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► To cite this version:

Kaouther Toumi Lajimi, Rana El Bahsh, Serge Agbodjo. The determinants of bank profitability, does Islamic ethics perspective matter? A comprehensive study on Islamic banks vs. Conventional ones. 34th International Conference of AFFI, Université grenoble Alpes; CERAG Research Center; IUT de Valence, May 2017, Valence, France. hal-04109833

HAL Id: hal-04109833

<https://ut3-toulouseinp.hal.science/hal-04109833>

Submitted on 30 May 2023

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The determinants of bank profitability, does Islamic ethics perspective matter? A comprehensive study on Islamic banks vs. Conventional ones.

Kaouther TOUMI¹, Rana El BAHSH², Serge AGBODJO³

Abstract

We examine whether the level of diversification, risk, efficiency and ethical governance influence Islamic banks (IBs) profitability compared to conventional (CBs) and hybrid banks (HBs). Using a sample of 205 banks; divided into 92 CBs, 92 IBs and 22 HBs from 18 countries for the period 2005-2015, we find that IBs are more profitable than CBs based on return on assets, return on deposits and net margin ratio. However, IBs are observed to be less profitable based on the return on equity. IBs appear to be less diversified in terms of sources of revenue, types of earning assets and types of funding sources. Furthermore, IBs appear to have slightly more diversified portfolios in terms of liabilities and assets components. In terms of risk, IBs present lower financial risk, liquidity risk and insolvency risk but higher margin risk and credit risk. We provide initial confirmation that diversification and risk impact differently the profitability of the sampled groups of banks. Regarding the impact of the Shariah governance, we find two principal results. First, the availability of a Shariah supervisory board in the governance structure increases banks profitability. Second, banks governed under a centralized Shariah governance model is found to influence positively the profitability of IBs revealing that such Shariah governance model increases the credibility and the reputation of IBs in the industry which improves thus their profitability.

Key words

Profitability; diversification; risk; efficiency; Shariah/Ethical governance.

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The determinants of bank profitability, does Islamic ethics perspective matter?

A comprehensive study on Islamic banks vs. Conventional ones.

Introduction

The banking sector has an important role in the economic development. No wonder as this sector plays a crucial role as a financial intermediary affects the economic function and contributes to the financial system stability. Turbulences in the banking system have led to several economic crises throughout the world. So sustaining a healthy banking sector would contribute to economies and spur growth as well as endure negative and external financial shocks. For that reason, it is important for this financial sector to achieve profits to sustain its growth and development. Financial theories have always researched profitability as a fundamental dimension for the corporations' survival and continuity. These theories realize that profitability is not a self-stand dimension; it is affected by other several dimensions, notably, risk and diversification. The portfolio theory pulls in the relation between risk and return and clarifies that this relation can be developed through diversification which shall at the end improve returns (Markowitz, 1952). The market model suggests that the total risk of an asset combines the systematic risk which can't be eliminated through diversifying and the specific risk which can be eliminated through diversification (Sharpe, 1964). The option theory shows that shareholders are encouraged to increase company risk in order to maximize their wealth and their return (Black and Scholes, 1973). Corporate finance theories integrate another important dimension to profitability; leverage and the related financial risk. Leverage turned to have an effect on capital structure and though increase the return on equity. Also, the corporate governance theories explain how the conflict and the informational asymmetries between different stakeholders in a corporation can lead to agency and informational costs (Fama and Jensen, 1983; Jensen and Meckling, 1976; Myers, 1984; Myers and Majluf, 1984) that affect, as a consequence, the profitability, if not, in certain times, the existence of the whole corporation.

Studies have revealed several interesting findings about the profitability of banks and their determinants (Athanasoglou et al., 2008; Dietrich and Wanzenried, 2011; Masood and Muhammad, 2012; Park and Weber, 2006). The structural changes in the banking industry and the proliferation of alternative financing sources for firms have enabled banks to consistently look out for other ways to increase their profits besides lending or traditional activities (Meslier et al., 2014). More importantly and recently researches have distinguished between two important types of banks, Islamic banks and Conventional banks. These two types of banks are similar in sector basis, but they include many differences in their functionalities which make it crucial to study the differences between them; this includes the factors that affect their profitability.

