

## Is Profitability of Islamic Banks Shaped by Bank-specific Variables, Global Financial Crisis and Macroeconomic Variables?

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### ABSTRACT

This study aims to investigate the determinants of Islamic banks' (IBs) profitability. A large sample of IBs from 12 developing countries has been selected for a period (2004-2017) that includes the recent global crisis period (GFC), as well as bank-specific and macroeconomic variables. The paper applies advanced quantitative techniques by using a dynamic generalized method of moments (GMM) compared to the fixed effect models that are widely used within the literature. Findings indicate that asset quality, capital adequacy and non-financial activity play major roles in determining profitability of IBs. Furthermore, findings show that IBs are not affected by the GFC, as they are less exposed to international banks and do not grant subprime loans. Moreover, IBs were able to maintain better capital ratios during the GFC, which shielded them from the severe effects of the crisis. On the other hand, results showed that profitability would be reduced by increases in asset quality, liquidity, and deposit ratio. These findings emphasised that profitability of IBs would be safeguarded if those banks maintained a suitable level of capital adequacy to withstand any financial distress and introduced diverse sources of income. Hence, the findings of this research provide useful insights for IBs' stakeholders including bank management, investors, clients, and policy markets.

### ملخص

تهدف هذه الدراسة إلى البحث في محددات ربحية البنوك الإسلامية. فقد تم اختيار عينة ضخمة من البنوك الإسلامية من 12 بلدا ناميا لفترة (2004-2017) تشمل فترة الأزمة المالية العالمية (GFC) الأخيرة، فضلا عن المتغيرات الخاصة بالبنوك والاقتصاد الكلي. وتعتمد الورقة تقنيات كمية متطورة

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من خلال استخدام أسلوب اللحظات المعمم (GMM) الديناميكي بالمقارنة مع نماذج التأثير الثابت المستخدمة على نطاق واسع في الأدبيات. وتشير النتائج إلى أن كل من نوعية الأصول وكفاية رأس المال والنشاط غير المالي تؤدي أدوارا رئيسية في تحديد ربحية البنوك الإسلامية. وعلاوة على ذلك، تبين النتائج أن البنوك الإسلامية لا تتأثر بالأزمة المالية العالمية، لأنها أقل عرضة لمعاملات المصارف الدولية ولا تمنح قروض الرهن العقاري. كما أن البنوك الإسلامية قد تمكنت من الحفاظ على نسب رأسمالية أفضل خلال فترة الأزمة المالية العالمية، الأمر الذي حماها من التداعيات الخطيرة للأزمة. ومن ناحية أخرى، أظهرت النتائج أن الربحية ستُخفض بزيادة نوعية الأصول والسيولة ونسبة الودائع. وشددت هذه النتائج على أن ربحية البنوك الإسلامية ستكون مضمونة إذا حافظت تلك المصارف على مستوى مناسب من كفاية رأس المال لمواجهة أي ضائقة مالية وأدخلت مصادر دخل متنوعة. ومن هنا فإن نتائج هذا البحث توفر لمحات عامة مفيدة لأصحاب المصلحة في البنوك الإسلامية، بما في ذلك إدارة البنوك، والمستثمرين، والعملاء، وأسواق السياسات.

#### ABSTRAITE

Cette étude vise à examiner les déterminants de la rentabilité des banques islamiques (BI). Un large échantillon de banques islamiques de 12 pays en développement a été sélectionné pour une période (2004-2017) qui inclut la récente période de crise mondiale (GFC), ainsi que des variables macroéconomiques et spécifiques aux banques. Le document applique des techniques quantitatives avancées en utilisant une méthode dynamique généralisée des moments (GMM) par rapport aux modèles à effet fixe qui sont largement utilisés dans la littérature. Les résultats indiquent que la qualité des actifs, l'adéquation des fonds propres et l'activité non financière jouent un rôle majeur dans la détermination de la rentabilité des IB. En outre, les résultats montrent que les BI ne sont pas affectées par la crise financière mondiale, car elles sont moins exposées aux banques internationales et n'accordent pas de prêts à risque. En outre, les BI ont été en mesure de maintenir de meilleurs ratios de capital pendant la crise financière mondiale, ce qui les a protégées des effets graves de la crise. D'autre part, les résultats ont montré que la rentabilité serait réduite par une augmentation de la qualité des actifs, de la liquidité et du ratio des dépôts. Ces résultats soulignent que la rentabilité des BI serait préservée si ces banques maintenaient un niveau approprié de fonds propres pour résister à toute détresse financière et introduisaient diverses sources de revenus. Par conséquent, les résultats de cette recherche fournissent des informations utiles aux parties prenantes des BI, notamment la direction des banques, les investisseurs, les clients et les marchés des politiques.

**Keywords:** Islamic Banks (IBs), profitability, bank-specific determinants, macroeconomic variables, global crisis period (GFC), generalized method of moments (GMM).

**JEL Classification:** C23, C26, F36, G21, F62

## 1. Introduction

Banks play a substantial role in the development of economies, as the performance of the banking sector directly impacts the performance and growth of economies (Khasawneh, 2016). A profitable and healthy banking system improves the stability of a financial system and offers a safeguard against negative shocks (Rashid and Jabeen, 2016). Islamic banks (IBs), particularly, have contributed to economic growth (Sun et al., 2017) and financial stability globally, and in the Middle East economies (Tabash and Dhankar, 2014). IBs represent a significant portion of Muslim countries' banking systems and are growing rapidly over time. IBs increased their market share in the Organization of Islamic Cooperation (OIC) region from almost zero in the 1970s to about 40% in some countries (Sun et al., 2017).

Therefore, this paper is motivated by the significant growth of the IBs. They continued to grow 10–12% per annum, and showed robustness and stability despite the impact of the global financial crisis (GFC) (Beck et al., 2013; Olson and Zoubi, 2016) and other global financial shocks across banking markets such as sovereign debt crisis (Alqahtani et al., 2016). Hence, more interest and attention were given to IBs during and after the GFC (Khasawneh, 2016; Trabelsi and Trad, 2017; Hussien et al., 2019), indicating that IBs represent a different business model compared to conventional commercial banks (CBs). IBs' business model involves the prohibition of Riba (interest), Maysir (games of chance), Gharar (taking excessive risks in contracts), and Haram (unlawful) activities that include unethical business, together with the payment of part of one's wealth to benefit society (Zakat)<sup>1</sup> (Alotaibi et al., 2020). Such models also involve the prohibition of monopolies, extravagance and stinginess, and the promotion of justice, fairness, and honesty (Al-Qaradawi, 2005). Further, IBs' business model suggests a different product structure, as compared to CBs, which has contributed to their unique performance. IBs' product

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<sup>1</sup> Zakat is an annual obligatory financial levy on all surplus wealth of Muslims to help the needy; it literally means purification, growth, and blessing (Al-Qaradawi, 2005).

structure involves asset-backed financing instruments (Zeitun, 2012), as they use profit-loss sharing structure of financing and investment. However, there is an ongoing argument about how far this is applied in practice (Effendi, 2018; Yanikkaya et al., 2018).

