

# INTRODUCING FINANCIAL INCLUSION TO MENA ISLAMIC-BANKS PROFITABILITY DETERMINANTS

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## Abstract

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This paper assesses Islamic banks (IBs) profitability determinants by investigating bank-specific, macroeconomic, and financial inclusion variables in MENA. Data is collected from Zawya, Bankscope, The Banker, Global Vindex and World Bank databases covering 73 IBs from 2008-2017. ROA and ROE are deployed as IBs' profitability term with new predictor variables assessing financial inclusion: overall financial structure, financial service penetration, and self-service banking prevalence. Common bank-specific variables are employed that include; credit risk, liquidity, size, capital adequacy, the effect of income fees and charges, and operating costs with other macroeconomic variables; GDP, inflation, and the average world governance indicator (WGI). A dynamic panel data is applied using a GMM model. Both ROA and ROE have almost the same significant relationship with credit risk, size, capital adequacy, and effect of income fees and charges but no significance was established with Basel capital adequacy. The same significant relationship between ROA and ROE is validated with only WGI as a macroeconomic variable and self-service banking prevalence as a financial inclusion indicator. Guiding IBs executives to improve bank profitability by utilizing macroeconomic and financial inclusion factors. Results may imply the importance of new products and alternative channel development in enhancing IBs' profitability. Few studies are found measuring the effect of bank-specific, macroeconomic, and financial inclusion variables. Thus, this paper contributes to the existing literature by introducing other dynamics affecting IBs' profitability.

**Keywords:** Islamic Banks, Bank-Specific, Macroeconomics, Financial Inclusion

**Authors' individual contribution:** Conceptualization - O.El-A.; Methodology - M.M.R.; Software - M.M.R.; Validation - O.El-A.; Formal Analysis - M.M.R.; Investigation - O.El-A.; Resources - O.El-A. and M.M.R.; Data Curation - M.M.R.; Writing - Original Draft - M.M.R.; Writing - Review & Editing - O.El-A.; Visualization - M.M.R.; Supervision - O.El-A.; Project Administration - O.El-A. and M.M.R.; Funding Acquisition - O.El-A. and M.M.R.

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## 1. INTRODUCTION

There is an unquestionable important role of a country's banking sector in the overall economic activities development where the banking sector is crucial for global economic stability and

development. Ultimately, failure in such a growth-supporting sector for the economy can lead to an associated effect for the entire global economy where the global financial crisis is a vivid demonstration of how banks can transmit devastating economic shocks into the economic

system of a country and across the globe. The domino effect of the 2008 economic crisis was mainly triggered by the collapse of Lehman Brothers bank due to the sub-prime mortgage situation where in 2008 a banking crisis starts by one bank unable to meet the demands of depositors in the US which consequently leads to a “bank run” inducing banks to suspend the convertibility of their liabilities and calling for large scale government intervention by extending liquidity and capital assistance (Afonso, Kovner, & Schoar, 2011).

No wonder then that in most of the economic structures, financial institutions take the primary role in the design and implementation of financial policy. Adversity impact on the economy, on the other hand, is always the result of the failure in the performance of such a vital sector. Such a vital sector of the economy has two main versions of operations: conventional banking (CBs) versus Islamic banks (IBs). An IMF survey comparing the performance of IBs with CBs claims that IBs showed stronger resilience during the global financial crisis where IBs managed to survive the crisis without much substantial impact (IMF, 2010; Othman, Mat Sari, Alhabshi, & Mirakhor, 2017).

The fundamental feature that differentiates conventional banking transactions from Islamic operations is the interest payment and receipt notion. In conventional banking, the transactions related to the cash deposits and borrowing activities bear a fixed interest rate<sup>1</sup>. Other characteristics that differentiate IBs are the prohibition in the engagement of activities that are related to products or services which may harm people (such as pork, liquor, and gaming bets). Furthermore, IBs evade speculative trades. Moreover, IBs should be applying the concept of profit and loss sharing.

Islamic banking has marked a noticeable momentum in recent years and is still expected to grow further. According to Thomson Reuters (2018) and the Islamic Financial Services Board (2019), the total Islamic financial services industry (IFSI) worth including the banking sector is valued at USD 2.19 trillion in 2018 with a 6.9% growth (Year-on-Year) in total assets out of which global IBs size showed 0.9% growth in assets to close at circa USD 1.57 trillion representing 71.7% of the overall IFSI. Tracking the global Islamic banking growth from December 2013 to June 2018, on the other hand, shows a Compound Annual Growth Rate (CAGR) of 7.2%.

Therefore, given the importance of IBs to both the country's economy as well as to the banking industry, several studies were developed seeking a definition of the variables contributing to the overall performance of IBs. A handful amount of literature in banking performance analysis extensively focuses on analyzing a range of internal variables (also known as bank-specific variables) and external variables in which banks operate including those related to macroeconomic indicators (Mokni & Rachdi, 2014; Khasawneh, 2016; Trad, Trabelsi, & Goux, 2017; Yanikkaya, Gumus, & Pabuccu, 2018). Recent studies also extended banking profitability variables into other non-core banking indicators such as financial inclusion, global price indexes, and customer behaviors (Yanikkaya et al., 2018) by extending profitability explanation to financial service penetration and self-service banking prevalence.

Hence, the objective of this paper is to contribute to the existing literature by examining the profitability factors that affect IBs in MENA. Through exploring a group of bank-specific variables, macroeconomic indexes, and financial inclusion factors, the current study observes the significant relationship between such variables and IBs' profitability to answer the following research questions: What are the determinants of the profitability of IBs? What are the factors that can mainly determine IBs profitability?

This paper proceeds as follows. Section 2 presents the literature review and hypothesis development. Section 3 describes the research design and methodology. Section 4 outlines data and statistical results. Discussion is elaborated under Section 5. The final section provides conclusions, study limitations & future research, and recommendations.

## 2. LITERATURE REVIEW

### 2.1. Islamic banking in theory and practice

In theory, the business model of IBs is built on four main pillars: 1) the ban of interest-bearing transactions “Riba”; 2) the prohibition of any gambling activities; 3) the prohibition of excessive uncertainty “Gharar”; 4) the restriction on financing or investing in sectors producing products (such as weapons, drugs, alcohol, and pork) that are against Islamic principles (Abedifar, Ebrahim, Molyneux, & Tarazi, 2015; Yanikkaya et al., 2018; Alzahrani, 2019). Besides, the cornerstone that resembles the main Islamic finance theoretical model is profit-and-loss sharing (PLS) contracts (Archer & Karim, 2009; Alzahrani, 2019).

Thus, in Islamic financed transactions, the aforementioned requirements are fulfilled in IBs through contractual agreements which are based on buying/selling banking products with the names of (Murabahah<sup>2</sup>, leasing (Ijarah<sup>3</sup>, or partnership in (Musharakah<sup>4</sup>/ Mudharabah<sup>5</sup>) (Archer & Karim, 2009; Lajis, 2019).

It is debated that such a PLS structure has safeguarded IBs against severe shocks such as the global financial crisis (IMF, 2010; Othman et al., 2017). The fact that IBs were protected against the impact of the economic crisis may be relied on to the nature of operations of IBs that do not allow the trading in risk derivatives or mortgage-backed securities rather trade-in asset-backed securities

<sup>2</sup> Murabahah is an Islamic financing product where a seller and a buyer agree on both the cost and markup of an asset. Interest is replaced by the markup since interest is prohibited in Islam. Thus, Murabahah is not considered a loan that is an interest-bearing “Riba”. It is rather an agreeable credit sale form in Islam. The buyer is not entitled as the real owner till full payment of the loan.

<sup>3</sup> Ijarah financing can be resembled to leasing contracts where the bank buys the underlying asset on behalf of a customer and then leases it back for a specified period of time at a pre-agreed fixed cost referred to as rent. Despite being not a PLS contract, Shariah still permits the charges of rental services on property, on the conditions that the banks – which in this case referred to as the lessor preserve the risk of asset ownership.

<sup>4</sup> Musharakah contracts bear a similarity with joint venture agreements, where a bank and an entrepreneur equally share capital to initiate a new project. The agreement regulates the share of each party in the profits generated from the success of the business as well as the loss that might be incurred. The legal entity of the joint venture is an independent one and according to the agreement, the bank can terminate the contract after the completion of specified agreed upon terms.

<sup>5</sup> Mudharabah contracts are similar to Musharakah being profit sharing agreements. However, and unlike Musharakah, the bank alone secures the required capital to finance a new business project, while the other party offers the experience, management and working force. A pre-agreed fixed ratio determines the share of each party in any profits generated from the business while the loss is to be totally borne by the bank. In Murabahah, the bank purchases goods for the customer and then the bank sells these goods back to the customer at a pre-determined price that includes the original purchase price added to a pre-determined profit margin. This contract is widely utilized in financing trade and working capital (Saripudin, Mohamad, Razif, Abdullah, & Rahman, 2012).

<sup>1</sup> The concept of a fixed interest rate on lending or borrowing is referred to in Islamic scholars as “Riba”.

where all cash flows are attached to the purchase and the sale of real assets without establishing unsteady debt levels.

In practice, however, there is an existing debate on PLS principles where it is said that the contracts between IBs and customers are constructed on the asset side and largely based on transaction-based structures such as Murabahah, which rises the conclusion that the essence of Islamic Banking is much similar to that of their conventional counterparts (Archer & Karim, 2009; Yanikkaya et al., 2018; Alexakis, Izzeldin, Johnes, & Pappas, 2019).

In addition, there is another debate in place about the regulatory framework governing IBs' operations. A comprehensive overview is given by (Alexakis & Tsikouras, 2009) who lists the primary supervisory bodies that signal the main policy and best practices for Islamic finance activities. Among such bodies is the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI)<sup>6</sup>. AAOIFI has released over 56 standards that include financial accounting, auditing, governance, and Shaaria standards along with a code of ethics for accountants and auditors of Islamic finance institutions (Alexakis & Tsikouras, 2009; Mohammed, Fahmi, & Ahmad, 2015).