IBs are considered as having ethical identity, since the foundation of their business philosophy is closely tied to religion (Haniffa and Hudaib, 2007). Religiously oriented organizations are expected to follow strict moral constraints that shape the particular context

of their economic operations (Abdelsalam et al., 2016). Among the core differences between Islamic and conventional banking is first, the prohibition of both the receipt and payment of interest (Riba) in all transactions. Second, the principle of risk sharing on the both sides of the balance sheet replaces the conventional remuneration based on the interest rate remuneration. The third tenet of Islamic finance involves restrictions on the uses of funds. Islamic financial institutions face a restricted set of investment opportunities because of the prohibition of the excessive uncertainty and risk taking, gambling, short-sales as well as the prohibition of non Shariah compliant activities considered as harmful to society. A fourth major difference is that transactions must be underpinned by real economic activities. The Shariah governance that characterizes the governance structure in the Islamic context is the fifth major difference. Islamic financial institutions are governed under a strict surveillance of a Shariah committee which is composed of Shariah scholars who refers to specialists engaged professionally to provide expertise in the Shariah compliance process. Finally, Islamic finance requires parties to honor principles of fair treatment and the sanctity of contracts. These requirements led to a new base of financial function, that defines ethics as an important part of it, that is the Shariah principles. The provision of banking services in line with Islamic principles results in operations and balance sheet structures that are distinct from conventional banks. These core differences between the two financial systems boosted us to reveal how Islamic ethics affect profitability of banks based on the contribution of the financial theories.

Theory does not make clear predictions whether Islamic banks should be more profitable or not. The purpose of this paper is to define the determinants of bank profitability in Islamic banks versus conventional ones. More specifically, we explore the effect of bank-level variables such as risk, leverage, diversification, costs, and governance; and several country-level and on bank profitability. Moreover, we distinguish between three types of banks in their offering of Islamic bases financial services; the fully-fledged Islamic Banks (IBs), the fully-fledged conventional banks (CBs) and the conventional banks with Islamic windows that we name the hybrid banks (HBs). This categorization was accomplished manually through scanning the website of each bank to find how Islamic Banking is present (if any). For robustness we integrate several measures of profitability; Return on Assets, Return on Equity, Return on Customer Deposits, and Net Interest Margin. We investigate the effect of several types of risks (insolvency risk, credit risk, liquidity risk, margin risk and leverage) on profitability. We also apply the Herfindahl-Hirschman Index to examine the effect of several dimensions of diversification (Revenues, assets, earning assets, funding sources and liabilities) on profitability. Furthermore we control by the efficiency of managing costs and the ethical governance practices on banks' profits. The sample accumulates 206 banks from 18 countries that have both Islamic and conventional banks. The period of the study covers the years from 2005 to 2015.

To our knowledge, no other study have addressed a world level three categorization of Islamic, conventional, and hybrid banking over this period of time to test bank determinants of profitability. We make several sup-samples and examine whether the determinants of bank profitability affect the three categories of banks differently methodology will allow the

identification of the Islamic finance ethics on bank profitability. Our paper analyzes the determinants of bank profitability for a period that covers the 2007/2008 financial crisis. This is important because IBs were much less affected by the financial crisis than CBs because they are less dependent on derivatives and trading which had high volatility during the crisis. Moreover, our paper is related to a large number of studies that analyze the impact of diversification on bank return. Diversification with its five dimensions (Revenue, assets, earning assets, deposits and liabilities) was never been tested in other studies on IBs. To our knowledge, no existing study considers the effect of diversification on the different categories of banks. A large literature exist on the impact of revenue diversification on CBs returns (Berger et al., 2010; Brighi and Venturelli, 2014; Chiorazzo et al., 2008; Köhler, 2014a, 2014b; Lee et al., 2014; Meslier et al., 2014). Köhler (2014a) and Berger et al. (2010) extend their analysis to the impact of deposits diversification on the profitability of CBs. this research contributes to the scarce literature dedicated the impact of diversification on the profitability of IBs. Furthermore, diversification measures capture banks business models and describe how banks generate profits, what types of customers they serve, and which distribution channels they use. Therefore, analyzing them is important for investors and financial analysts as well as for regulators. The financial crisis has shown that it is necessary to take a more detailed look at banks business models and not only at the capital, liquidity and risk management since it should give regulators a deeper understanding of the sustainability of bank profits and stability (Köhler, 2014a). The paper should not only provide practical implications for Islamic and conventional bank managers, but also enlighten some perspectives to the policy makers who set rules that encourage and/or discourage the diversification in banking.

We find that IBs are more profitable based on return on assets, return on deposits and net margin ratio. However, IBs are observed to be less profitable based on the return on equity. IBs appear to be less diversified in terms of sources of revenue, types of earning assets and types of funding sources. Furthermore, IBs appear to have slightly more diversified portfolios in terms of liabilities and assets components. In terms of risk, IBs present lower financial risk, liquidity risk and insolvency risk but higher margin risk and credit risk. This research confirms that diversification and risk have a different impact on the profitability of the banks sup-samples . Regarding the impact of the Shariah governance, we find interesting results. First, the availability of a Shariah supervisory board in the governance structure increase banks profitability. Second, the positive effect on profitability is more pronounced in IBs which operate under a centralized Shariah governance model. . This implies that the Shariah governance model increases the credibility and the reputation of IBs in the industry improving thus their profitability.