Despite the surge in the IBs' literature, there are continuing puzzling issues regarding the determinants that explain IBs' profitability a decade after GFC, such as whether they are different from their conventional counterparts, given the fact that the profitability of IBs was challenged few years post-GFC (Alqahtani et al., 2016; Olson and Zoubi, 2016). For instance, Olson and Zoubi (2016) examined the performance of IBs in 22 Middle East and North Africa region (MENA) and South East Asia countries during the period 1996–2014, and report that IBs performed better during the GFC, then (like CBs) became affected in 2009 by the economic downturn.

Consequently, this study expanded the number of years investigated, ultimately comprising the longest period after the GFC between 2004 and 2017 that had yet to be covered by prior literature. This also covers other global financial shocks across banking markets such as sovereign debt crisis and regional political distress in the Middle East. Importantly, this reflects the rapid changes to and interventions in the banking systems in OIC developing countries following recent re-regulations after the GFC.

Moreover, this research combines internal (bank-specific) and external (macroeconomic) variables to estimate the determinants of IBs' profitability. Although IBs are based on ethical and social values, they are required by their owners and depositors to maximize their wealth. Therefore, this study will answer the question: which bank-specific and macro-economic determinants affect the IBs' profitability, pre- and post-the GFC period? Answering this research question helps understanding the significant factors that influence IBs' profitability positively and negatively to maximize the owners' wealth and funds of depositors under different market conditions.

The remainder of the study is structured as follows. The literature review is presented in Section 2. Section 3 describes the methodology and data, while the empirical results are given in Section 4. Finally, Section 5 concludes the study.

## 2. Literature Review

The performance of banks can be evaluated in terms of profitability, efficiency, liquidity, credit risk performance and solvency, using various variables and statistical techniques (Hanif et al., 2012). Many prior studies have been conducted to analyze the determinants and factors influencing CBs' performance. However, after the GFC, the literature has concentrated more on IBs, distinguished by their different characteristics and principles (Beck et al., 2013; Olson and Zoubi, 2016; Zarrouk et al., 2016; Hussien et al., 2019; Ibrahim, 2020). In addition, due to the rapid growth of IBs in OIC countries, many researchers, and policymakers have been attracted to investigating the underlying issues, challenges and potential for this industry. Hence, research on IBs has been refocused as a priority topic, achieving momentum in banking research based on the distinctive business model of IBs (Rashid and Jabeen, 2016; Sun et al., 2017; Yahya et al., 2017).

There is general agreement in literature that the performance of IBs is superior to CBs (Daly and Frikha, 2017). Studies argue that IBs provide competitive performance while addressing religious and ethical values (Khasawneh, 2016; Alhammedi et al., 2020), even during the GFC period (Čihák and Hesse, 2010; Hasan and Dridi, 2011; Beck et al., 2013; Olson and Zoubi, 2016). Moreover, empirical studies have found that some financial firms have been impacted differently by GFC (Čihák and Hesse, 2010; Hasan and Dridi, 2011; Beck et al., 2013; Tabash and Dhankar, 2014; Alqahtani et al., 2016; Alzoubi, 2018; Hussien et al., 2019). Firms using Islamic financing instruments to finance their operations or not heavily dependent on the interest-based financing were less susceptible to the crisis (see Čihák and Hesse, 2010; Hasan and Dridi, 2011). Further, some have argued that the GFC could have been prevented if Islamic finance was the predominant model, instead of conventional finance (Beck et al., 2013). This is because the practices and risky financial instruments that are believed to be responsible for the GFC, such as mortgaged-backed securities, collateralized debt obligation and credit default swaps are prohibited in Islamic finance (Alqahtani and Mayes, 2017). In addition, IBs were able to maintain better capital ratios than CBs (Bashir, 2003) during the GFC, which shielded the former from the severe effects of the crisis (Chazi and Syed, 2010).

Nevertheless, few other studies have questioned the performance of IBs under different economic conditions, especially post-crisis, and have found inconclusive empirical evidence (see Beck et al., 2013; Alqahtani et al., 2016; Olson and Zoubi, 2016; Hussien et al., 2019). For example, Alqahtani et al. (2016) found that IBs in the Gulf Cooperation Council (GCC) performed well immediately after the crisis but as a result of the economic downturn, their post-crisis performance on a longer span was less effective compared with their conventional counterparts. Similarly, Olson and Zoubi (2016) revealed that IBs in MENA and South East Asian countries performed better during the GFC; then, like CBs, became affected in 2009 by the economic downturn. However, most studies on the performance of IBs were conducted before, during and only a few years post-GFC.

Most banking research was conducted in developed countries, while little evidence was documented in developing countries and on IBs (Zeitun, 2012; Sun et al., 2017). Hence, this section provides a summary of the literature related to the financial performance of IBs in developing countries.