The main difference between the standards of AAOIFI and their counterparts of the Generally Accepted Accounting Principles (GAAP)<sup>7</sup> lies in the fact that the traditional GAAP is not giving reference to the religious framework; yet it is designed for the economies and instruments of interest-based activities (Arche & Karim, 2009; Alzahrani, 2019). For instance, if the conventional accounting principles form a violation of the Shaaria standards, they are rejected. Else, GAAP is incorporated into AAOIFI standards regarding the perceptions of assets, liabilities, profit, revenue, expenses, and owner's equity.

On another account, empirical literature explored IBs' performance dynamics where some draw a comparison between IBs against commercial banks (CBs). The next section summarizes investigations about IBs' profitability determinants.

## 2.2. Literature findings/measurement of variables

Most of the found studies have displayed bank profitability as a function of a group of internal and external variables (Mokni & Rachdi, 2014; Khasawneh, 2016; Trad et al., 2017; Yanikkaya et al., 2018). The internal variables are related to bank-specific factors which include size, liquidity, leverage, assets/liabilities structure, and credit risk, while the external variables are related to macro-variables linked to the broader surroundings that cannot be controlled by the bank management including macroeconomic conditions and the regulatory and legal environment (Elsiefy, 2013; Miah & Sharmeen, 2015).

The most extensively used profitability measure that is utilized in substantial empirical studies to measure bank profitability is the ROA (Ika & Abdullah, 2011; Masood & Ashraf, 2012; Elsiefy, 2013; Fayed, 2013; Mokni & Rachdi, 2014; Khasawneh, 2016; Trad et al., 2017; Yanikkaya et al., 2018).

Nonetheless, it is argued that depending on ROA in isolation as a measurement of bank profitability has two drawbacks. The first one is that it does not consider other profit-generating activities that are off the balance sheet (Elsiefy, 2013). Such an argument is crucial given that the change in the nature of bank role as financial intermediation has imposed a shift in the total income of banks from margin income to income financed by off-balance sheet activities (Buljevich & Park, 1999). The second limitation of ROA is in the fact that ROA does not take account of the risk profile adopted by the bank. In that sense, profitability measured by ROA can give more favorable results to banks that take higher risks to lift earnings on the account of banks that take the lower risk to guarantee consistent earnings (Elsiefy, 2013).

The second commonly used measurement of bank profitability is ROE (Mokni & Rachdi, 2014; Trad et al., 2017). It interprets the overall bank's ability to generate profits from each unit of the shareholder's equity. Logically, a higher rate of ROE denotes that the related bank is more efficient with respect to its performance (Al-Tamimi, Lafi, & Uddin, 2009; Hanif, 2011; Yanikkaya et al., 2018).

### 2.2.1. Bank-specific variables

#### Credit risk

It is argued that credit risk management for IBs is more challenging than CBs (Othman et al., 2017) who points out that in the case of a financing default; IBs are banned from putting accrued interests or penalizing borrowers, except if the delay in repayment is deliberately made. Such an argument of risk exposure is demolished in research by Song and Oosthuizen (2014) who proves that the counterparty default risk in IBs is mitigated in a practice by most IBs; which demand that a customer deposits additional collateral before contracting a Murabahah transaction.

While assessing bank profitability through credit risk, it is said that the quality of the loan portfolio is used as a proxy for credit risk (Mokni & Rachdi, 2014). In the explored literature, the commonly used factor that measures credit risk is the ratio of provisions for loan losses/total assets (Elsiefy, 2013; Fayed, 2013; Mokni & Rachdi, 2014; Khasawneh, 2016; Trad et al., 2017; Yanikkaya et al., 2018).

It is observed by (Yanikkaya et al., 2018) that loan loss provision (LLP) showed a negatively significant sign with IBs' profitability.

*H1-1: There is a significant association between credit risk and Islamic banks' profitability.*

#### Liquidity

High liquidity of banks is said to negatively affect bank profitability (Mehta & Bhavani, 2017) since high liquidity signals that funds are blocked rather than being managed in profit-generating ventures. However, Ali and Puah (2019) argue that a sufficient portion of liquidity can provide safety to large banks toward macroeconomic shocks. A research by Elsiefy (2013) argues that the impact of liquidity on IBs can vary given which measure of profitability is being used.

The most commonly used liquidity indicator is total loans to total assets. The higher this ratio is, the lower is the bank's liquidity and thus the riskier a bank is. Liquidity has a positive significance with 0 NIM of 74 IBs in GCC and the United Kingdom

<sup>6</sup> AAOIFI is a Bahrain based not-for-profit organization that was established to maintain and promote Shariah standards for Islamic financial institutions, participants, and the overall industry.

<sup>7</sup> GAAP is the accounting standard adopted by the U.S. Securities and Exchange Commission (SEC).

(Yanikkaya et al., 2018). Nonetheless, Bashir (2003) reports in his study of the profitability of 14 IBs between 1993 and 1998, that liquidity has a negative relation with IBs' performance, which is due to the conservative policies of IBs in the allocation of funds.

*H1-2: There is a significant association between liquidity and Islamic banks' profitability.*

#### Size

Theoretically, banks with large size tend to have lower costs due to economies of scale, hence, increasing profitability (Mokni & Rachdi, 2014). However, it is argued that banks which are extremely large could have a negative effect on profitability due to the associated cost of managing extremely large firms (Abedifar et al., 2015).

However, size - profitability relationship showed a significant positive sign with NIM but did not prove significant for ROA (Yanikkaya et al., 2018).

*H1-3: There is a significant association between size and Islamic banks' profitability.*

#### Basel capital adequacy

In 2011, Song and Oosthuizen (2014) report that capital adequacy ratio (CAR) in IBs takes a range from 8% to 12% as per a questionnaire surveying regulatory bodies of 52 countries in different regions of the globe. In 2017, however Islamic Financial Services Board (2019) reports the IBs average CAR in 2017 has reached 18.2%. While examining the relationship between profitability (ROA) and CAR, (El-Ansary, El-Masry, & Yousry, 2019) delivers that a significant positive ROA-CAR correlation exists for IBs in the study that covered 38 IBs and 75 CBs in 10 countries within the MENA region during the period from 2009 to 2013. In their research, El-Ansary et al. (2019) rely on such a CAR-ROA positive association to the conclusion that IBs are profitable due to the effective management of their capital buffers.

*H1-4: There is a significant association between capital adequacy and Islamic banks' profitability.*

#### Effect of income fees and charges

Few papers have discussed the non-interest income impact on IBs profit which has been tested by (Mokni & Rachdi, 2014). The paper concludes that - after examining a sample consisting of 15 CBs and 15 IBs - the ratio of non-interest income to total assets measuring off-balance sheet activities has a positive significant relationship with ROA indicating that involvement in off-balance-sheet activities by banks will hold a positive effect on bank profitability.

*H1-5: There is a significant association between the effect of income fees and charges and Islamic banks' profitability.*

#### Operating costs

Although Yanikkaya et al. (2018) argues that operation cost carries NIL significance with IBs' profitability, Miah and Sharmeen (2015) point out that operating cost has a significant relationship with CBs however with no impact on IBs claiming that CBs are already well invested and have reached an optimum size to shrink the costs of their operation. IBs, on the other hand, do not have the same operating level as CBs; and thus, have not yet reached the satisfactory achievement of economies of scale.

*H1-6: There is a significant association between operating costs and Islamic banks' profitability.*

#### 2.2.2. Macroeconomic variables

Macroeconomic factors proxied with the gross domestic product (GDP) suggests that an increase in GDP can lead to an expansion in all economic activities which increases the debtor's ability to meet their obligations (Mokni & Rachdi, 2014; Khasawneh, 2016).

*H1-7: There is a significant association between GDP and Islamic Banks' profitability.*

Inflation, on the other hand, shows no impact on IBs' profitability (Masood & Ashraf, 2012; Elsiefy, 2013; Mokni & Rachdi, 2014). Nonetheless, Yanikkaya et al. (2018) indicate that inflation rates show a significant positive relationship with IBs indicating that IBs give account to inflation rates for interest margin while designing their related interest margin.

*H1-8: There is a significant association between the inflation rate and Islamic Banks' profitability.*

World governance indicator (WGI), however, is used to reflect the degree of adherence to international regulatory bodies. Although not much literature was found measuring bank profitability with WGI, research was found that tries to explain bank performance by political stability. It is concluded by Abid, Goaid, and Ben Ammar (2018) that bank performance is not explained by WGI indexes concluding that WGI is not a key determinant in explaining IBs' profitability.

*H1-9: There is a significant association between WGI and Islamic Banks' profitability.*

In the research of Yanikkaya et al. (2018), IBs profitability is insignificantly related to GDP, inflation, and interest rate volatility.

#### 2.2.3. Financial inclusion variables

Similar to WGI, literature exploring the relationship between financial inclusion and bank profitability is rare. Yanikkaya et al. (2018) who try to explain profitability in relation to financial service penetration and self-service banking prevalence; found that financial structure and financial inclusion have a positive significant relation with ROA of both Islamic and CBs indicating that the ratio of borrowers to savers has a strongly positive relation with ROA.

*H1-10: There is a significant association between financial inclusion and Islamic banks' profitability.*

### **3. RESEARCH METHODOLOGY**

ROA and ROE are deployed to measure IBs' profitability in relation to bank-specific variables, Macroeconomic variables, and financial inclusion variables; where ROA is utilized by Samad (2004), Ika and Abdullah (2011), Masood and Ashraf (2012), Elsiefy (2013), Fayed (2013), Mokni and Rachdi (2014), Khasawneh (2016), Trad et al. (2017), Yanikkaya et al. (2018), and ROE is used by Mokni and Rachdi (2014), and Trad et al. (2017).