The remaining of the research proceeds as follows. Part one, cites the theoretical background and the literature review, and the development of the hypothesis. Part two, specifies the methodology, the sample, the empirical model and the measures of dependent and explanatory variables. Part three, describes the empirical results. And part four concludes.

1. Theoretical background and literature review

Profitability has always been one of the fundamental dimensions of financial analysis and theories realize that it is not a self-stand dimension but affected by other several dimensions notably, risk, diversification, efficiency and governance. But what do the different characteristics of Islamic finance imply for IBs relative risk, diversification, efficiency and governance? We build on the theoretical contributions to explore the impact of Islamic finance ethics on banks profitability and its determinants.

First, with regard to risk, financial theories suggest that it should not be treated separately with returns (Black and Scholes, 1973; Markowitz, 1952; Sharpe, 1964); and if we consider the ethical and moral aspects governing IBs businesses, the issue of risk is addressed differently. The nature of Islamic intermediation, the complexity of Islamic financing techniques and the customers religiosity expose IBs to specific risk profile (Abedifar et al., 2013). Islamic finance laws prohibit the excessive risk taking and gambling that eliminates the access to speculative risky activities which should in turn decrease the overall risk of IBs assets portfolios. As the risk must be adequately compensated to guarantee continuous funding for firms future growth, the riskier the investment portfolio is, the higher the expected return is. The option theory (Black and Scholes, 1973) suggests that equity value can be viewed as call option on the company asset and shows that call price is a positive function of risk and, consequently, shareholders are encouraged to increase firm's risk to maximize their wealth and their return on equity. Considering the Islamic finance ethics, we expect a lower return on equity for IBs since their shareholders are constrained to take less risk than CBs. Additionally, the theoretical model encourages the risk sharing arrangements that might be a risk reducing factor. It should conceptually make IBs less vulnerable to risk since it permits to be better able to pass negative shocks on their asset side. The operational mechanisms for profit and loss sharing tend to help IBs for maintaining pro-cyclical protection and reduce the risk of withdrawal due to the loyalty to the banks in times of adverse conditions added to the religious convictions of the depositors (Abedifar et al., 2013). Also, financial theories of capital structure looked at the relation between leverage and return on equity. The related literature is based on the assumption that funds can be raised through debt and equity and that the introduction of debt increases the firm financial risk which in turn is borne by shareholders; who require thus a larger rate of return as compensation to accepting this risk. Al-Deehani et al. (1999) investigate the leverage effect relationship in IBs in the absence of debt (and the presence of PSIA) in the IBs capital structure. Leverage effect seems to be limited in IBs since PSIA are not debts instruments that increase the IBs bankruptcy and financial risk. IBs shareholders don't require higher equity of return when compared to CBs shareholders. In Addition, the traceability requirement related to the asset backing principle and the religiosity beliefs of IBs customers may induce loyalty and decrease default which in consequence reduce their credit risk compared to CBs (Abedifar et al., 2013). Differences in asset quality across Islamic and conventional banks are a priori ambiguous as it is not clear whether the tendency towards equity-funding in IBs provides stronger incentives to

adequately assess and monitor risk and discipline borrowers (Beck et al., 2013). Theoretically, the PLS principle encourages entrepreneurs to provide adequate efforts to manage projects (since the remuneration depends primarily on their effort) decreasing thus the credit risk. Furthermore, theoretically, if IBs fully share their profits and losses with PSIA holders, there will be no exposure to profit rate risk, termed also margin risk or mark-up risk, which is the interest rate risk concept in CBs. However, if IBs attempt to match the market returns expectations and increase PSIA holders remuneration, the profit rate risk will be positive as a result of the displaced commercial risk (Farook et al., 2012; Toumi et al., 2011). In practice, the profit risk is considered as one of the major risks that need serious attention by IBs due to market pressure. CBs usually deal with the exposure to mismatches through derivatives such as interest rate swaps or by moving these assets off balance sheet. However, risk management under Islamic finance emphasizes risk sharing versus risk transfer in conventional finance, which significantly restricts IBs from using derivatives and other conventional hedging mechanisms. The requirement of transparency (the banning of Gharar) limits IBs also from accessing to these instruments. As consequence, IBs are constrained to asset-liability management to manage the maturities mismatches. Based on the banking literature, demand on deposits encourage banks to monitor their lending activities (Diamond and Rajan, 2000). To that extent, IBs prefer first to rely on short term non-PLS financing contracts in the assets side and second to maintain significant liquid asset. Farook et al. (2012) argue that the level of short term non-PLS financing contracts in assets side determine the extent to which the IB is exposed to returns mismatches and profit rate risk. Finally, the restrictions of IBs to certain asset classes, the lack of high-quality liquid assets, the limited availability of a *Shariah* compatible money market as well as intra-bank market and the limited access to lender of last resort can also increase the liquidity riskiness of IBs (Beck et al., 2013; Greuning et al., 2008).