**Table 1:** Summary of Literature Review

| Study                  | Sample/<br>Region                                | Period      | Methodology  | Main Findings   |
|------------------------|--|-------------|--|---|
| Bashir (2003)          | 14 Islamic banks form 8 Middle Eastern countries | 1993 - 1998 | Regression analysis                                | IBs' profitability measures respond positively to the increases in capital and loan ratios.<br>The larger equity to total asset ratio and larger loan to asset ratio interacted with GDP lead to higher profit margins.<br>Taxes have a negative effect on banks' profitability.<br>Higher GDP per capita and higher inflation rates have a strong positive impact on the performance measures. |
| Čihák and Hesse (2010) | 19 banking systems in OIC countries              | 1993-2004   | Panel regression models                            | Small IBs are financially stronger than small CBs; large CBs are financially stronger than large IBs; and small IBs are financially stronger than large IBs   |
| Asma et al. (2011)     | 9 IBs in Malaysia                                | 2007-2009   | Generalized Least Square (GLS) panel data analysis | Only the bank size is significant in determining the profitability with positive relationship. While, capital adequacy, liquidity, credit risk and expenses management were insignificant.  |

| Study                    | Sample/<br>Region                                  | Period      | Methodology                                       | Main Findings  |
|--------------------------|--|-------------|---|--|
| Hanif et al. (2012)      | 22 CBs and 5 IBs in Pakistan                       | 2005-2009   | Financial ratios analysis and questioner          | IBs leads in terms of credit risk management and solvency maintenance but underperform CBs in terms of profitability and liquidity.  |
| Masood and Ashraf (2012) | 25 IBs from 12 countries                           | 2006-2010   | panel data  | Banks size, capital adequacy, loans to assets and assets management results leads to positive and significant relationship with IBs profitability. Nonperforming loans, gearing ratio, are negatively related to profitability. Liquidity, deposits and operating efficiency, inflations have less effect on profitability.  |
| Zeitun (2012)            | 38 CBs and 13 IBs in GCC countries                 | 2002-2009   | panel data  | Bank size has a positive significant influence on IBs' performance as measured by ROE. GDP is positively correlated to bank's profitability, while inflation is negatively correlated to bank's profitability.   |
| Beck et al. (2013)       | 510 banks across 22 countries, 88 of which are IBs | 1995–2009   | Regression (fixed effect)                         | IBs are less cost-effective but have higher asset quality and are better capitalized. They found large variation cross-country in the differences between conventional and IBs as well as across IBs of different sizes. During crisis, IBs are better capitalized, with lower loan losses.  |
| Alqahtani et al.(2016)   | 101 banks from 6 GCC countries                     | 1998–2012   | Regression -                                      | IBs performed better than CBs in terms of capitalisation, profitability and liquidity during the early stages of the GFC but worse later as a result of the economic downturn. IBs may have avoided the consequences of volatile financial instruments, but they were not immune to major economic recession.  |
| Khasawneh (2016)         | 61 IBs, 207 CBs in MENA countries                  | 2006 - 2013 | Regression And Z-score index to measure stability | Profitability and stability determinants of IBs and CBs are different. The results show that IBs are more profitable than CBs, while CBs are more stable. The larger banks are more stable than smaller banks, and off-balance sheet activities increase banks' vulnerability for both IBs and CB. Both IBs and CB are affected by the financial crises in terms of profitability and stability. |

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| Study                    | Sample/<br>Region                               | Period    | Methodology                          | Main Findings   |
|--------------------------|---|-----------|--------------------------------------|---|
| Rashid and Jabeen (2016) | 5 IBs and 17 CBs in Pakistan                    | 2006-2012 | GLS regression                       | Operating efficiency, deposits, and market concentration are significant in explaining performance of IBs, while operating efficiency, reserves, and overheads are significant determinants of CBs performance. Bank size positively but statistically insignificantly related performance. The impact of GDP and the lending interest rate on performance is negative for both types of banks.         |
| Olson and Zoubi (2016)   | MENA and South East Asia, 22 countries          | 1996–2014 | Regression (fixed effect)            | IBs performed better during the GFC, then became affected in 2009 because of the economic downturn like CBs. However, the GFC has differentially impacted various countries and regions such as such as the Southeast Asia region.  |
| Zarrouk et al. (2016)    | 51 IBs in MENA countries                        | 1994-2012 | GMM                                  | Profitability of IBs is positively affected by banks' cost-effectiveness, asset quality and level of capitalization. Non-financing activities allow IBs to earn higher profits. IBs' profitability measures respond positively to an increase in GDP and investments but negatively to inflation rates. Profitability determinants did not differ significantly between IBs and CBs.                    |
| Daly and Frikha (2017)   | 12 banks (6 IBs and 6 CBs) in Bahrain           | 2005-2009 | Data Envelopment Analysis (DEA)      | The increase of IBs' size and the rapid growth in the customers' deposits are the important factors of performance. Government interventions have a negative impact on the banking performance.   |
| Trabelsi and Trad (2017) | 94 IBs in 18 GCC and South East Asian countries | 2006-2013 | GMM and Z-score to measure stability | Bank capital is the main indicator that contributes to maximizing profitability and stability of IBs and reducing their credit risk. But liquidity and asset quality determinants lead to inconclusive results. GCC IBs are more profitable, more solvent and less risky than those operating in the South East Asian region. No significant relationship between inflation rate and IBs profitability. |



| Study                   | Sample/<br>Region                         | Period       | Methodology   | Main Findings  |
|-------------------------|---|--------------|---|--|
| Sohel et al. (2019)     | Using data from a sample of 20 countries  | 2000 - 2015  | Regression<br>Using fixed effect                                      | IBs, as compared to CBs, have a greater dependence on fee than returns from loans to increase their profitability. They show that measures such as loan to deposit ratio may affect the profitability of IBs less significantly than CBs and contribute to lower credit risk.  |
| Sun et al. (2017)       | 66 CBs and 39 IBs in 15 OIC countries     | 1997–2010    | GMM   | The profit margin of the IBs and CBs differs significantly, but overall IBs are not different in behaviour or dynamics from CBs as they both compete traditionally (borrowing & lending) to meet funding demands. Capital adequacy, management quality, and diversification determinants significantly explain the margins of both types of banks. |
| Alzoubi (2018)          | 42 IBs and 26 CBs from 13 MENA countries  | 2006 to 2016 | Using fixed effect panel data analysis                                | IBs is significantly positively affected by the bank size, the capital adequacy ratio and the size of customers' deposits, significantly negatively affected by investments in securities, but insignificantly affected by loans and cash held   |
| Yanikkaya et al. (2018) | 74 IBs and 354 CBs in OIC and UK          | 2007 - 2013  | GMM<br>fixed effect   | Profitability measures are not persistent over time and neither of them has significant relationship with the country specific macroeconomic variables.  |
| Hussien et al. (2019)   | 30 IBs in 5 GCC countries (Oman excluded) | 2005 - 2011  | Regression, fixed and random effect.<br>Chi-square test<br>Panel data | IBs is significantly impacted by bank size, capital adequacy, inflation rate, credit risk, financial risk, and liquidity. They find a structural change before and after the GFC.  |
| Ibrahim (2020)          | 21 CBs and 16 IBs in Malaysia             | 2003 to 2015 | panel-data modelling method   | IBs are less profitable than CBs. However, the increasing presence of Islamic banking appears to make Malaysian banks less risky and, with limited evidence, more efficient.   |

NOTE: IBs, Islamic banks; CB, conventional bank; GDP, gross domestic product; DEA, data envelopment analysis; GCC, Gulf Cooperation Council, OIC; Organization Islamic Cooperation; MENA, Middle East and North Africa region; GMM, generalized method of moment; GFC, global financial crisis.