#### **3.1. Empirical methodology**

The model formula is profitability = f (bank-specific variables; macroeconomic variables; financial inclusion variables). This equation is developed by the researcher according to the research design.

$$ROA = \lambda_{i,t-1}ROA + \lambda_{i,t-2}ROA + \sum_{k=1}^k \lambda^k BS_{i,t}^k + \sum_{j=1}^j \lambda^j ME_{i,t}^j + \sum_{l=1}^l \lambda^l FI_{i,t}^l + \varepsilon_{i,t} \quad (1)$$

$$ROE = \lambda_{i,t-1}ROE + \lambda_{i,t-2}ROE + \sum_{k=1}^k \lambda^k BS_{i,t}^k + \sum_{j=1}^j \lambda^j ME_{i,t}^j + \sum_{l=1}^l \lambda^l FI_{i,t}^l + \varepsilon_{i,t} \quad (2)$$

where *ROA*: Return on assets; *ROE*: Return on equity;  $\lambda_{i,t-1}ROA$ : 1-period lagged *ROA*;  $\lambda_{i,t-2}ROA$ : 2-period lagged *ROA*;  $\lambda_{i,t-1}ROE$ : 1-period lagged *ROE*;  $\lambda_{i,t-2}ROE$ : 2-period lagged *ROE*; *i, t*: Bank *i* at time *t*; *BS*: Bank-specific variables; *ME*: Macroeconomic variables; *FI*: Financial inclusion variables;  $\varepsilon_{i,t}$ : Error term; *K*: A number of *BS* variables; *J*: A number of *ME* variables; *L*: A number of *FI* variables.

Expanding the proxies used in the above function can give the models as below:

$$ROA_{i,t} = \alpha + \lambda_{i,t-1}ROA + \lambda_{i,t-2}ROA - \beta_1 LLP_{i,t} + \beta_2 LA_{i,t} + \beta_3 LogA_{i,t} + \beta_4 Equ/Asset_{i,t} + \beta_5 CAR_{i,t} + \beta_6 NII/TA_{i,t} - \beta_7 OpC/TA_{i,t} + \beta_8 GDPG_{i,t} + \beta_9 Inf_{i,t} + \beta_{10} WGI_{i,t} + \beta_{11} Borr\_Sav_{i,t} + \beta_{12} Bank\_Ser\_Cov_{i,t} + \beta_{13} Self\_Ser_{i,t} + \varepsilon_{i,t} \quad (3)$$

$$ROE_{i,t} = \alpha + \lambda_{i,t-1}ROE + \lambda_{i,t-2}ROE - \beta_1 LLP_{i,t} + \beta_2 LA_{i,t} + \beta_3 LogA_{i,t} + \beta_4 Equ/Asset_{i,t} + \beta_5 CAR_{i,t} + \beta_6 NII/TA_{i,t} - \beta_7 OpC/TA_{i,t} + \beta_8 GDPG_{i,t} + \beta_9 Inf_{i,t} + \beta_{10} WGI_{i,t} + \beta_{11} Borr\_Sav_{i,t} + \beta_{12} Bank\_Ser\_Cov_{i,t} + \beta_{13} Self\_Ser_{i,t} + \varepsilon_{i,t} \quad (4)$$

where *i* = 73 IBs; *t* = Jan. 2008 to Dec. 2017;  $\varepsilon_{i,t}$  = Error term;  $\lambda_{i,t}$  = lag effect<sub>(t-1)</sub>

Explanatory variables are categorized into Table 1 as follows: 1) bank-specific variables (BS) including credit risk, liquidity, size, capital adequacy, the effect of income fees and charges,

operating costs, 2) macroeconomic variables (ME) including GDP, inflation and WGI and 3) Financial inclusion variables (FI) including overall financial structure, financial service penetration, and self-service banking prevalence.

**Table 1.** Variable definitions/measurements

Variables		Dimensions	Elements	Measures	Abbreviation	Code	Source
Dependent variables	Bank-specific	Bank profitability	Return on assets	Total income/ Total assets	ROA	D1	Zawya, The Banker, Orbis Bank Focus
			Return on equity	Total income/ Total equity	ROE	D2	Zawya, The Banker, Orbis Bank Focus
Independent variables	Bank-specific variables	Credit risk	Loan loss provision	Impairment Charges for loan loss/Total loans	LLP	V1	Zawya, The Banker, Orbis Bank Focus
			Liquidity	Loan to assets	Total Loans/ Total Assets	LA	V2
		Size	Total assets logarithm	Log (10) for Total assets	Log(A)	V3	Zawya, The Banker, Orbis Bank Focus
			Capital adequacy	Equity to assets	Total equity/ Total assets	Equ/Asset	V4
		Basel capital adequacy		(Tier1 Capital + Tier2 Capital)/Risk-weighted assets	CAR	V5	Zawya, The Banker, Orbis Bank Focus
		Effect of income fees & charges	Non-interest income margin	(Non-interest income + Other Non-interest income)/ Total assets	NII/TA	V6	Zawya, The Banker, Orbis Bank Focus
		Operating costs	Operation costs to total assets	Operation costs/ Total assets	OpC/TA	V7	Zawya, The Banker, Orbis Bank Focus
	Macroeconom variables	World Bank indicators	Real GDP growth rate	Annual percentage growth rate of GDP	GDPG	V8	The World Bank
			Inflation rate	Annual inflation rate	Inf.	V9	The World Bank
			World governance index	Average of Aggregate indicators of six broad dimensions of governance	WGI	V10	The World Bank
	Financial inclusion variables	Overall financial structure	Borrowers/ Savers ratio	Population borrowed/ Population saved from/in a financial institution for the last year	Borr_Sav	V11	Findex Database
			Financial service penetration	Banking service coverage	Dummy Variable takes '1' if > 50% of population (%age15+) have bank account or credit/debit cards	Bank_Ser_Cov	V12
		Self-service banking prevalence	Usage of self-service banking	Population who made or received digital payments transactions in the past 12 months	Self_Ser	V13	Findex Database

### 3.2. Sample type/Data collection

Secondary data is obtained from specialized databases in the MENA region. The selected sample as shown in Table 2 covers 73 IBs in MENA in the period from 2008-2017.

Non-probability sampling is selected where convenience sampling is adopted covering 16 MENA countries namely Algeria, Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Libya, Oman, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, United Arab Emirates, and Yemen.

**Table 2.** Country distribution of observations

No.	Country	Banks	Obs	Percent
1	Algeria	1	4	0.78%
2	Bahrain	13	98	19.03%
3	Egypt	3	28	5.44%
4	Iran	17	108	20.97%
5	Iraq	1	2	0.39%
6	Jordan	3	17	3.30%
7	Kuwait	4	35	6.80%
8	Libya	1	2	0.39%
9	Oman	1	2	0.39%
10	Qatar	6	47	9.13%
11	Saudi Arabia	6	58	11.26%
12	Sudan	5	23	4.47%
13	Syria	1	2	0.39%
14	Tunisia	2	14	2.72%
15	United Arab Emirates	7	62	12.04%
16	Yemen	2	13	2.52%
	<b>Total</b>	<b>73</b>	<b>515</b>	<b>100.00%</b>

### 3.3. Development of main hypotheses

*H1: There is a significant statistical relationship between independent variables and the IBs' profitability.*

*H2: All the research independent variables have a joint significant statistical impact on IBs' profitability.*

Structure of main hypotheses analysis & statistical methods is shown in Table 3.

**Table 3.** Structure of main hypotheses analysis & statistical methods

Hypotheses structure	Underlying variables*	Statistical analysis tools
H1: There is a significant statistical relationship between independent variables and the profitability of the Islamic banking sector.	Each IDv alone {LLP, LA, LOGA, Equ/ASSET, CAR, NIL_TA, OPC_TA, GDPG, INF., WGI, BORR_SAV, BANK_SER_COV, SELF_SER} and each of {ROA}, {ROE}	Pearson correlation
H2: All the research independent variables have a joint significant statistical impact on IBs' profitability.	IDVs {LLP, LA, LOGA, Equ/ASSET, CAR, NIL_TA, OPC_TA, GDPG, INF., WGI, BORR_SAV, BANK_SER_COV, SELF_SER"} and each of {ROA}, {ROE}	Diagnostics statistics: <ul style="list-style-type: none"> <li>• Multicollinearity (VIF Test);</li> <li>• Serial Correlation (Breusch-Godfrey LM Test);</li> <li>• Heteroskedasticity (Breusch-Pagan-Godfrey Test);</li> <li>• Heterogeneity Random Effect (Hausman Test);</li> <li>• Equality (Anova, Welch F-Tests).</li> </ul> Regression analysis (GMM)

Note: \* Independent variables related to lagging effect (t-1 & t-2) and heterogeneity are considered in the GMM model. All variables are defined in Table 1.

Source: Developed by the researcher.

## 4. DATA STATISTICS RESULTS

Unbalanced panel data is used as it contains the merits of both cross-sectional and time-series data. GMM model is utilized in the best interest of the model accuracy as it uses lagged regressor variables (2-period lags) as instrumental variables to moderate potential concerns related to the problem of endogeneity, heterogeneity, heteroscedasticity, and serial correlation of the model. GMM was also found in studies by Mokni and Rachdi (2014), Trad et al. (2017), Yanikkaya et al. (2018), and El-Ansary et al. (2019).

### 4.1. Univariate analysis

#### 4.1.1. Descriptive statistics

Results shown in Table 4 illustrate that MENA IBs have, on average, a positive profit on ten years' time

horizon. For the total sample, the ROA means equals 1.3% with a minimum -8% and a maximum of 4.9% showing a low mean variability.

IBs median of 1.3% identical to their mean. However, there is a large dispersion in the minimum and maximum observation of IBs ROA that could be seen from the high standard deviation of ROA that is 1.5%, which is similar to ROE indicative figures that show a mean of 10.8% with a high relative standard deviation of 11.5% indicating that IBs experience high-risk volatility.