Second, the *Shariah* compliant nature of IBs implies different diversification forms in the income, asset and liabilities structure that might have an effect on profitability. IBs have diversified into nontraditional markets and no longer perform a simple intermediation function that is, deposit taking and lending. They developed diversified range of financing techniques and sources of income to avoid the payment or the receipt of interest. There might be a higher share of non-interest revenue in IBs as these banks might charge higher fees and commissions to compensate for the lack of interest revenue (Beck et al., 2013). Revenue should result from legitimate activities such as financing, investment, trading, rendering of services and other profit-oriented activities. Revenue could result from sales and lease financing contracts where the interest income earned is replaced respectively with profit and rent. IBs revenue comes also from equity financing income and investment income. Only income earned on *Shariah* compliant securities is recognized. IBs income comes also from fee-based contracts. Revenue from conventional derivatives and speculative activities are limited in IB since they face restrictions on the use of conventional derivatives. Standard portfolio theory predicts that, a shift from interest to non-interest income in CBs, would lead to larger benefits from diversification. The decision to diversify income sources and financial services is desirable for efficiency thanks to economies of scope (Klein and Saldenberg,

1997). Revenue diversification should reduce total risk since non-traditional banking activities that generate non-interest income are thought to be negatively, weakly or imperfectly correlated with traditional activities, thereby stabilizing profits and improving the risk-return trade-off (Köhler, 2014a). Regarding the IBs assets, it could exist in the form of sales receivable assets, lease assets, equity financing or investment assets, as well as liquid assets. Various types of contracts defining contractual rights and obligations of counterparties underlie each category of asset. For instance, sales receivable assets can be based on *Murabaha*, *Bay Muajjal*, *Salam* or *Istisna* contracts; equity financing or investments on *Mudrabah* and *Musharaka* contracts; and lease assets on *Ijarah* and *Ijarah Muntahia Bittamleek* contracts. IBs are able to ride much more complex, sophisticated and innovative financing structures from these basic contracts. These assets can be jointly funded by unrestricted PSIA, shareholders' funds, and other non-PSIA funds such as customer or demand deposits (savings and current accounts). In terms of retail vs. wholesale funding, there is a priori no clear difference, as IBs can rely on market funding as much as CBs, as long as it is Sharia-compliant (Beck et al., 2013). Diversification of assets should ensure the highest possible consistency in the evolution of revenues and earnings. The diversification of earning assets creates new sources of revenue through improving clients' loyalty as it enables banks to provide both primary and complementary services to customers who demand multiple products (Berger et al., 2010). Banks acquire information about clients during the process of making loans, which can facilitate the efficient provision of other financial services (Diamond, 1984). Diversified banks can benefit also from leveraging managerial skills and abilities across products and gaining economies of scope through spreading fixed costs (Berger et al., 2010). On the other side, the diversification of businesses within a single financial conglomerate could intensify agency problems between corporate insiders and small shareholders, resulting in adverse implications on the performance (Rotemberg and Saloner, 1994). Banks should focus on a single line of business so as to take greatest advantage of management's expertise and reduce agency problems, leaving investors to diversify on their own. Diversified banks can suffer from diluting the comparative advantage of management by going beyond their existing expertise (Klein and Saidenberg, 1997).

Additionally, Islamic finance requires IBs to conduct extra-financial screening that excludes financing and investing in sectors that contradict Islamic ethics. Sector diversification, when respectively and fairly represented in a portfolio and when financed assets that compose it are from uncorrelated economic sectors, reduces assets portfolio specific risk. As a result, excluding sectors in the Islamic finance context may reduce the investment opportunities available to IBs and that increases the concentration risk in the assets portfolios (Beck et al., 2013). However, IBs face higher restrictions on investing in non-real sector related securities. The tangibility and the traceability of money requirement allow IBs to offset the concentration risk in specific sectors since this feature permits to have a better vision on the allocation of funds. IBs can thus diversify their portfolios with assets that are uncorrelated or weakly correlated which will in turn reduce risk.