Table 1 summarizes the relevant empirical literatures that have investigated the performance of IBs. As shown in table 1, empirical studies have examined the performance of IBs in different developing countries, some of which were conducted within a single-country setup while other studies have concentrated on a panel of countries. For example, evidence drawn from specific countries such as: Malaysia (Asma et al., 2011), Pakistan (Hanif et al., 2012; Rashid and Jabeen, 2016), Bangladesh (Miah and Sharmeen, 2015), Indonesia (Hardianto and Wulandari, 2016), Bahrain (Daly and Frikha, 2017), Yemen (Yahya et al., 2017). Other studies looked at a wider group of countries such as GCC countries (Zeitun, 2012; Alqahtani et al., 2016; Hussien et al., 2019), MENA countries (Khasawneh, 2016; Zarrouk et al., 2016; Olson and Zoubi, 2016), OIC countries (Cihák and Hesse, 2010; Masood and Ashraf, 2012; Sun et al., 2017; Yanikkaya et al., 2018).

Some former studies compared the profitability of both IBs and CBs (Hanif et al., 2012; Alqahtani et al., 2016; Khasawneh, 2016; Daly and Frikha, 2017; Sun et al., 2017; Alzoubi, 2018; Yanikkaya et al., 2018), whereas other studies focused only on IBs (Asma et al., 2011; Masood and Ashraf, 2012; Zarrouk et al., 2016; Trabelsi and Trad, 2017; Yahya et al., 2017; Hussien et al., 2019).

Most of the previous studies used either return on equity (ROE), return on assets (ROA) or both ratios as dependent variables to measure banks' profitability (Bashir, 2003; Asma et al., 2011; Masood and Ashraf, 2012; Yanikkaya et al., 2018; Hussien et al., 2019), while few other studies use net profit margin (NPM) (e.g. Sun et al., 2017). Regarding the independent variables, various studies determined the significance of several internal (bank specific) or macro-economic variables (or both) in explaining bank profitability. The most common internal factors identified in the literature are the asset quality, capital strength, the deposit level, the loans ratio, the risk level and banks' costs and size.

Employing a sample group of countries, Zarrouk et al. (2016), for instance, examined the variables that determine the profitability of 51 IBs in MENA countries from 1994-2012. They found that profitability of IBs is positively affected by banks' asset quality and level of capitalization. This finding aligned with Bashir (2003), Beck et al. (2013) and Sun et al. (2017) but was inconsistent with Trabelsi and Trad (2017) and Alzoubi (2018), who found that asset quality led to inconclusive results as a

determinant of profitability. Sun et al. (2017) report that capital adequacy, quality management, and diversification determinants significantly explain the margins of both IBs and CBs in OIC countries over the period 1997-2010. In contrast, Trabelsi and Trad (2017), who examined the performance of IBs in GCC and South East Asian countries over the period 2006-2013, find that asset quality and liquidity determinants lead to inconclusive results, but bank capital is the main indicator that contributes to maximizing profitability of IBs and reduces their credit risk. This confirms the finding of Bashir (2003), who shows that adequate capital ratios play a practical role in explaining the performance of IBs. Hence, regulators may use this as evidence for prompt supervisory action.

Further, Zarrouk et al. (2016), like Masood and Ashraf (2012), pointed out that the non-financing activities allow IBs to earn higher profits.

Besides, Zeitun (2012) studied the performance of IBs and CBs operating in GCC countries over the 2002-2009 period. The author discovered that bank size has a positive significant influence on IBs' performance in line with the findings of Asma et al. (2011), Masood and Ashraf (2012), Daly and Frikha (2017), Alzoubi (2018), but opposed to Rashid and Jabeen (2016), who indicate that bank size has insignificant impact on bank profitability. On other hand, Čihák and Hesse (2010) found that small IBs are financially stronger than large IBs.

Measuring the asset quality, Bashir (2003), Masood and Ashraf (2012) documented that the loan to assets ratio is positively related to profitability. In addition, Masood and Ashraf (2012) report that the ratio of non-performing loans (NPLs); loans under follow-up to total assets (describing the capital situation of banks' loans portfolio) is related negatively to performance, as cyclical behaviour of NPLs leads to a decrease in banks' asset value and earnings quality (Arham et al., 2020).

Using data from a sample of 20 countries for the period from 2000 to 2015, Sohel et al. (2019) report that the IBs, as compared to CBs, depend more on fee than returns from loans to increase their profitability. They show that measures such as loan to deposit ratio may affect the profitability of IBs less significantly than CBs, and contribute to lower credit risk. Arham et al. (2020) report that NPLs are an important credit risk in Emerging Asia banks. They point to the role of country governance

in mitigating the negative effects of macroeconomic variables on bank credit risk.

Therefore, many studies examined external factors. For instance, Hussien et al. (2019) affirm that GDP and inflation are important factors in explaining IBs' performance, as the authors indirectly explain the impact of financial crisis due to international interdependence. Bashir (2003), Zeitun (2012) and Zarrouk et al. (2016) show that IBs' profitability measures respond positively to an increase in GDP but negatively to inflation rates. Correspondingly, Rashid and Jabeen (2016) highlight the impact of GDP and lending interest rate on banks' performance. Nevertheless, Yanikkaya et al. (2018) find that the profitability of IBs is insignificantly related to most of the macroeconomic variables used in the analysis. Further, Bashir (2003) reports that taxes have a negative effect on banks' profitability. Hence, Daly and Frikha (2017) highlight that government intervention has a negative impact on the banking performance.

As shown in Table 1, some studies concluded that the determinants of profitability for IBs are different from those for CBs, inferring that the profitability of IBs relies on the different dynamics (Beck et al., 2013; Olson and Zoubi, 2016; Khasawneh, 2016; Yanikkaya et al., 2018). For instance, Khasawneh (2016) reports that the profitability and stability determinants of IBs and CBs in MENA countries varied over the period 2006-2013. Khasawneh's results show that IBs are more profitable than CBs, while the latter are more stable. On the other hand, Ibrahim (2020) finds that IBs in Malaysia were less profitable than their conventional counterparts during the period 2003 to 2015. Nevertheless, despite lower profitability, Ibrahim (2020) highlights the positive spillover effects of IBs' presence on bank risk and, to a limited extent, bank efficiency.

