variable is GDPPC, and contrary to this paper, expectation has no effect on banks' profitability in developing and less developed countries. The results are consistent with [Ben Naceur and Omran \(2011\)](#) who studied the performance of banks in developing countries (MENA region). Meanwhile, the growth rate has a diverse effect on ROA and NIM. In one hand, the growth rate linked positively with ROA through the entire regression but significant in Columns 5 and 6 ($p < 0.01$). In the other hand, this variable correlated negatively but weakly (Columns 5 and 6) with NIM. These results are in alignment with well-documented literature ([Table I](#)) that economic growth will improve banks' profitability in the long run. The final macroeconomic variable is real interest rate which is constructed by subtracting interest rate from inflation rate. The results show that real interest has a positive and highly significant correlation with ROA and NIM, and this is consistent with many studies as seen in [Table I](#).

Next, the effects of taxation variables on banks' profitability will be discussed. The results show that direct taxes (corporate taxes; TAX) have inconsequential relation with ROA and NIM (except in Column 6 for ROA with a positive sign; $p < 0.05$). This outcome is supported by [Aburime's \(2008\)](#) study. In relation to implicit taxes (RES), the results are insignificant. However, the interaction of the variables (TAX and RES) with GDPPC is significant in case of RES and only for NIM (positive) in Columns 3, 4 and 5 at 5 per cent level. This indicates that banks in developing and less developed countries managed to pass some of its costs to its customers, and this is related to economic development. The outcome of this study contradicts the findings of [Demirgüç-Kunt and Huizinga \(1999\)](#).

In contrary to this paper, expectation deposit insurance had no effect on banks' profitability in developing and low-income countries, and the sign was negative for ROA and positive for NIM. This implies that the lack of deposit insurance scheme and mispriced scheme hinders banks' risk taken behaviour leading to lower profitability in the long run. The results of this study contradict [Demirgüç-Kunt and Huizinga's \(1999\)](#) findings.

The interaction of oil prices with GDPPC variable affected NIM positively at 10 per cent level. The effect on ROA is trivial and negative. The results of ROA are in line with [Essayad and Madani \(2003\)](#); meanwhile, the results of NIM support [Huseynov's \(2009\)](#) findings. The findings of this study indicate that oil prices impact banks' profitability indirectly, and the weak effect could be related to the fluctuation of oil prices during the study period, and some of the countries are net oil importers.

The set of financial structure variables has an insignificant effect on banks' profitability in developing and less developed countries. The first variable in this set is stock market capitalization (MACP); this variable enters the regression with a negative sign for both of profitability variables but irrelevant. The same applies to the interaction of this variable with GDPPC but with a positive sign. These results suggest that capital markets and banks will complement each other in developing and underdeveloped countries in the long run, and this is related to economic development. The immaterial results here are supported by [Demirgüç-Kunt and Huizinga \(1999; ROA\)](#), [Aburime \(2008; ROA and PBT\)](#) and [Borroni et al.'s \(2016; NIM\)](#) findings. The second variable is banks assets to GDP (BNK) which impacted ROA negatively and significantly ($p < 0.01$), whereas its effect on NIM is positive but insignificant. The interaction of BNK with GDPPC is positive ($p < 0.01$) for ROA and

negative for NIM ($p < 0.01$). Referring to [Table I](#), [Ghosh \(2016\)](#) and [Demirgüç-Kunt and Huizinga \(1999\)](#) findings are in contrast to this paper finds. [Ghosh's \(2016\)](#) results show that banks assets to GDP affected ROA positively and NIM negatively, whereas [Demirgüç-Kunt and Huizinga's \(1999\)](#) results revealed that this variable had a negative effect on ROA and NIM. The results of this study suggest that the development of the banking sector will reduce costs leading to higher profitability in long run for banks operating in developing and less developed countries. The effect of size is insignificant for ROA (positive) and NIM (negative), and this is in line with previous studies such as [Yanikkaya et al. \(2018\)](#) and [Islam and Nishiyama \(2016\)](#). Finally, the concentration had a positive effect on ROA and NIM, but the results are significant in the case of NIM ($p < 0.10$). This reveals that concentrated markets allow banks in developing and underdeveloped countries to earn monopolistic profits by increasing its interest margin. These results supported by many studies, for example, [Athanasoglou et al. \(2006\)](#) and [Saona\(2016\)](#).