Third, in terms of efficiency, it is a priori ambiguous whether IBs should be more or less efficient and thus whether they are less or more profitable than CBs. First, costs could be

generated from agency relationships. The corporate governance theories predict that the existence of agency costs as a result of information asymmetries influence firm's profitability. Toumi et al. (2012) conclude that information asymmetries and the related costs are lower in IBs since the philosophy of Islamic finance leads in theory to a full transparency. Toumi et al. (2012) argues that Islamic mechanisms of financing, particularly PLS financing contracts, reduce moral hazard problems in IBs decreasing related *informational costs*. This happens as a result of the PLS-financing contracts that entitle IBs to observe their contractors and the PLS principle that encourages entrepreneurs to provide adequate efforts in managing funds since their remuneration depends primarily on their effort and know-how. Toumi et al. (2012) conclude that the IBs are able in this way to avoid being victims of informational asymmetries and disadvantages related to the difficulty of observing clients behavior, which in turn reduces the informational costs in IBs. Second, regarding the *agency costs* that result from the existence of conflicts of interest in the bank, the agency relationships become more complex since the corporate structures in IBs deviate from the conventional forms and generate new forms of agency relationships (Abdelsalam et al., 2016; Al-zoubi and Maghyereh, 2007; Safieddine, 2009; Toumi et al., 2012). On the one hand, The conflicts of interest related to the classical agency relationship shareholders-depositors and shareholder-managers seems to be theoretically lower in IBs which should lead to lower agency costs as argue Toumi and al (2012). Weaver and Agle (2002) argue that organizational religiosity induces social norms that suppress opportunistic behavior of bank managers. So, monitoring and screening costs might be lower for IBs given the lower agency problems (Beck et al., 2013). But on the other hand, new forms of agency relationships arises in IBs; the ethical committee-managers, the PSIA's depositors-managers and the PSIA's depositors-shareholders relationships; increasing the overall agency costs in the bank (Toumi et al., 2012). Third, the specific nature and design of Islamic financial products added to the complexities of Islamic banking operations might generate higher *transactional costs* compared to CBs. Fourth, since diversification takes different forms in IBs, the transaction savings related costs could be different. the literature on the benefits of diversification reveal that, among the identified benefits, are gaining economies of scope through spreading fixed costs over products and services (Berger et al., 2010; Elsas et al., 2010). The bank could increase the efficiency and enhance profitability by eliminating redundant operations and capitalizing on obtained client information when they process traditional intermediation activities to facilitate provision of other financial services. Finally, the younger age of IBs compared to most CBs might imply higher cost structures (Beck et al., 2013).

Finally, the global financial crisis has heightened interest in the relationship between governance and banks performance (Aebi et al., 2012). The governance structure in IBs is unique due to the Ethical or Shariah governance. IBs are governed under a strict surveillance of a Shariah Supervisory Board (SSB) which is composed of Shariah scholars who refers to specialists which are engaged professionally by the IBs to provide expertise in the Shariah compliance process. Together with the regular boards of directors and other operational committees, the SSB changes the governance in IBs into "multi-layer" governance (Mollah and Zaman, 2015). Choudhury and Hoque (2006) considered this body as the Supra Authority

that has the responsibility to ensure that Islamic laws are followed and reflected in the Islamic financial arrangements and transactions. The SSB disposes a vital governance role in protecting all stakeholders' financial interests. Toumi and Viviani (2016) highlight the role of the SSB in decreasing the asymmetries of information between managers and shareholders in IBs that lead to reduced opportunistic behavior. IBs seem also to integrate Corporate Social Responsibility (CSR) dimensions into their governance frameworks through the SSB since it has the responsibility to ensure that IBs products and services are purged from immoral and anti-social elements. Several researches have addressed the issue of CSR and banks performance and find a strong positive linkage (Platonova et al., 2016; Mallin et al., 2014; Wu and Shen, 2013). Waddock and Graves (1997) report that theoretically the benefits from CSR are greater compared with its costs since firms that pay special attention to socially responsible activities may expect to reach better profitability later. Preston and O'Bannon (1997) argue that meeting the needs of corporate stakeholders enhances reputation and impact positively the profitability. The Ethical and Shariah governance would have a role in enhancing the CSR practices impacting thus the IBs profitability.

Summarizing, theory does not provide clear answers whether and how risk, diversification, cost efficiency and governance differ between conventional and Islamic banks and how it impact profitability. This ambiguity is exacerbated by lack of clarity whether the products of IBs follow *Shariah* rules in form or in substance, an ambiguity which might vary across countries. We therefore turn to empirical analysis to explore differences between banks groups. During this analysis we will explore differences in profitability between Islamic and conventional banks. Globally we test:

Hyp1: Profitability of banks following the Islamic finance ethics differs from CBs

Hyp2: Banks profitability is affected in a different way when we consider the Islamic finance ethics.