LLP, on average, equals 1.6% with a median of 0.9%, a minimum -1.5%, and a maximum of 27.5% showing a high mean variability indicating that IBs have an exposure on the front of borrowers' default risk.

The descriptive statistics of LA mean is 63%; almost equal to its median 65.5% ranging between a minimum of 5.1% and a maximum 95%, indicating that IBs possess a better liquidity profile.

It is also shown that IBs size is 3.82 and 3.7 for mean and median which is normal for all banking sector records.

Furthermore, Equ/Assets and CAR are 17.5%, 18.7% respectively indicating that IBs show high risk-weighted assets.

NII/TA figures show a mean and a median of 2.1, 1.5%, while OpC/TA shows a 2% of mean indicating that IBs display an efficient operating costs management.

Means for GDP records 2.9%, inflation records 7.9% while WGI records 41.4 ranks out of 100 which are considered moderate real reflecting figures. Financial inclusion indicators show borrowers to savers ratio, bank service coverage ratio, and self-service usage ratio of 100.2%, 85.5%, and 35.7% respectively, alarming that IBs operate in countries with a high overall financial structure, well-structured financial service penetration, and a moderate self-service banking prevalence.

**Table 4.** Descriptive statistics

Variables	N	Mean	Median	Maximum	Minimum	St. dev.	Skewness	Kurtosis
ROA	500	0.013	0.013	0.049	(0.080)	0.015	(1.389)	9.765
ROE	503	0.108	0.099	0.439	(0.485)	0.115	(0.181)	5.833
LLP	506	0.016	0.009	0.275	(0.015)	0.027	4.648	31.380
LA	514	0.630	0.655	0.950	0.051	0.176	(0.803)	3.526
LOG_A	515	3.822	3.870	5.079	1.279	0.654	(0.505)	3.055
E/ASSET	515	0.175	0.127	0.873	0.017	0.159	2.646	10.287
CAR	501	0.187	0.173	0.615	0.041	0.090	1.740	7.503
NII_TA	508	0.021	0.015	0.142	(0.037)	0.024	2.610	12.546
OPC_TA	515	0.020	0.016	0.143	0.003	0.014	3.170	19.671
GDPG	515	0.029	0.032	0.196	(0.240)	0.044	(0.590)	9.462
INF	515	0.079	0.034	0.393	(0.049)	0.094	1.706	5.551
WGI	515	41.426	46.204	72.185	3.066	20.347	(0.264)	1.793
BORR_SAV	469	1.002	0.659	5.274	0.124	0.834	3.214	16.131
BANK_SER_COV	469	0.855	1.000	1.000	-	0.352	(2.017)	5.067
SELF_SER	469	0.357	0.228	0.898	-	0.358	0.185	1.209

Note: All variables are defined in Table 1.

Source: Developed by the researcher from EViews® 10 extracted outputs.

#### 4.1.2. Pearson's correlation matrix

The correlation matrix between ROA and ROE on one hand as a profitability measure and independent variables on the other is shown in Tables 5, 6, and 7 as follows.

LLP has a significant negative correlation with ROA and ROE; as loan loss provision decreases profitability increases.

LA has no significant relationship with ROA or ROE, which should show a relation because as the amount of assets being engaged in loans increases, liquidity decreases, and this negatively affects bank profitability. The higher the ratio is, the lower is bank liquidity and therefore the riskier is the bank to higher defaults. However, such a ROA-LA & ROE-LA relationships in the sample model is weak (-0.0104) and (-0.0756) respectively while being statistically insignificant (since the p-value is insignificant > 0.1).

LogA has a significant positive relationship with ROA and ROE. Such a correlation relationship is consistent with the results of (Masood & Ashraf, 2012). As the bank size increases, total loans thus increase which attracts higher income for banks. Accordingly, profitability is expected to increase.

Equ/Assets shows no significant relationship with ROA despite showing a negative significant relationship with ROE. CAR displays a significant positive correlation with ROA and a significant negative correlation with ROE. As the percentage of equity increases, relying on covering loans from deposits decreases; saving some paid profit expense to depositors, which positively impacts profitability measure; ROA. Nonetheless, equity has increased leaving the ROE ratio denominator with a higher value, which decreases ROE.

NII/TA displays no significant correlation with ROA or ROE.

OpC/Assets displays a significant negative correlation with ROA and ROE. As the percentage of operating costs decreases; a positive impact on profitability will occur.

Inf. shows a positive correlation with ROA and ROE while WGI shows a negative relationship ROA and ROE indicating that, high restrictions from WGI applied policies negatively affect profitability. GDP, on the other hand, fails to establish any relationship with ROE despite being positive with ROA indicating that; as the economy is growing, bank profitability is expected to increase.

ROA fails to have any significant correlation with financial inclusion indicators which is opposite to the findings of ROE as two factors establish a significant relationship with ROE namely; borrowers to savers ratio (positive significant relation) and service coverage dummy variable (negative significant relation). While usage of self-service banking channels fails to have any significant correlation with ROE indicating that; as the financial inclusion grows, bank profitability is expected to increase except for the usage of self-service banking channels which has no firm effect.

In conclusion, the researcher can partially accept the first hypothesis  $H_a$  as most of the independent variables are significantly correlated with the profitability measures deployed in the research model in the Islamic banking sector.

Nonetheless, though there is a vivid representation of the correlation between independent variables, the researcher will test Multicollinearity with VIF (variance inflation factor) to decide whether any variables are deemed to be removed.

Table 5. Pearson correlation matrix

Corr./Probability	ROA	ROE	LLP	LA	LOGA	Equ/Asset	CAR	NII/TA	OPC/TA	GDPG	INF.	WGI	BORR_SAV	SER_COV	SELF_SER
ROA	1														
	-----														
ROE	0.7736	1													
	0.0000	-----													
	***														
LLP	-0.2387	-0.1709	1												
	0.0000	0.0004	-----												
	***	***													
LA	-0.0104	-0.0756	-0.2541	1											
	0.8309	0.119	0.0000	-----											
			***												
LOG_A	0.1089	0.1468	-0.1631	0.3256	1										
	0.0247	0.0024	0.0007	0.0000	-----										
	**	***	***	***											
Equ/Asset	0.0682	-0.3254	0.1205	-0.1500	-0.2837	1									
	0.1602	0.0000	0.0128	0.0019	0.0000	-----									
		***	**	***	***										
CAR	0.1078	-0.2147	-0.0195	0.0054	-0.3054	0.4845	1								
	0.0261	0.0000	0.6886	0.9117	0.0000	0.0000	-----								
	**	***			***	***									
NII_TA	0.0155	0.0010	0.2481	-0.2476	-0.1581	0.0590	-0.0739	1							
	0.7504	0.9830	0.0000	0.0000	0.0011	0.2243	0.1278	-----							
			***	***	***										
OPC_TA	-0.2106	-0.1650	0.2324	-0.0414	-0.137	-0.0614	-0.0988	0.2806	1						
	0.0000	0.0006	0.0000	0.3937	0.0069	0.2062	0.0415	0.0000	-----						
	***	***	***	***	***		**	***							
GDPG	0.1085	-0.0504	-0.0205	-0.0726	-0.0719	0.2911	0.0884	-0.0419	-0.0933	1					
	0.0252	0.2994	0.6727	0.1348	0.1385	0.0000	0.0682	0.3888	0.0543	-----					
	**					***	*		*						
INF	0.1494	0.3083	0.0440	-0.0495	0.0111	-0.2183	-0.1691	0.1099	0.2102	-0.3536	1				
	0.0020	0.0000	0.3647	0.3085	0.8189	0.0000	0.0005	0.0233	0.0000	0.0000	-----				
	***	***				***	***	**	***	***					
WGI	-0.1367	-0.3407	-0.0891	0.1629	0.1030	0.2598	0.1730	-0.1751	-0.2738	0.3204	-0.7462	1			
	0.0047	0.0000	0.0661	0.0007	0.0335	0.0000	0.0003	0.0003	0.0000	0.0000	0.0000	-----			
	***	***	*	***	**	***	***	***	***	***	***				
BORR_SAV	-0.0747	0.1080	-0.0296	-0.1441	-0.0529	-0.1591	-0.0677	-0.0327	-0.0534	-0.1210	0.2785	-0.2969	1		
	0.1239	0.0258	0.5423	0.0029	0.2759	0.001	0.1633	0.5005	0.2717	0.0124	0.0000	0.0000	-----		
		**		***		***				**	***	***			
SER_COV	-0.0505	-0.1528	-0.0537	0.3480	0.5283	0.1085	-0.0498	-0.0815	-0.0792	0.0327	-0.1474	0.3573	-0.3340	1	
	0.2986	0.0016	0.2688	0.0000	0.0000	0.0252	0.3049	0.0931	0.1026	0.5015	0.0023	0.0000	0.0000	-----	
	***	***		***	***	**		*		***	***	***	***		
SELF_SER	-0.0084	-0.0307	-0.1338	0.2624	0.3000	-0.0768	-0.0811	0.0577	-0.0335	-0.2100	0.0310	0.1132	-0.1671	0.3570	1
	0.8622	0.5275	0.0057	0.0000	0.0000	0.1136	0.0944	0.2350	0.4908	0.0000	0.5239	0.0195	0.0005	0.0000	-----
			***	***	***		*			***	***	***	***	***	

Note: \*\*\* Correlation is significant at the 0.01 level (2-tailed); \*\* Correlation is significant at the 0.05 level (2-tailed); \* Correlation is significant at the 0.1 level (2-tailed). All variables are defined in Table 1.  
Source: Developed by the researcher from EViews® 10 extracted outputs.