To enhance the profitability of IBs, Yanikkaya et al. (2018) highlight the importance of new product and alternative channel development, especially products that promote more risk sharing as compared to the products based on Murabahah (debt based) structure. Conversely, other studies have shown that the profitability determinants do not differ significantly between IBs and CBs (Sun et al., 2017; Zarrouk et al., 2016), suggesting that there is evidence of several similarities between the determinants of the profitability for IBs and CBs.

After reviewing the literature, and as presented in table 1, the empirical conclusions of the previous studies are mixed, and differ significantly. This is due to the variation in data, time periods, countries' context, and statistical methods employed in the analyses.

Therefore, this paper contributes to the existing IBs literature in different ways to fill the gaps. First, it provides recent data and analysis on IBs in a wide group of countries, including GCC, MENA and South East Asian regions. Second, it covers a long period of time, ensuring enough spread of years pre- and post- GFC. Third, the study applies advanced quantitative techniques by using a dynamic generalized method of moments (GMM) compared to the fixed effect models commonly used within the literature. Furthermore, this study uses asset ROA, ROE and NPM as measures of IBs profitability to examine whether the profitability of IBs is driven by the same variables as CBs specifically, analyzing how bank-specific characteristics and macroeconomic factors affect the profitability of IBs.

### **3. Data and Methodology**

This paper uses panel data of 45 fully-fledged IBs collected from 12 Muslim-majority countries that are members of the OIC, namely Saudi Arabia, Kuwait, United Arab Emirates, Bahrain, Oman, Qatar, Jordan, Turkey, Pakistan, Malaysia, Bangladesh, and Indonesia, over a period of 14 years ranging from 2004 to 2017. These developing countries were chosen based on the availability of data and the importance of IBs in their banking system. They are from different regions, namely GCC and the Middle East, East Asia, and South Asia. IBs in all these countries operate in dual-type banking systems, where both IBs and CBs function at the same time in the financial system.

The examined variables were gathered via DataStream and the World Bank outlook to cover bank-specific variables, macroeconomic variables; and dummy variables were created to capture the effect of financial crisis on the financial performance of IBs.

### **3.1 Variables**

#### **3.1.1 Dependent Variables**

The banking literature uses return on asset (ROA), return on equity (ROE) and net profit margin (NPM) as measures of profitability for banks, as shown in table 1 (Masood and Ashraf, 2012; Zarrouk et al. 2014; Trabelsi and Trad, 2017; Sun et al., 2017). Return on asset (ROA) is net profit after tax and zakat to total assets. Return on equity (ROE) is defined as net profit divided by shareholder equity; NPM is the difference between financial income and financial costs.

#### **3.1.2 Independent Variables**

Independent variables are classified as internal (bank-specific) and external variables. Internal variables of bank profitability are associated with bank characteristics; external factors are macroeconomic variables, and dummy variables were created to represent the GFC. To examine whether investing in Islamic loans impacts profitability, LOAN/TA is used as a measure of liquidity and risk. Islamic loans in IBs include Murabaha, Ijara, Salam and Istisna. A high LOAN/TA indicates that the bank has taken more financial stress by making excessive loans (Masood and Ashraf, 2012; Zarrouk et al. 2014; Khasawneh, 2016; Trabelsi and Trad, 2017). EQAS is a measure of capital adequacy. We expect positive relationship to be shown between total EQAS and IBs' profitability, according to prior studies (Bashir, 2003; Trabelsi and Trad, 2017; Hussien et al. 2019). The higher the EQAS ratio, the lower the need for external funding and therefore the higher the profitability of a bank. The bank's size is denoted by the logarithm of total assets (LOGTA). The profitability is affected by the bank size and usually considered positive or negative (Smirlock, 1985; Trabelsi and Trad, 2017). Some studies find that small IBs are financially stronger than large IBs (Čihák and Hesse, 2010), while other studies find the opposite, arguing that larger banks are more able to generate profits as they take advantage of the economics of scale (Masood and Ashraf, 2012) and are more able to diversify and expand their investments and services (Alzoubi, 2018).

Leverage is represented by DEPEQ (debt to equity); if the capital of a bank is lower than its debt, the possibility of financial losses will be higher. The bank capital plays a major role in absorbing potential financial

risks. Therefore, lower ratio of debt to equity is favourable for banks (Masood and Ashraf, 2012). Managers' decisions on the capital structure (debt to equity) will affect the profitability and market value of IB<sup>2</sup>

**Table 2:** Definition of study variables

| Variable                    | Measure   |                   | Expected Effect |
|-----------------------------|---|-------------------|-----------------|
| Profitability               | Return on Assets (RAO) = Net income/Total Assets<br>Return on Equity (ROE) = Net income/Equity<br>NET Profit Margin | ROA<br>ROE<br>NPM |                 |
| Size                        | Natural Logarithm of Total Assets   | LOGTA             | +/-             |
| Capital Adequacy            | Equity/ Total Assets  | EQAS              | + /-            |
| Asset Quality (credit risk) | Loans / Total Assets  | LOANTA            | -               |
| Income diversification      | Non-financial activities/total assets   | NII/TA            | +               |
| Liquidity                   | Cash and cash equivalent to total assets  | CATA              |                 |
| Asset management            | Operating income/ Total Assets  | OPITA             | +               |
| Deposit                     | Deposits/Total Assets   | DEPTA             | +               |
| Leverage                    | Total Debt/ Total Equity  | DEPEQ             | -               |
| Operational Efficiency      | The cost of overhead/ Total asset<br>Total Operating Expenses/Total Assets  | OPE               | +               |
| Economic Activity           | Natural Logarithm of Annual Real GDP Growth Rate  | LOGGDP            | +               |
| Inflation                   | Annual Inflation Rate (Consumer Price Index, CPI)   | INF               | -               |
| Time                        | Global Financial crisis   | GFC               | + -             |

Source: DataStream and the World Bank outlook

To investigate whether non-financial activities impact profitability of IBs, NII/TA is used to represent this variable. Cash and cash equivalents CA/TA are used to capture the impact of liquidity. The higher percentage of ratio indicates that banks have more liquidity. The main reason for bank failure is inadequate liquidity (Masood and Ashraf, 2012). On the other hand, having too much liquidity may lead banks to lose higher return of investment (an opportunity cost). As IBs are banned from access to inter-banking market or hedging instruments, it is argued that they are potentially less exposed to liquidity risk compared to large CBs (Čihák and Hesse, 2010; Kassim and Abdullah, 2012).