2. Research design

2.1. Sample and data

We use data from Bankscope database, a global database with data on both listed and non-listed banks, to construct a list of Islamic and conventional banks worldwide. We obtain data for a sample of 746 banks, we keep only those having consolidated financial statements as in Mollah et al. (2016). We note that the Bankscope database classification of IBs is not suitable so we filter the data extracted for many reasons. First, Some IBs are mistakenly classified as CBs. Second, Bankscope database does not differentiate Hybrid Banks (HBs, CBs with Islamic windows) from fully IBs or fully CBs. The classification of CBs in the three categories is done manually through visiting the web site of banks and scanning the base system of financial services it provides. We then filter the remaining banks that have available data for more than 3 years. For the Islamic Republic of Iran and Sudan, financial information are available for only IBs since the legal and banking system are entirely Islamic. Finally, all bank variables have been winsorized at the 1% and 99% percentiles to reduce the influence of

outliners and potential data errors. Our sample covers 206 banks from 18 countries over the period 2005-2015. Banks are categorized into 92 IBs, 92 fully-CBs and 22 CBs with Islamic windows (22 HBs). Increased competition has led CBs to expand their activities and to develop new lines of Shariah compliant businesses beside their traditional interest activities. We merge macroeconomic and country-specific data from the Worldbank database, the world factbook website and the Pew Research Center website. Table 1 reports the country-wise distribution of the sample.

Table1: The country-wise distribution of the sample. This table describes the sample of the study that covers 92 IBs, 92 CBs and 22 HBs.

Countries	IBs	CBs	HBs	Total
Bahrain	16	6	1	23
Bangladesh	7	1		7
Egypt	1	3		4
Iraq	1	2		3
Iran	11			11
Jordan	2	10		12
Kuwait	10	4		14
Lebanon	1	19	1	21
Malaysia	8	14	6	28
Qatar	6	4	2	12
Saudi Arabia	3	4	4	11
Sudan	5			5
Syrian Arab Republic	2	3		5
Thailand	1	13		14
Turkey	3			3
United Arab Emirates	10	6	8	24
United Kingdom	3			3
Yemen	2	3		5
Total	92	92	22	206

2.2. Empirical model

We investigate the link between Risk, diversification, efficiency and governance with banks profitability. The general model is:

$$Profitability_{i,t} = \beta_0 + \sum_{j=1}^J \beta_j X_{i,t}^j + \sum_{k=1}^K \alpha_k X_{i,t}^k + \varepsilon_{i,t} \quad (1)$$

Where $Profitability_{i,t}$ is the profitability of bank i at time t , with $i=1, \dots, N$; $t=1, \dots, T$; β_0 is the constant term, $X_{i,t}$ are the explanatory variables and $\varepsilon_{i,t}$ the disturbance. The $X_{i,t}$ are grouped into bank-specific $X_{i,t}^j$ and country-specific variables $X_{i,t}^k$. Table 1 lists the variables used in the study.

We conduct a regression analysis of the determinants of banks profitability for the whole period 2005-2015 and for all banks groups. Table 3 presents the summary statistics of profitability and respective determinants for each category of banks.

2.3. Measures of bank profitability

In line with prior literature, the *Profitability_{i,t}* variable is represented first by the return on assets ROA (Athanasoglou et al., 2008; Dietrich and Wanzenried, 2011; Mokni and Rachdi, 2014; Mollah et al., 2016; Mollah and Zaman, 2015; Olson and Zoubi, 2016). ROA has emerged as the key ratio for the evaluation of bank profitability that reflects the ability of a bank's management to generate profits from the bank's assets. Our Results show that IBs are in average more profitable than CBs based on ROA (1,624% vs 1,608%). Similar results are reported by Beck et al. (2013) and Mokni and Rachdi (2014) contrary to Mollah and Zaman (2015), Mollah et al. (2016), Olson and Zoubi (2016) and Kabir et al. (2015). Second, the financial literature commonly uses also the return on equity ROE that reflects the return to shareholders equity (Athanasoglou et al., 2008; Dietrich and Wanzenried, 2011; Lee et al., 2014; Mokni and Rachdi, 2014; Mollah and Zaman, 2015; Olson and Zoubi, 2016). Our results reveal that IBs are observed to be less profitable in average when we compare the ROE (9.655% vs 12,262%). This result stands in line with the results of Mollah and Zaman (2015) and Olson and Zoubi (2016). The third measure used is the net interest margin NIM (Dietrich and Wanzenried, 2011; Garcia-Herrero et al., 2009; Olson and Zoubi, 2016). The NIM focuses on the profit earned on interest activities. For IBs, this ratio is measured by the difference between the Income generated from financing activities and the income attributable to depositors and PSIA holders to total gross income ratio (see table 2). Results reveal that IBs have in average higher net margin than CBs (3,692% vs 3,127%). Finally, the return on average customer deposits ROD serves as our fourth measures of profitability (Olson and Zoubi, 2016). It represents the bank profitability from the depositor's perspective. IBs offer in average higher returns on deposits with a mean value 9,203% versus 2,942% for CBs and 2,451% for HBs. This result is in line with the results of Olson and Zoubi (2016).