Table 6. IBs - ROA: Pearson correlation rank, sign and magnitude

Independent variables	Expected correlation ROA	Pearson correlation		
		ROA		
		Rank	Corr. coefficient	Sign
<b>Bank-specific</b>				
V1 - Credit risk	-	1	-0.2387	- ***
V2 - Liquidity	+	12	-0.0104	NS
V3 - Size	+	5	0.1089	+ **
V4 - Capital adequacy	+	9	0.0682	NS
V5 - Basel capital adequacy	+	7	0.1078	+ **
V6 - Effect of income fees & charges	+	11	0.0155	NS
V7 - Operating costs	-	2	-0.2106	- ***
<b>Macroeconomic</b>				
V8 - GDPG	+	6	0.1085	+ **
V9 - Inflation rate	+/-	3	0.1494	+ ***
V10 - World governance indicator	-	4	-0.1367	- ***
<b>Financial inclusion</b>				
V11 - Overall financial structure	+	8	-0.0747	NS
V12 - Financial service penetration	-	10	-0.0505	NS
V13 - Self-service banking prevalence	NS	13	-0.0084	NS

Note: \*\*\* Correlation is significant/Significant at the 0.01 level (2-tailed); \*\* Correlation is significant/Significant at the 0.05 level (2-tailed); \* Correlation is significant/Significant at the 0.1 level (2-tailed); +ve: Positive significant relation; -ve: Negative significant relation; NS: No significant relation. All variables are defined in Table 1.

Source: Developed by the researcher from EViews® 10 extracted outputs.

Table 7. IBs - ROE: Pearson correlation rank, sign and magnitude

Independent variables	Expected correlation ROE	Pearson correlation		
		ROE		
		Rank	Corr. coefficient	Sign
<b>Bank-specific</b>				
V1 - Credit risk	-	5	-0.1709	- ***
V2 - Liquidity	+	10	-0.0756	NS
V3 - Size	+	8	0.1468	+ ***
V4 - Capital adequacy	-	2	-0.3254	- ***
V5 - Basel capital adequacy	-	4	-0.2147	- ***
V6 - Effect of income fees & charges	+	13	0.0010	NS
V7 - Operating costs	-	6	-0.1650	- ***
<b>Macroeconomic</b>				
V8 - GDPG	+	11	-0.0504	NS
V9 - Inflation rate	+/-	3	0.3083	+ ***
V10 - World governance indicator	-	1	-0.3407	- ***
<b>Financial inclusion</b>				
V11 - Overall financial structure	+	9	0.1080	+ **
V12 - Financial service penetration	-	7	-0.1528	- ***
V13 - Self-service banking prevalence	NS	12	-0.0307	NS

Note: \*\*\* Correlation is significant/Significant at the 0.01 level (2-tailed); \*\* Correlation is significant/Significant at the 0.05 level (2-tailed); \* Correlation is significant/Significant at the 0.1 level (2-tailed); +ve: Positive significant relation; -ve: Negative significant relation; NS: No significant relation. All variables are defined in Table 1.

Source: Developed by the researcher from EViews® 10 extracted outputs.

## 4.2. Multivariate analysis

### 4.2.1. Diagnostic tests

#### 4.2.1.1. Multicollinearity Test (VIF test)

Andy Field states in *Discovering statistics using SPSS* that Myers (1990) suggests that up till a value of 10 is a good value and if VIF is > 10, then multicollinearity may be biasing the regression model (Bowerman & O'Connell, 1990). Tolerance values below 0.1 (VIF > 10) specify thoughtful problems, though as per Menard (1995) values below 0.2 (VIF > 5) should be revised.

Extreme tolerable value of VIF would be 10 as an indicator that there is no multicollinearity which matches a cut off tolerance value that equals 0.1 (VIF = 10 that relate to standard errors being inflated extra than 3 times (square root of 10 = 3.16)), that matches multiple correlations of .95 with other explanatory variables. However, at low-level values of VIF; there is still some problems of collinearity that could be faced as a VIF (5.3)

matches multiple correlations of .9 or a VIF (3) matches multiple correlations of .82, which is a high correlation coefficient (Hair, Black, Babin, & Anderson, 2010).

Hair et al. (2010) state that "The researcher should always assess the degree and impact of multicollinearity even when the diagnostic measures are substantially below the suggested cutoff (e.g., VIF values of 3 to 5)" (p. 200).

Based on the VIF shown in Table 8, multicollinearity is no serious issue (VIF > 10). This is consistent with the findings of the Pearson correlation matrix being no correlation coefficient exceeds 0.95 (VIF = 10, R<sup>2</sup> = 0.9) and even there are no diagnostic measures that are substantially below the suggested cutoff; (VIF = 5.3, R<sup>2</sup> = 0.81) which matches multiple correlations of .9 or (VIF = 3, R<sup>2</sup> = 0.67) which matches multiple correlations of .82.

In conclusion, the researcher shall not remove any independent variables and accepts the correlation between independent variables in the IBs from the model.

**Table 8.** Multicollinearity test: Islamic banks - ROA and ROE

VIF	ROA			VIF	ROE		
	Coefficient	Uncentered	Centered		Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF	Variable	Variance	VIF	VIF
LLP	0.000906	1.755	1.169	LLP	0.044606	1.759	1.284
LA	0.000016	21.536	1.331	LA	0.001030	20.988	1.358
LOG_A	0.000002	81.386	1.840	LOG_A	0.000105	76.159	1.961
EQU_ASSET	0.000033	4.123	1.684	EQU_ASSET	0.002011	4.412	1.877
CAR	0.000062	7.919	1.460	CAR	0.003821	7.693	1.443
NIH_TA	0.000707	2.256	1.221	NIH_TA	0.045844	2.233	1.200
OPC_TA	0.003382	5.039	1.238	OPC_TA	0.194833	4.610	1.236
GDPG	0.000244	1.990	1.282	GDPG	0.016058	2.059	1.317
INF	0.000084	4.380	2.476	INF	0.005452	4.248	2.415
WGI	0.000000	14.513	2.850	WGI	0.000000	14.342	2.811
BORR_SAV	0.000001	3.041	1.283	BORR_SAV	0.000044	3.229	1.262
BANK_SER_COV_DUMMY	0.000005	13.904	2.082	BANK_SER_COV_DUMMY	0.000356	14.414	2.054
SELF_SER	0.000003	2.614	1.315	SELF_SER	0.000215	2.594	1.296
C	0.000037	113.328	NA	C	0.002169	102.379	NA

Note: All variables are defined in Table 1.

Source: Developed by the researcher from EViews® 10 extracted outputs.

#### 4.2.1.2. Heteroskedasticity test

In case of ROA and ROE shown in Tables 9 and 10, the test is significant ( $p < .05$ ) being Prob. Chi-Square

(13) = 0.0000; (i.e., it is heteroscedasticity). The researcher will apply GMM model to treat the heteroscedasticity problem.

**Table 9.** Heteroscedasticity test: Islamic banks - ROA

<b>Heteroskedasticity test: Breusch-Pagan-Godfrey</b>				
F-statistic	9.129345	Prob. F (13,420)		0.00000
Obs*R-squared	95.61822	Prob. Chi-Square (13)		0.00000
Scaled explained SS	221.5511	Prob. Chi-Square (13)		0.00000
Variable	Coefficient	Std. error	t-statistic	Prob.
C	-0.000057	0.000139	-0.412975	0.679800
LLP	0.006218	0.000690	9.012149	0.000000
LA	0.000240	0.000092	2.605970	0.009500
LOG_A	0.000007	0.000030	0.244724	0.806800
EQU_ASSET	0.000129	0.000132	0.972459	0.331400
CAR	-0.000102	0.000181	-0.563891	0.573100
NIH_TA	-0.000952	0.000609	-1.561814	0.119100
OPC_TA	0.001772	0.001333	1.329297	0.184500
GDPG	-0.000002	0.000358	-0.005191	0.995900
INF	0.000208	0.000211	0.988583	0.323400
WGI	-0.000001	0.000001	-0.513871	0.607600
BORR_SAV	0.000008	0.000017	0.443213	0.657800
BANK_SER_COV_DUMMY	-0.000099	0.000053	-1.868060	0.062400
SELF_SER	-0.000030	0.000042	-0.721233	0.471200
R-squared	0.220318	Mean dependent variable		0.000136
Adjusted R-squared	0.196185	S.D. dependent variable		0.000303
S.E. of regression	0.000272	Akaike info criterion		-13.550860
Sum squared resid	0.000031	Schwarz criterion		-13.419470
Log-likelihood	2954.536	Hannan-Quinn criterion		-13.499000
F-statistic	9.129345	Durbin-Watson statistics		1.595256
Prob(F-statistic)	0.000000			

Note: All variables are defined in Table 1.

Source: Developed by the researcher from EViews® 10 extracted outputs.

**Table 10.** Heteroscedasticity test: Islamic banks – ROE

<b>Heteroskedasticity test: Breusch-Pagan-Godfrey</b>				
F-statistic	5.996506	Prob. F (13,421)		0.0000
Obs*R-squared	67.96259	Prob. Chi-Square (13)		0.0000
Scaled explained SS	133.088	Prob. Chi-Square (13)		0.0000
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-statistic</b>	<b>Prob.</b>
C	0.016888	0.008263	2.043739	0.041600
LLP	0.218784	0.037469	5.839033	0.000000
LA	0.006421	0.005694	1.127586	0.260100
LOG_A_	-0.002744	0.001817	-1.509950	0.131800
EQU_ASSET	0.002053	0.007955	0.258120	0.796400
CAR	-0.018585	0.010966	-1.694698	0.090900
NI_LTA	-0.040266	0.037985	-1.060028	0.289700
OPC_TA	0.096708	0.078309	1.234966	0.217500
GDPG	0.007000	0.022481	0.311383	0.755700
INF.	0.018237	0.013099	1.392271	0.164600
WGI	-0.000051	0.000069	-0.731281	0.465000
BORR_SAV	0.000672	0.001175	0.572154	0.567500
BANK_SER_COV_DUMMY	-0.003845	0.003348	-1.148231	0.251500
SELF_SER	0.000976	0.002599	0.375624	0.707400
<b>R-squared</b>	<b>0.156236</b>	<b>Mean dependent variable</b>		<b>0.008921</b>
<b>Adjusted R-squared</b>	<b>0.130181</b>	<b>S.D. dependent variable</b>		<b>0.018263</b>
<b>S.E. of regression</b>	<b>0.017033</b>	<b>Akaike info criterion</b>		<b>-5.275669</b>
<b>Sum squared resid</b>	<b>0.122142</b>	<b>Schwarz criterion</b>		<b>-5.144508</b>
<b>Log-likelihood</b>	<b>1161.458</b>	<b>Hannan-Quinn criterion</b>		<b>-5.223902</b>
<b>F-statistic</b>	<b>5.996506</b>	<b>Durbin-Watson statistics</b>		<b>1.273893</b>
<b>Prob(F-statistic)</b>	<b>0.000000</b>			

Note: All variables are defined in Table 1.