6. Conclusion

The analyses of this study add significantly to the empirical literature related to the determinants of banks' profitability. The analysis reveals that internal factors contribute significantly to the profitability of mainstream banks in OIC countries specifically capital adequacy, loans, OBS activities and foreign ownership. Moreover, the external factors which are GDP growth, real interest rate, banking sector development and concentration contributed to banks' profitability in OIC countries.

Based on this paper findings, some policy and regulation implications can be driven:

- Banks in OIC countries depend on nontraditional activities to improve their profitability; thus, regulatory bodies must regulate nontraditional activities to avoid any crisis. [Brunnermeier et al.'s \(2012\)](#) study revealed that the components of nontraditional activities equally contribute to market risk.
- Deposits have minimal effect on mainstream banks' profitability. Therefore, governments need to encourage people to open banks accounts[11].
- Overhead costs reduced banks' profitability accordingly banks' management must implement procedures to reduce overhead costs.
- Foreign ownership has a positive impact on the financial sector in OIC countries; hence, regulatory bodies need to facilitate foreign investment in the banking sector.
- Deposit insurance scheme did not contribute to banks' profitability; therefore, regulatory authorities need to establish an explicit insurance scheme and maintain close supervision over banks to discourage them from taking high risks. The World Bank Regulation and Supervision Survey which covered 180 countries for the period 1999-2011, compiled by [Barth et al. \(2013\)](#), revealed that the members of OIC countries need to improve their deposit insurance systems. Furthermore, policymakers must be attention to the fact that the establishment of an explicit deposit insurance system could delay the development of financial markets and of financial depth in general as reported by [Cull et al. \(2002\)](#). Additionally, [Cubillas et al. \(2012\)](#) argued that during a financial crisis deposit insurance scheme has a negative impact on the market discipline.
- Concentration correlated positively and significantly with profitability (NIM) this supported by a large volume of literature as seen in [Table I](#). Therefore, policymakers need to maintain a small number of banks.

- Banking sector development contributes to banks' profitability in the long run; as a result, the regulatory bodies need to increase the efficiency of the banking sector.
- Authorities required to develop stock markets, so they are complementing not substitute for the banking sector.

Even though this study had several implications to researchers and policymakers, more studies are required with data beyond 2008. These studies could compare the profitability of conventional banks in OIC countries before and after the crisis. Also, future studies could include factors such as legal enforcement and governance.

Notes

1. The organization has 57 members, and the majority of the members are underdeveloped countries.
2. According to [Goldberg \(2014\)](#), 41 per cent of adults in developing countries have formal bank accounts, and the ones having accounts they rarely use it.
3. The number of banks in each country is small ([Table II](#)).
4. Several studies such as [Nguyen \(2011\)](#) and [Alexiou and Sofokils \(2009\)](#) used other operating income to total assets as a proxy for OBS activities.
5. The global spread of the financial crisis occurred at the end of 2008 through the impact on the results is negligible. In addition, developing and underdeveloped countries have a low degree of integration with world capital markets which will delay the effect of the crisis on those countries. Thus, the inclusion of 2007-2008 data will have minimal effect on the results of this study.
6. Comoros, Guinea-Bissau and Somalia not included because of data availability.
7. Their methodology is adopted by other researchers such as [Hassan and Bashir \(2003\)](#).
8. [Olson and Mossman \(2001\)](#), and [Olson and Zoubi \(2008\)](#) did not find evidence that nonlinear techniques outperformed linear models. Furthermore, linear regression is widely used in the literature, has produced good results and has even outperformed other techniques ([Olson and Mossman, 2001](#)).
9. Results are available upon request.
10. ROA also reflects how well bank managers use the bank's real investment resources to generate profits. ROA is chosen as the profitability measure over ROE because ROE disregards financial leverage and the risks associated with it.
11. [Goldberg \(2014\)](#) reported that "only 41 per cent of adults in developing countries have formal bank accounts, and many who do rarely use their accounts."

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