Table 5 provides the results of the mean comparison test of profitability and confirms findings of table 3. The results reveal significance in difference; of return on equity, return on deposits and net margin means; between CBs and IBs at 1% significance level (Except for NIM at 10% level). These primary results suggest the evidence that following the Islamic finance ethics impact the profitability of banks. However, no significance of difference of return on assets means between the two categories of banks (CBs versus IBs).

2.4. Measures of bank-specific and country-level explanatory variables

To capture bank portfolios diversification, we calculate the Herfindahl-Hirschman Index (HHI); we capture five dimensions of the index: HHi_Revenue (Chiorazzo et al., 2008; Elsas et al., 2010; Lee et al., 2014; Meslier et al., 2014), HHi_Assets (Berger et al., 2010), HHi_Earningass, HHi_fundings (Berger et al., 2010) and HHi_liabilities. The indices measure how focused or diversified the portfolios of banks are. The lower the HHI is; the well diversified is the portfolio of the bank (See table 2 for details on HHI calculations). Previous

researches have focused on the effect of diversification on the performance of CBs; no study has addressed this issue in the IBs.

Results on table 3 reveal a difference in diversification level between IBs, CBs and HBs. IBs appear to be less diversified in terms of sources of revenue, types of earning assets and types of funding sources. The higher values of HHi_revenue 0,745 (vs 0,627 for CBs and 0,605 for HBs) is expected for IBs. We note that this index captures the degree to which banks diversify between traditional banking activities (Lending for CBs/Financing for IBs) and non-traditional ones (fee-based activities, market oriented activities, etc.). The restrictions to generate revenue from non-compliant trading and derivatives allow IBs to be more focused on fee-based activities and traditional activities. Our results are in line with (Beck et al., 2013) who find that IBs are more involved in fee-based businesses and though have a significant higher share of fee income than do the CBs. The higher values of HHi_earningass 0,603 (vs 0,516 for CBs and 0,549 for HBs) is expected for IBs. Since diversification of earning assets ensures diversification of revenues; results of the two indexes are related. The result could be explained by the same reasons above. We add the lower loans to banks ratio in IBs since the interbank operations are underdeveloped. Our results are consistent with Beck et al. (2013) study which reveals a significant higher financing ratio (loans to deposits ratio) for IBs.

Further, IBs appear to be less diversified in terms types of sources of funding. A higher HHi_funding for IBs (0,65 vs 0,501 for CBs and 0,471 for HBs) suggests a less diversification in terms of deposits (Customer deposits, deposits from banks and other deposits & short term funding) and non-deposits (trading liabilities and LT funding). The result is also expected since IBs have limited opportunities to obtain funds through Islamic money market including interbank deposits or other short term deposits. Islamic interbank markets are underdeveloped reducing the level of IBs interbank operations to refinance at short-term. IBs don't benefit also from the support of central banks as this involves the payment of interest. HBs are observed to have the most diversified portfolio since they are more involved in the non-traditional banking businesses and rely heavily on non-deposits funding (Derivatives, trading and LT funding). Furthermore, IBs appear to have slightly more diversified portfolio in terms of liabilities components ("remunerated" liabilities, other liabilities) as reveal the lower HHi_liabilities (0,883 vs 0,917 in CBs and 0,898 in HBs). In IBs, the unpaid portion of depositors' share of profits would be an important component of other liabilities amounts. In addition to the classical loan loss reserves, IBs tend to retain specific reserves to manage risks related to PSIAs, such as profit equalization reserves and investment risk reserves, by setting aside amounts from the PSIA holders profits (Toumi and Viviani, 2013). Toumi et al. (2016) found for example that the amount of these particular reserves could reach 0,6% of PSIAs in a sample of IBs from Bahrain. The proportion of the PSIA ranges on average from 35 % to 70 %.

The lower HHi_assets for IBs (0,754 vs 0,779 for CBs) shows a slightly more diversified portfolio for IBs in terms of earning assets and non-earning assets. (Beck et al., 2013) found that IBs have significantly higher fixed assets explaining the results for HHi_Assets.