Source: Developed by the researcher from EViews® 10 extracted outputs.

#### 4.2.1.3. Breusch-Godfrey serial correlation LM test

In case of ROA and ROE shown in Tables 11 and 12, the test is significant ( $p < .05$ ) being Prob. Chi-Square (2) = 0.0000; then there is an autocorrelation with

lag time between omitted variables (i.e., serial correlation). The researcher will apply a dynamic model using the GMM regression model to add two-period lag variables RESID (-1) and RESID (-2) to treat the autocorrelation problem.

**Table 11.** Auto correlation test: Islamic banks – ROA

<b>Breusch-Godfrey serial correlation LM test:</b>				
F-statistic	106.5098	Prob. F (2,418)		0.0000
Obs*R-squared	146.5097	Prob. Chi-Square (2)		0.0000
<b>Variable</b>	<b>Coefficient</b>	<b>Std. error</b>	<b>t-statistic</b>	<b>Prob.</b>
LLP	-0.020618	0.024604	-0.837986	0.402500
LA	0.002267	0.003280	0.691204	0.489800
LOG_A_	0.000086	0.001066	0.080909	0.935600
EQU_ASSET	0.003454	0.004715	0.732683	0.464200
CAR	-0.001955	0.006440	-0.303591	0.761600
NI_LTA	0.012737	0.021759	0.585367	0.558600
OPC_TA	0.093432	0.047977	1.947434	0.052200
GDPG	-0.005274	0.012756	-0.413460	0.679500
INF.	-0.016332	0.007621	-2.143064	0.032700
WGI	-0.000042	0.000040	-1.051720	0.293500
BORR_SAV	0.000582	0.000615	0.946294	0.344500
BANK_SER_COV_DUMMY	0.000192	0.001879	0.102206	0.918600
SELF_SER	0.000655	0.001497	0.437611	0.661900
C	-0.001464	0.004948	-0.295892	0.767500
RESID (-1)	0.547122	0.049205	11.119240	0.000000
RESID (-2)	0.089933	0.050390	1.784731	0.075000
<b>R-squared</b>	<b>0.337580</b>	<b>Mean dependent variable</b>		<b>0.000000</b>
<b>Adjusted R-squared</b>	<b>0.313809</b>	<b>S.D. dependent variable</b>		<b>0.011682</b>
<b>S.E. of regression</b>	<b>0.009677</b>	<b>Akaike info criterion</b>		<b>-6.401945</b>
<b>Sum squared resid</b>	<b>0.039144</b>	<b>Schwarz criterion</b>		<b>-6.251787</b>
<b>Log-likelihood</b>	<b>1405.222000</b>	<b>Hannan-Quinn criterion</b>		<b>-6.342674</b>
<b>F-statistic</b>	<b>14.201310</b>	<b>Durbin-Watson statistics</b>		<b>1.853398</b>
<b>Prob(F-statistic)</b>	<b>0.000000</b>			

Note: All variables are defined in Table 1.

Source: Developed by the researcher from EViews® 10 extracted outputs.

**Table 12.** Auto correlation test: Islamic banks – ROE

<b>Breusch-Godfrey serial correlation LM test:</b>				
F-statistic	74.6046	Prob. F (2,419)		0.0000
Obs*R-squared	114.2291	Prob. Chi-Square (2)		0.0000
<b>Variable</b>	<b>Coefficient</b>	<b>Std. error</b>	<b>t-statistic</b>	<b>Prob.</b>
LLP	-0.122871	0.182769	-0.672278	0.501800
LA	0.028710	0.027738	1.035031	0.301300
LOG_A_	0.003827	0.008846	0.432610	0.665500
EQU_ASSET	0.023258	0.038723	0.600621	0.548400
CAR	0.002650	0.053289	0.049721	0.960400
NIL_TA	0.201208	0.185225	1.086290	0.278000
OPC_TA	0.763124	0.385161	1.981311	0.048200
GDPG	-0.008455	0.109079	-0.077516	0.938300
INF.	-0.114924	0.064300	-1.787323	0.074600
WGI	-0.000259	0.000336	-0.769496	0.442000
BORR_SAV	0.002224	0.005704	0.389933	0.696800
BANK_SER_COV_DUMMY	-0.005076	0.016266	-0.312044	0.755200
SELF_SER	0.004595	0.012625	0.363956	0.716100
C	-0.034101	0.040263	-0.846948	0.397500
RESID (-1)	0.414313	0.051982	7.970361	0.000000
RESID (-2)	0.245265	0.054388	4.509549	0.000000
R-squared	0.262596	Mean dependent variable		0.000000
Adjusted R-squared	0.236197	S.D. dependent variable		0.094561
S.E. of regression	0.082642	Akaike info criterion		-2.112508
Sum squared resid	2.861649	Schwarz criterion		-1.962610
Log-likelihood	475.470400	Hannan-Quinn criterion		-2.053345
'F-statistic'	9.947279	Durbin-Watson statistics		1.675970
'Prob(F-statistic)'	0.000000			

Note: All variables are defined in Table 1.

Source: Developed by the researcher from EViews® 10 extracted outputs.

#### 4.2.1.4. Heterogeneity test (cross sectional correlation)

In case of ROA and ROE shown in Table 13 for both Panel A and Panel B, the test is significant ( $p < .05$ ) being Prob. = 0.0000; then there is a fixed

effect, of the selected independent variables and ROA/ROE, between cross-sections in IBs (i.e., fixed effect). The researcher chooses the “fixed” option while using GMM model to treat the heterogeneity problem.

**Table 13.** Hausman test: ROA and ROE of IBs

<b>Correlated random effects: Hausman test - Test cross-section random effects</b>			
<b>Panel A: ROA</b>			
Test Summary	<b>Chi-Sq. statistic</b>	<b>Chi-Sq. d.f.</b>	<b>Prob.</b>
Cross-section random	69.756601	13	0.00000
<b>Panel B: ROE</b>			
Test Summary	<b>Chi-Sq. statistic</b>	<b>Chi-Sq. d.f.</b>	<b>Prob.</b>
Cross-section random	62.237757	13	0.00000

Source: Developed by the researcher from EViews® 10 extracted outputs.

#### 4.2.1.5. Equality test of means

An equality test of means between ROA and ROE as shown in Table 14 is adopted using Wald test & test for equality - ANOVA f-test and Welch f-test. If the test is non-significant ( $p > .05$ ); accept the null hypotheses ( $H_0 =$  they are equal) meaning that

the profitability dependent variables are identical. If, however, the test is significant ( $p < .05$ ) then the profitability dependent variables are not identical. Based on test results, ROA and ROE are not identical under IBs. Thus, the researcher adopts each dependent variable on a separate model.

**Table 14.** Wald test and equality test: Islamic banks – ROA and ROE

<b>Wald test - Test statistic</b>	<b>Value</b>	<b>df</b>	<b>Probability</b>
t-statistic	2.355551	513	0.0189
F-statistic	5.548621	(1, 513)	0.0189
Chi-square	5.548621	1	0.0185
Null hypothesis: C (1) = C (2)			
Null hypothesis summary:			
Normalized restriction (= 0)		<b>Value</b>	<b>Std. error</b>
C (1) - C (2)		-0.033768	0.014336
<b>Test for equality of means between series</b>			
<b>Method</b>	<b>Value</b>	<b>df</b>	<b>Probability</b>
t-test	-6.764721	1028	0.0000
Satterthwaite-Welch t-test*	-6.764721	548.8041	0.0000
Anova F-test	45.76145	(1, 1028)	0.0000
Welch F-test	45.76145	(1, 548.804)	0.0000

Source: Developed by the researcher from EViews® 10 extracted outputs.

#### 4.2.2. GMM regression model

The researcher adopts two lag time serial correlation AR orders (1 and 2) along with fixed effect heterogeneity with ROA & ROE.

Reading the model output in Table 15 shows the following:

- Adjusted R-squared is lower by 5% than R-squared showing 77.7% which is a higher value than such found in related studies that range between 42% and 68% that can be relied on the introduction of the financial inclusion dimensions as can be explained by the researcher.

- Durbin Watson (DW) is 1.8 which means that the regression model is accepted because DW near 2, indicating the null existence of autocorrelation (Field, 2000).

- Some of the variables show insignificant t-test probability namely, Liquidity, CAR and Operating costs, GDP and Inflation, and borrowers to savers, banking service coverage. Their t-test probability is insignificance showing p-value > 0.05; thus, acceptance of  $H_0$  (Null Hypothesis): Results occur with a random chance relationship; and a rejection of  $H_a$  (Alternative Hypothesis): Results occur with a real chance relationship.

- Almost half of the independent variables independently show a significant t-test indicating a good explanatory model to the IBs' profitability; namely, Credit risk, Size, Capital adequacy and Effect of income fees and charges, WGI, and Banking self-service usage.

- Looking to the entire model significance J-statistic (GMM) shows a p-value < 0.01; indicating a significant whole model, thus, rejecting  $H_0$  (Null Hypothesis): Results occur with a random chance relationship; and acceptance of  $H_a$  (Alternative Hypothesis): Results occur with a real chance relationship. Moreover, some variables appear with signals that are consistent with the previous studies while others do not show such consistency.