To measure how operating income affects profitability of banks, we employed operating income to total assets (OPITA), and in order to assess whether IBs have a good management of their expenditures, we used the most common variable, the operational efficiency (OPE) (Masood and Ashraf, 2012). Deposit to total assets (DEPTA) is considered the key and lowest cost and the main source of banks' funding, and we expect that the higher this ratio, the higher profitability for IBs.

However, other variables we believe would affect the performance of IBs are macroeconomic variables and the GFC (2007-2009). Annual real gross domestic product growth rate (GDP) represents the total economic activity. The prior studies find a positive relationship between GDP growth and profitability of banks (Masood and Ashraf, 2012; Zarrouk et al. 2014; Khasawneh, 2016; Trabelsi and Trad, 2017). INF is used to examine the effect of inflation on profitability. Finally, GFC captures the impact of GFC on IBs' performance.

### **3.2 The Arellano and Bond (1991) GMM Model**

The least squares estimation is inappropriate since it generates biased and inconsistent estimates (Baltagi, 20012005). Therefore, in order to eliminate unobserved heterogeneity for IBs, this paper employs the Arellano and Bond (1991) generalized method of moments (GMM), using lagged dependent variables to deal with endogeneity issue as well as taking one lagged value of two endogenous variables, namely capital adequacy (EQAS). This model should not be employed if the study period is short, but in our study, this issue does not exist as it covers the period for 2004- 2017. This model has been applied in the IBs' literature (e.g. Zarrouk et al., 2016; Trabelsi and Trad, 2017; Sun et al., 2017). We



employed two diagnostic tests. Firstly, we tested whether there is existence of first and second order serial correlation; the test should reject the second order to ensure that there is no serial correlation among residuals. Secondly, we checked the validity of over-identification restrictions using the Sargan test (Baltagi, 2005; Athanasoglou et al, 2008).

To empirically investigate how profitability of IBs is determined, this paper follows Athanasoglou et al. (2008) and Zarrouk et al. (2014), employing a dynamic linear model given by equation (1)

$$P_{it} = C + \delta P_{it-1} + \sum_{i=1}^n \lambda_i Z_i + \sum_{i=1}^n \lambda_i Y_i + \sum_{i=1}^n \lambda_i D_i + \varepsilon_{it} \quad (1)$$

where  $P_{it-1}$  is the lagged value of profitability variables,  $Z_i$  in the model denotes bank-specific variables, while  $Y_i$  represents macroeconomic and  $D_i$  refers to dummy variable GFC.

#### 4. Empirical Findings

Table 3 reports descriptive statistics for the study's variables. It shows the mean and standard deviation value for variables. The average value is represented by the mean, while standard deviation shows deviation of values from the mean. The descriptive statistics show that the average of return on assets (ROA) in our banks sample is 1.73 percent, whereas the return on equity (ROE) mean is 11.23 over the study period. Regarding the ratio of capital adequacy (EQAS), mean is 21.32 percent and standard deviation is 18.60 percent, whilst the mean for income generated from non-financial activities (NIITA) is 0.0123 percent and standard deviation is 0.016. The average for the ratio of loans to average total assets (LOANTA) is about 60 percent and for deposits to average total assets is 76 percent. The average for asset management to measure operating income over average total assets (OPETA) is 0.013 percent and exposes standard deviation 0.019.

**Table 3:** Descriptive statistics

| Variable | Mean  | Std. Dev | Min       | Max     |
|----------|-------|----------|-----------|---------|
| ROA      | 1.73  | 2.27     | -6.76     | 13.21   |
| ROE      | 11.23 | 20.11    | -261.52   | 184.22  |
| NPM      | 17.23 | 46.95    | -558.39   | 174.68  |
| EQAS     | 21.32 | 18.60    | -2.84     | 204.41  |
| LOGTA    | 16.79 | 2.21     | 11.17191  | 22.93   |
| DEPEQ    | .7559 | .651     | 0         | 3.86    |
| NIITA    | .0123 | .0158    | -.1058638 | 0.1361  |
| CATA     | .0989 | .102     | .0037726  | 0.7068  |
| LOANTA   | .5925 | .253     | 0         | 1.1867  |
| OPETA    | .0137 | .019     | -.111677  | .1318   |
| DEPTA    | 2.134 | 11.20    | 0         | 145.195 |
| INF      | 4.915 | 4.86     | -4.863278 | 53.24   |
| LOGGDP   | 1.545 | .651     | -.6913948 | 3.991   |
| OPE      | .0451 | .030     | 0         | 0.253   |

To examine whether there is multi-collinearity among independent variables, table 4 shows the relationship between independent variables we used to examine how they affect probability. As Table 4 demonstrates, the correlation among the independent variables is extremely low, clarifying that there is no existence of multi-collinearity.

**Table 4:** Correlation matrix

|        | inf   | eqas  | ope   | opeta | depta | loggdp | logta | depeq | niita | cata  | loanta |
|--------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|--------|
| inf    | 1     |       |       |       |       |        |       |       |       |       |        |
| eqas   | -0.12 | 1     |       |       |       |        |       |       |       |       |        |
| ope    | 0.29  | -0.1  | 1     |       |       |        |       |       |       |       |        |
| opeta  | 0.15  | -0.04 | -0.15 | 1     |       |        |       |       |       |       |        |
| depta  | 0.02  | 0.02  | -0.09 | 0.03  | 1     |        |       |       |       |       |        |
| loggdp | 0.09  | 0.12  | -0.01 | 0.19  | 0.08  | 1      |       |       |       |       |        |
| logta  | 0.21  | -0.21 | 0.18  | 0.2   | 0.08  | 0.07   | 1     |       |       |       |        |
| depeq  | -0.02 | -0.22 | 0.12  | 0.26  | -0.09 | -0.18  | -0.01 | 1     |       |       |        |
| niita  | 0.1   | -0.04 | 0     | 0.49  | 0.36  | 0.09   | -0.06 | -0.1  | 1     |       |        |
| cata   | 0.06  | 0.17  | 0.03  | -0.01 | 0.24  | 0.05   | 0.13  | -0.23 | -0.24 | 1     |        |
| loanta | -0.08 | -0.02 | -0.13 | 0.09  | -0.47 | 0.09   | -0.35 | 0.02  | 0.16  | -0.44 | 1      |