- LLP signifies a negative relation recording to the highest coefficient (-0.39) to ROA, which is consistent with the results of the tested dimension by Trad et al. (2017) and Yanikkaya et al. (2018).

- Although liquidity is expected to show a positive relationship with profitability, the results depicted above provide contradicting results. LA has no statistical relation with ROA which is

consistent with the results of the same tested dimension (Obeidat, El-Rimawi, Masa'deh, & Maqableh, 2013). Yet, contradicting to those reported by Bashir (2003) who found that liquidity negatively influences IBs' profitability.

- LogA signifies a positive relation to ROA which is consistent with the results of Tai (2014), Miah and Sharmeen (2015).

- Equity to assets shows a positive significance but with a low coefficient (+0.022), while CAR which is supposedly positively in relation to IB's profitability shows no effect on the profitability indicating a very low coefficient (+0.015), which is consistent with the results concluded by Eltabakh, Ngamkroekjoti, and Siad (2014), Samail, Zaidi, Mohamed, and Kamaruzaman (2018) in their conclusion of IBs' profitability post the global economic crisis. The results confirm the insignificance of CAR that can be reasonable in the sense that recent crises might tend all operating banks to have alike capital and risk levels.

- However, NII/TA signifies a positive relation to ROA recording the second-highest coefficient (+0.24) which is consistent with the results of the same tested dimension by Mokni and Rachdi (2014).

- Alternatively, Opc/TA exerts no significant effect on ROA given that most of the cost of the operations is already reflected in the margins of IBs (Miah & Sharmeen, 2015; Yanikkaya et al., 2018).

- GDP has no effect on IBs' ROA. On the other hand, although the inflation rate is expected to have a positive relationship with profitability, the impact is insignificant. Such results are consistent with Elsiefy (2013) who studies IBs performance in Qatar and concludes that macroeconomic variables have an insignificant impact on profitability since most IBs operating in the MENA region are closely related to economic stability and growth, which is not similar to WGI which signifies a negative relation with ROA.

- Only self-service banking channels are negatively significant with ROA which is inconsistent with Yanikkaya et al. (2018). Such an impact may be rationalized by the unavailability of Islamic differentiated products and which thus lead to low market shares acquired by IBs.

Table 15. Regression analysis (GMM)-ROA

Variable	Coefficient	Std. error	t-statistic	Prob.
ROA <sub>t-1</sub>	0.296747	0.047455	6.253197	0.000***
ROA <sub>t-2</sub>	0.005908	0.040887	0.144492	0.8852
LLP	-0.390348	0.035491	-10.99848	0.000***
LA	0.001057	0.005782	0.182748	0.8552
LOG_A	0.013994	0.004847	2.887493	0.0042***
EQU_ASSET	0.022792	0.006442	3.53825	0.0005***
CAR	0.015598	0.014921	1.045374	0.2969
NIL_TA	0.241691	0.032023	7.547353	0.0000***
OPC_TA	0.025787	0.06373	0.404626	0.6861
GDPG	-0.001173	0.013278	-0.088321	0.9297
INF	0.000925	0.007528	0.122857	0.9023
WGI	-0.000512	0.000185	-2.772913	0.006***
BORR_SAV	-0.000947	0.000861	-1.098815	0.2730
BANK_SER_COV_DUMMY	0.000164	0.00249	0.066064	0.9474
SELF_SER	-0.004325	0.001735	-2.492658	0.0134**
C	-0.030204	0.021433	-1.409235	0.1601
<b>R-squared</b>	<b>0.829436</b>	<b>Mean dependent variable</b>	<b>0.012838</b>	
<b>Adjusted R-squared</b>	<b>0.777462</b>	<b>S.D. dependent variable</b>	<b>0.013098</b>	
<b>S.E. of regression</b>	<b>0.006179</b>	<b>Sum squared resid</b>	<b>0.008896</b>	
<b>Durbin-Watson statistics</b>	<b>1.855406</b>	<b>J-statistic</b>	<b>233</b>	
<b>Instrument rank</b>	<b>73</b>	<b>Prob (J-statistic)</b>	<b>0.0000***</b>	

Note: Dependent variable: ROA. The AR order 1 (2) are tests for first (second)-order serial correlation. \* Significant at 10% level (2-tailed); \*\* Significant at 5% level (2-tailed); \*\*\* Significant at 1% level (2-tailed). All variables are defined in Table 1.

Reading the model output in Table 16 shows the following:

- Adjusted R-squared is lower by 5% than R-squared showing 77% which is a higher value than such found in related studies that range between 42% and 68% that can be relied on the introduction of the financial inclusion dimensions as can be explained by the researcher.

- Durbin Watson (DW) is 1.94 meaning that the regression model is accepted because DW near 2, indicating the null existence of autocorrelation (Field, 2000).

- Some of the variables show insignificant t-test probability namely, Liquidity, CAR and Operating costs, GDP, Inflation rate, and borrowers to savers and banking service coverage dummy variable. Their t-test probability is insignificance showing p-value > 0.05; thus, accepting  $H_0$  (Null Hypothesis): Results occur with a random chance relationship; and rejecting  $H_A$  (Alternative Hypothesis): Results occur with a real chance relationship.

- Almost half of the independent variables independently show a significant t-test indicating a good explanatory model to IBs' profitability; namely, Credit risk, Size, Capital adequacy and Effect of income fees and charges, WGI, and Banking self-service usage.

- Looking to the entire model significance J-statistic (GMM) shows a p-value < 0.01; indicating a significant whole model, thus, rejecting  $H_0$  (Null Hypothesis): Results occur with a random chance relationship; and accepting  $H_A$  (Alternative Hypothesis): Results occur with a real chance relationship.

- Moreover, some variables appear with signals that consist of the previous studies while others do not consist:

- LLP signifies a negative relation recording the highest coefficient of (-1.72) to ROE, which is inconsistent with the results of Mokni and Rachdi (2014) and Trad et al. (2017), who reports positive significance with ROE.

- LA has no statistical relation to ROE. Such findings are identical with the results by Masood and Ashraf (2012), however, contradicts

those reported by Trad et al. (2017) who found that liquidity negatively influences IBs' profitability.

- LogA signifies a positive relation to ROE, contradicting to the results of Masood and Ashraf (2012), Mokni and Rachdi (2014), who conclude that size has no significance with IBs ROE, while Trad et al. (2017) establishes a negative relation between size and ROE.

- Equity to assets shows a negative significance at  $p < 0.1$  (due to displaying the equity in ROE denominator) with a relatively higher coefficient (-0.132) than with ROA, contradicting with the results of Mokni and Rachdi (2014) who reports no significance with ROE, while CAR that is supposed to show a positive relationship with IBs' profitability exerts NIL impact; showing a relatively high coefficient (+0.149), which contradicts with the negative significance concluded by Masood and Ashraf (2012). The results confirm the insignificance of CAR that can be reasonable in the sense that recent crises might tend all operating banks to have alike capital and risk levels.

- NII/TA signifies a positive relation to ROE recording a high coefficient value of (+0.66), contradicting the negative significance result of Mokni and Rachdi (2014).

- OpC/TA exert no significant effect on ROE, although, recording the highest coefficient value of (+0.788), which is contradicting with the negative significance of Masood and Ashraf (2012). Such a result may be relied on to the fact that most of the cost of operations is already reflected in the margins of IBs.

- GDP has no effect on IBs' ROE, similar to Masood and Ashraf (2012), Mokni and Rachdi (2014) findings. On the other hand, although the inflation rate is expected to have a positive relationship with profitability, the impact is not significant, similar to Masood and Ashraf (2012), Mokni and Rachdi (2014) results. Such results are consistent with Elsiefy (2013) who studied the performance of Qatar banks and concludes that macroeconomic variables have an insignificant impact on profitability. It might be the case that IBs operating in the MENA region are closely related to their economy's stability and growth, which is not similar to WGI which signifies a negative relation with ROE.

• Only self-service banking channels are negatively significant with bank's performance as measured by ROE which is inconsistent with Yanikkaya et al. (2018). Such an impact may be

rationalized by the unavailability of Islamic differentiated products and which thus lead to low market shares acquired by IB.

**Table 16.** Regression analysis (GMM)-ROE

Variable	Coefficient	Std. error	t-statistic	Prob.
ROE <sub>t-1</sub>	0.050855	0.059185	0.859252	0.3911
ROE <sub>t-2</sub>	0.019458	0.055288	0.35193	0.7252
LLP	-1.724652	0.297763	-5.792039	0.0000***
LA	-0.018541	0.052511	-0.353085	0.7244
LOG_A	0.139076	0.043477	3.198854	0.0016***
EQU_ASSET	-0.132343	0.072412	-1.827636	0.0689*
CAR	0.149468	0.114928	1.300544	0.1947
NIL_TA	0.668458	0.314208	2.127437	0.0345**
OPC_TA	0.788898	0.538697	1.464456	0.1445
GDPG	0.017206	0.111956	0.153681	0.878
INF	-0.049829	0.065387	-0.762061	0.4468
WGI	-0.004409	0.001607	-2.742929	0.0066***
BORR_SAV	-0.01172	0.008227	-1.424557	0.1557
BANK_SER_COV_DUMMY	-0.018962	0.022362	-0.847945	0.3974
SELF_SER	-0.031876	0.014773	-2.15771	0.032**
C	-0.217878	0.188102	-1.158299	0.2480
<b>R-squared</b>	<b>0.825974</b>	<b>Mean dependent variable</b>	<b>0.117879</b>	
<b>Adjusted R-squared</b>	<b>0.770009</b>	<b>S.D. dependent variable</b>	<b>0.10877</b>	
<b>S.E. of regression</b>	<b>0.052163</b>	<b>Sum squared resid</b>	<b>0.617669</b>	
<b>Durbin-Watson statistics</b>	<b>1.942567</b>	<b>J-statistic</b>	<b>227</b>	
<b>Instrument rank</b>	<b>75</b>	<b>Prob (J-statistic)</b>	<b>0.0000***</b>	

Note: Dependent variable: ROE. The AR order 1 (2) are tests for first (second)-order serial correlation. \* Significant at 10% level (2-tailed); \*\* Significant at 5% level (2-tailed); \*\*\* Significant at 1% level (2-tailed). All variables are defined in Table 1.

## 5. DISCUSSION

### 5.1. Effect of bank-specific determinants

Credit risk is negatively significant for both ROA and ROE which is identical to the results of Yanikkaya et al. (2018) concerning ROA. Such a result is rationalized by Mokni and Rachdi (2014) arguing that a high provision of non-repayment of loans is an indication of the reduced overall credit quality of the bank. The justification is strengthened by Trad et al. (2017) arguing that the higher portion of the overall bank's loans predicated to result in default; the less stable the bank will be. However, a positive relationship with ROE was proofed by Mokni and Rachdi (2014), Trad et al. (2017) arguing that loans bear the highest risk and thus, yield higher profitability.

Liquidity, on the other hand, shows no significance with IBs profitability contradicting the results of Bashir (2003) who proves a negative relationship with IBs' performance and Yanikkaya et al. (2018) who indicates that liquidity has a positive coefficient with ROA. Nonetheless, the results illustrated in the research at hand show consistency with the conclusions of Obeidat et al. (2013) in their study on the profitability of IBs in Jordan over the period from 1997 to 2006 where the LA ratio shows no significant impact on IBs ROA. Similarly, Masood and Ashraf (2012) confirm that liquidity has no significance with ROE, while Trad et al. (2017) reports a negative ROE-liquidity relationship. The NIL impact, however, may be relied on to the basis that IBs loans receive delayed payment which thus makes IBs the primary tolerant of the lost opportunity cost.

On another sound and similar to the results of Tai (2014), Miah and Sharmeen (2015), bank size shows a statistically significant positive coefficients with IBs ROA which by turn contradicts with the

results of Elsiefy (2013), Eltabakh et al. (2014) who prove that bank size has a negative impact on the profitability of IBs while Yanikkaya et al. (2018) proves that there is a significant positive relationship with only NIM as a profitability measure but could not prove a significant relationship between size and ROA. Unlike ROA, size has no significant impact on ROE as validated by Masood and Ashraf (2012), Mokni and Rachdi (2014), while Trad et al. (2017) report that size is negatively significant with ROE. The positive impact of bank size on profitability indicates that there is a potentiality for higher profit rates with increment in IBs size implying that bank scale matters for IBs.

The results at hand show that capital adequacy measured by equity to total assets is positively significant with ROA and negatively significant with ROE contradicting the results of Mokni and Rachdi (2014) who reports insignificance with ROA and ROE. On the other hand, CAR could not establish any relationship with ROA or ROE; similar to the results of Samail et al. (2018) who examine IBs ROA in Malaysia for the period from 2010-2016 and the results of Eltabakh et al. (2014) who examines IBs ROA between January 2005 and December 2012 and finally concludes that after 2008 crisis, CAR relationship is negative and statistically insignificant despite being positive and statistically significant before the crisis. As for ROE, the research conclusions contradict the negative significance relationship proved by Masood and Ashraf (2012).

Similar to the results of Mokni and Rachdi (2014), our results show that non-interest income bears a significant positive relationship with IBs ROA, which indicates that off-balance-sheet activities carry a positive effect on bank profitability. As for ROE, the research result contradicts the negative significance result of Mokni and Rachdi (2014).

Operation cost, on the other hand, shows no significance with IBs ROA and ROE, which is

consistent with the results of Yanikkaya et al. (2018), Miah and Sharmeen (2015) of ROA, where the latter point out that operating cost has a significant relationship on CBs with no impact on IBs. The results can be rationalized by the argument that IBs have not yet reached the satisfactory achievement of economies of scale or the optimum size shrink the costs associated with an operation especially that IBs have less experience and less history in the banking industry than CBs. ROE results, on the other hand, contradict the negative significance reported by Masood and Ashraf (2012).

## 5.2. Effect of macroeconomic determinants

The findings reveal that GDP and Inf. results with ROA and ROE are similar to the non-significance relation reported by Masood and Ashraf (2012), Mokni and Rachdi (2014). WGI, however, is the only macroeconomic factor that has a significant negative effect on IB's ROA. Such results are consistent with those concluded by Abid et al. (2018) and relied on the fact that lower corruption is achieved by noticeable increase in-country regulations leading to extensive banking restrictions and thus minimizes investment opportunities and hinders banks' ability to perform efficiently.

## 5.3. Effect of financial inclusion determinants

The results reveal that among the three determinants in this category, only self-service banking prevalence possesses a significant yet negative effect on IB's ROA, which contradicts with the results of Yanikkaya et al. (2018) where a positive impact of self-service banking channels was reported on IBs profitability. The results suggest that IBs should give more attention to their access channels and ensure that customers can bank in easier approaches. Perhaps IBs do not have the same widespread marketing plans as that of CBs and thus do not offer their customers access to self-service channels which by turn lower their market shares and impact profitability.

## 6. CONCLUSION

The study attempted to identify the determinants of IBs' profitability, by utilizing a dynamic panel data approach. Using a sample of 73 IBs located in the MENA region, during 2008-2017, the study demonstrates some important associations between a set of bank-level, macroeconomic and financial inclusion explanatory variables on IBs profitability (capture by ROA and ROE). The GMM estimations represented for IBs results are considerably different from the findings concluded by the previous studies that mostly utilize the static effect methods. Moreover, the main contribution of the researcher is the exploration of new dynamics that may affect IBs profitability and not only examining the traditional used explanatory variables. The researcher thus employs other novel or rarely used variables into the study such as variables measuring the level of financial inclusion, self-service banking prevalence, financial service penetration, and overall financial structure of the examined countries. It is then proved in the research that better and more financial infrastructure has shown no relation with IBs

profitability measures ROA and ROE. However, the usage of self-service banking channels negatively affects the profitability of IBs. The researcher believes that the study makes some important contributions to the existing literature. The research employs a GMM approach as compared to the static effect models that are commonly used within IBs literature. The results for IBs suggest that financial inclusion explanatory variables should be considered further to test their effect on the profitability of IBs.

Research limitations, on the other hand, that are found to impact the research results are related to the fact that the research is confined to exploring the IBs' profitability without studying the aspects of customer behavior towards Islamic banking that can be investigated in other different thesis scopes.

Another obstacle faced by the researcher in conducting this research is the limited access to data. In general, there is a prevailing issue of data constraints that faces academic researchers; nonetheless, such a limitation is intensified in the area of Islamic banking. Moreover, the limited number of IBs in general and those operating in the MENA region in particular as compared to their conventional counterparts is another challenge faced during conducting the thesis. Such limitations thus affected the thesis on three levels; the variables selection; the probability sampling and the time horizon of the research.

On the level of variable selection, the researcher selected the main variables that can best analyze the research question and at the same time have available and accessible data sets. Such a limitation resulted in relying on the dependent and independent variables prescribed in the previous chapters while disregarding others that have no presented data sets.

The time span, on the other hand, is determined in ten years from 2008 till 2017. On the level of sampling, the researcher uses convenient nonprobability sampling from 73 IBs operating in the MENA region. Cross-sections with missing data are disregarded from the research reducing the full sample size from 730 to 515. The standard errors, however, could have been minimized if a larger sample is examined. Moreover, given such limitations, the research conducts a fixed effect in the heterogeneity test although the model is dynamic.

Finally, the researcher deploys some newly introduced variables in an attempt to explain IBs profitability by macroeconomic; financial inclusion including Islamic banking service penetration side by side to the traditional bank-specific variables. Nonetheless, theoretical, and empirical results of the financial inclusion variables are rare in literature which constituted another challenge in searching for guiding references for such variables.

Future researches can overcome the time span obstacle explained above by enlarging the period of the research for the measures of evaluation to report more accurate results. The limited availability of Islamic banking data within the selected databases, on the other hand, can be overcome by extending the research variables to a larger region. Despite the fact that the researcher is confined to the MENA region; future researches can extend different areas from the wider globe.



Given the newly recognized importance of financial inclusion in developing markets such as Egypt, other measures testing such a vital variable should be introduced in future studies.

It is recommended to keep the same level of prudence maintained within risk management policies of IBs where sensible credit risk management policies addressing a less buff of profits reserved for loan loss provisions will lead to more profit, while at the same time not to violate the new IFRS 9 impairment model that replaces IAS 39 requiring impairment allowances for all exposures from the date of originating a loan, based on the deterioration of credit risk since initial recognition.

Enlarging IBs existence within MENA countries targeting the optimal size regarding invested capital, optimal diversified portfolio size (scale of operation), and branches network distribution.

IBs should focus on other non-core banking investments that could generate more profit such as the effect of non-interest income.

IBs management should consider their accessible channels as they are not having the same widespread marketing plans like that of CBs and thus do not offer their customers access to self-service channels.

The framework suggested by Basel Committee on Banking Supervision (BCBS) as per IFSB (2019) report, could not address the unique nature of IBs' operations which thus hinders IBs smooth operations and adaptability within Basel standards. Therefore, it is suggested that Islamic IFSB cooperates with the Basel committee to consider CAR standards that take into consideration the differentiated nature of IBs from their commercial counterparts and thus lead to fair-minded rivalry with CBs.

Giving guidance to regulatory bodies within countries to create a fair balance while setting policies and rules (WGI) while at the same time improve the investment atmosphere in MENA countries and thus, increase profitability without reaching the limit of imposing fierce restrictions on banks and thus minimizing the available investment opportunities.

Raising highlights to central banks that countries should adopt financial inclusion parameters such as banking service coverage and usage of self-service banking channels to enhance the profitability of the banking sector in general and IBs in specific by giving more attention to the accessible channels and ensure that customers can bank in easier approaches.

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