In table 5, we report the results of Arellano Bond regressions for all IBs. Estimations of GMM revealed stable coefficient as the Sargan test, showing no evidence of over-identifying restrictions for all regressions. Although the tests suggest that negative first-order autocorrelation is evident, this does not mean that estimates are inconsistent (Arrelano and Bond, 1991). In addition, the dynamic character of the model specification is confirmed as a highly significant coefficient of lagged ROA, ROE and NPM at 5% and 1% significance level. Empirical findings suggest that maintaining high capital ratio would lead IBs to be more profitable, confirming the argument of Berger (1995) that well-capitalised banks are likely to be safer and perform much better than banks with low capital. Furthermore, capital ratios are a reliable source in predicting potential bankruptcies (Chazi and Syed, 2010). In addition, Laeven and Levine (2009) advocate that a bank with higher equity is able to employ risk-taking policies and therefore higher profits, while maintaining high level of capital adequacy would help banks to expand their activities and withstand with any potential financial distress (Elfeituri, 2018). Further, unlike the debt capital, having more equity in IBs (based on profit-loss sharing principle) that is not subject to withdrawal would allow them to invest in long-term profitable assets, boosting profitability (Alzoubi, 2018).

**Table 5:** regression results using AB (1991)-GMM model

|        | ROA                 | ROA                 | ROE                   | ROE                   | NPM                  | NPM                  |
|--------|---------------------|---------------------|-----------------------|-----------------------|----------------------|----------------------|
| L.ROA  | -0.00327<br>(-0.11) | 0.0369**<br>-2.18   | -0.339***<br>(-42.37) | -0.371***<br>(-18.83) | 0.0770***<br>-3.29   | 0.0349**<br>-2.39    |
| EQAS   | 0.00739<br>-0.49    | 0.00939<br>-0.8     | 1.464***<br>-3.43     | 1.337***<br>-5.36     | -0.433***<br>(-3.29) | -0.935***<br>(-6.08) |
| LOGTA  | 0.016<br>-0.07      | 0.0546<br>-0.45     | 8.865**<br>-2.13      | 10.52***<br>-3.87     | 5.168**<br>-2.45     | 3.783*<br>-1.89      |
| DEPEQ  | -0.138<br>(-0.77)   | -0.179**<br>(-2.30) | -10.30***<br>(-3.09)  | -10.01***<br>(-4.22)  | -3.668***<br>(-2.58) | -1.998*<br>(-1.73)   |
| NII/TA | 24.00***<br>-2.74   | 8.717*<br>-1.72     | -532.0***<br>(-3.21)  | -508.3***<br>(-2.85)  | -506.5***<br>(-4.84) | -572.2***<br>(-3.50) |
| CATA   | -0.83<br>(-0.78)    | -1.672<br>(-1.15)   | -22.11<br>(-1.00)     | -26.18*<br>(-1.78)    | -41.31**<br>(-2.47)  | -53.54***<br>(-3.19) |

|          | ROA        | ROA       | ROE       | ROE       | NPM       | NPM       |
|----------|------------|-----------|-----------|-----------|-----------|-----------|
| LOANT    | -1.243**   | -1.351*   | 12.8      | 3.294     | -10.02    | -16.17**  |
| A        | (-2.51)    | (-1.94)   | -0.94     | -0.38     | (-0.97)   | (-2.16)   |
| OPITA    | 91.77***   | 98.37***  | 907.5***  | 1056.7*** | 1066.6*** | 1528.3*** |
|          | -14.29     | -22.21    | -7.44     | -9.28     | -7.55     | -11.31    |
| OPE      | -0.764     | 8.487*    | -391.5*** | -284.5*** | -288.7*** | -209.9**  |
|          | (-0.10)    | -1.8      | (-3.79)   | (-4.06)   | (-3.81)   | (-2.31)   |
| DEPTA    | -0.104     | 0.231     | 2.573*    | 1.624     | 0.282     | -0.846    |
|          | (-0.67)    | -0.86     | -1.9      | -1.43     | -0.44     | (-0.84)   |
| INF      | -0.0000553 |           | 0.298     |           | -0.00718  |           |
|          | (-0.01)    |           | -1.25     |           | (-0.05)   |           |
| LOGGD    | 0.178***   |           | 1.549     |           | 1.337*    |           |
| P        | -4.63      |           | -0.99     |           | -1.68     |           |
| GFC      | 0.527***   | 0.251***  | 14.15***  | 14.83***  | 4.351*    | 2.765*    |
|          | -4.41      | -2.86     | -4.73     | -13.39    | -1.92     | -1.78     |
| Constant | 0.504      | -0.548    | -137.5*   | -163.1*** | -50.87    | -21.43    |
|          | -0.11      | (-0.21)   | (-1.88)   | (-3.12)   | (-1.16)   | (-0.54)   |
|          | -2.4222    | -2.1985   | -1.2779   | -1.278    | -2.1269   | -1.9764   |
| AB       | 0.0154     | 0.0279    | 0.2013    | 0.2013    | 0.0334    | 0.0481    |
|          | -1.0347    | -1.6505   | -5.3687   | -1.2252   | 1.2381    | 1.3778    |
|          | 0.3008     | 0.1088    | 0.5914    | 0.2205    | 0.2157    | 0.1683    |
| Sargan   | 21.49      | 18.44     | 21.1      | 25.79     | 23.53     | 25.24     |
| test     | 0.9999     | 0.9988    | 0.9991    | 0.9999    | 0.9988    | 0.9993    |
| Wald     | 176651.6   | 708820.64 | 114278.93 | 19442.57  | 37623.75  | 128040.53 |
| chi2     | 0          | 0         | 0         | 0         | 0         | 0         |

t statistics in parentheses  
 ="\* p<0.10  
 \*\* p<0.05  
 \*\*\* p<0.01"

**Dependent variables:** ROA: return on assets, ROE: return on equity, NPM: net profit margin.

**Independent variables:** LROA, LROE, LNPM 1 lag of dependent variables, EQAS: equity to assets, LOGTA=:log of bank total assets, DEPEQ: debt to equity, NII/TA: non-interest income to total assets, CATA: cash and cash equivalents to total assets, LOANTA: total loans to total assets, OPITA=operating income to total assets, OPE: operational efficiency, DEPTA: deposits to assets, INF: inflation, LOGGDP: log of gross domestic product, GFC: dummy variable of global financial crisis.

It is interesting to find that non-traditional activities (NII/TA) from services and other investments are found to have a positive impact on profitability measured by ROA and ROE, and NPM in line with what Zarrouk et al. (2014) found. This result implies that IBs need to go much further for earnings diversification strategy to maintain their market share in the market with CBs. Our paper also finds that profitability of IBs is positively influenced by Asset Management (OPITA) at 1% significant level. This finding confirms that managing assets efficiently would lead to generating economic benefits to a bank via optimal allocation of resources, which is essential for bank survival. Meanwhile, loan to total assets ratio (LOANTA) is negatively related to profitability, in contrast to Bashir (2003) and Masood and Ashraf (2012). However, the former reports that the nonperforming loans variable is negatively related to profitability. Our finding can be justified by the higher fees charged by IBs compared to CBs' fees and monitoring cost increases for higher amounts of loans in terms of originated, serviced and monitored. This is consistent with Sohel et al. (2019) who found that IBs have a greater reliance on fees than returns from loans to increase their profitability, although, over-reliance on fee-based income may affect their growth, profitability and sustainability in the long run. Sohel et al. (2019) argue that this may be due to the IBs' size, their business experience and religious requirements. Therefore, IBs need to reconsider fees charged to customers to cover costs associated with loans and to maintain a market share with CBs. Examining the impact of liquidity measured by cash and cash equivalent to total assets (CATA), this variable is found to have a negative relationship to profitability for all models and to be highly significant with ROE and NPM. Such output confirms that maintaining high levels of liquid assets is not beneficial for banks, in line with the view that additional liquidity should be invested in new investment opportunities to ensure better growth and increasing profitability.

The gearing (debt to equity) ratio shows a negative relationship to the bank's profitability and is highly significant in all models, with the

exception of model 1. This result confirms that the high level of capital would help banks to absorb financial losses, and that sound protection can be gained by keeping a suitable level of capital against any decrease of bank's assets value or NPL. Therefore, it is crucial to maintain a lower ratio of debt to equity for banks to avoid financing costs and high levels of debt (Masood and Ashraf, 2012). As expected, poor cost management represented by total overheads to total assets (OPE) leads to reduced profitability for banks as the relatively high coefficient of OPE is negative and significant for all regressions. The higher the ratio of OPE, the lower the operational efficiency and, consequently, the lower the profit. Such findings are supported by Demirguc-Kunt and Huizinga (1999), Pasiouras and Kosmidou (2007); Dietrich and Wanzenried (2014). We argue that the administrative and personnel expenses are relatively high in such cases due to bad management and political purpose. This suggests that IBs should take the necessary actions to operate efficiently and thereby increase profits. However, in respect to the impact of the GFC on profitability, IBs during the GFC have increased their profitability. This result indicates that those IBs are not especially exposed to international banks as they mainly focus on Islamic product. While IBs' business model precludes them from granting subprime loans, leverage, taking excessive risks (Gharar) and risky financial instruments, they are less susceptible to the crisis (see Čihák and Hesse, 2010; Hasan and Dridi, 2011; Beck et al., 2013; Alqahtani and Mayes, 2017). Moreover, IBs were able to maintain better capital ratios during the GFC, which shielded them from the severe effects of the crisis (see Chazi and Syed, 2010). Finally, regarding the macroeconomic variables, LOGGDP has significant and positive effect on profitability, supporting the argument for the positive association between economic growth and banking sector performance, in line with Bashir (2003), Zeitun (2012), Khasawneh, (2016), Zarrouk et al. (2016) and Hussien et al. (2019).

## **5. Conclusion**

This paper has investigated the determinants of IBs' profitability using a large sample of banks from 12 countries for the period 2004-2017, using the GMM model. This study is considered greatly beneficial since it focuses on countries that have not been examined as intensely as well-developed countries. Our findings answered the research question of the study that profitability of IBs is shaped by bank-specific and macroeconomic variables. We confirm that the non-traditional activities

(NII/TA) from services and other investments are found to have a positive impact on profitability, suggesting that IBs need go much further for earnings diversification to increase their market share in the banking sector alongside CBs. This significant result clarified that IBs have successfully gained a competitive edge over CBs via focusing on sources of income other than the traditional lending activities.

Moreover, results confirm that the high level of capital would help banks to absorb financial losses and that sound protection can be gained by keeping suitable levels of capital against any decrease of banks' assets value or non-performing loans. Thus, maintaining lower ratio of debt to equity is crucial for banks to protect themselves from financing costs. Regarding the impact of the GFC on profitability, IBs during the GFC have increased their profitability over this period, indicating that those IBs are not exposed to international banks. In this matter, we argued that IBs rely heavily on Islamic product and avoid granting subprime loans and investing in risky financial instruments. Moreover, IBs were able to maintain better capital ratios during GFC, which safeguarded them from the severe effects of the crisis. This outcome confirms that central banks in these countries should verify that all banks are well-capitalised to ensure that they are protected against any potential financial distress, and therefore that the stability of the banking sector is secured.

However, the asset quality represented by loan to total assets ratio (LOANTA) is negatively related to profitability. This finding can be justified by the higher fees charged by IBs compared to CBs' fees and monitoring cost increases for higher amounts of loans in terms of origin, servicing, and monitoring have led to decreased profitability of IBs. The IBs have greater reliance on fees than returns from loans to increase their profitability. Therefore, they need to consider that the over-reliance on fee-based income may affect their growth, profitability, and sustainability in the long run.

Finally, this paper showed that economic growth has positively affected profitability of IBs, suggesting that policymakers and regulators need to set policies in favour of stimulating the economy to ensure growth and survival of IBs and the banking sector as whole.



### **5.1 Limitations and Future Studies**

This study has focused on fully-fledged IBs and not on Islamic “windows” or Islamic branches operated by some commercial banks. Furthermore, data limitations prevented us from including all IBs as we had to exclude some countries from the studied sample due to lack of financial data. This study can be extended in terms of the study period and sample size by including additional variables to examine how competition and market structure affect IBs performance compared to CBs in developing countries.

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