For HBs, we expected that related results will be intermediary results between IBs and CBs. But the larger size of HBs explains the more diversified sources of revenue (0,605 for HBs vs 0,745 for IBs and 0,627 for CBs) and funding sources (0,471 vs 0,65 for IBs and 0,501 for

CBs). From our sample, HBs corresponds to larger conventional banks that have great opportunities to diversify their activities and offer Islamic services in addition to conventional ones.

Risk proxies measures include:

- (i) *Insolvency_risk* measured by Z-score, combining profitability, leverage and return volatility into a single measure (Abedifar et al., 2013; Beck et al., 2013; Köhler, 2014a; Lee et al., 2014; Mollah et al., 2016; Olson and Zoubi, 2016). Z-score is inversely related to the probability of a bank's insolvency. A higher Z-score implies a higher bank stability and less overall bank risk. We find that IBs have a lower insolvency risk (80,21 for IBs vs 75,03 for CBs and 55,95 for HBs). Our finding is confirmed by previous studies (Abedifar et al., 2013; Beck et al., 2013; Hesse, 2010; Mollah and Zaman, 2015; Olson and Zoubi, 2016). The Islamic governance features and the Islamic ethics seem to make banks more stable and sound due to required reasonable risk-taking and the risk sharing principles. Also, differences in the Z-score are primarily driven by a higher level of capitalization suggesting a more conservative approach to risk taking. Banks with higher capital ratio is considered relatively safer and less risky. Furthermore, CBs and HBs are less stable as they increase their share of non-interest income (as reveal the lower HHi_revenue for CBs). DeYoung and Roland (2001) argue that non-interest income is usually more volatile. This suggests that a larger share of income from non-traditional activities may make banks more risky. This might particularly be the case for CBs and HBs, since they already have a large share of non-interest income and are more active than IBs in market oriented activities (as reveal the lower HHi-earningass). The higher overall risk in CBs and CBs might explain the higher return on equity in these banks compared to IBs.
- (ii) *Credit_Risk* measured by the reserves for impaired loans to non-performing loans ratio (Lee et al., 2014; Olson and Zoubi, 2016). The ratio informs about the quality of loans/financing portfolio. A higher ratio indicates a lower credit quality and a higher exposure to credit risk. Increased exposure to credit risk is associated with decreased profitability (Dietrich and Wanzenried, 2011; Mokni and Rachdi, 2014; Olson and Zoubi, 2011). In managing increasing credit risk, banks may incur additional expenses which might lead to lower profitability. We find a difference in average exists between IBs, CBs and HBs (0.054% for IBs vs 0.048% for CBs) and a lower exposure for HBs (0.033%). IBs have less diversified portfolios in terms of earning assets that imply IBs to rely more heavily than CBs and HBs on financing contracts (equivalent to loans) increasing their exposure to credit risk. Beck et al. (2013), Abedifar et al. (2013) and Johnes et al. (2014) find that IBs are less exposed to credit risk compared to CBs.
- (iii) *Liquidity_Risk* measured by liquid assets to deposits and short term customers funding's ratio (Beck et al., 2013; Mokni and Rachdi, 2014). A higher value of this ratio indicates a low liquidity risk. The liquidity risk is the probability of not having sufficient cash or borrowing capacity to cover deposit withdrawals or new

financing. The ratio is also an indicator of maturity matching as in Beck et al. (2013). We find that for IBs sample (CBs sample, HBs sample), the liquid assets ratio is 56.028% (29.85%; 24.863%) indicating a higher ratio of liquid assets and lower liquidity risk in IBs. Similar results are found in Mokni and Rachdi (2014) research. IBs have more liquid assets than CBs and HBs, as indicated by the significantly higher ratio of liquidity. Since they are more dependent on non-deposit funds (higher HHi_liabilities for IBs), IBs might hold a large stock of liquid assets as a buffer against liquidity shocks. Secondly, IBs primarily fund their loans by customer deposits, which are usually stickier with premature deposit withdrawals being unlikely (as reveals the higher HHi_fundings for IBs).

- (iv) *Margin_Risk* as a proxy of the interest rate risk measured by the volatility of the net interest margin. The margin risk is 1.51 for IBs (0.43 for CBs; 0.371 for HBs) indicating a higher volatility of margin and thus higher risk margin in IBs.
- (v) *Leverage_Ratio* as a proxy of the *financial risk* (Mollah et al., 2016). Banks with a lower leverage ratio (higher equity) usually report a higher ROA but a lower ROE. The ROE is associated to higher risk that is related to high leverage (Dietrich and Wanzenried, 2011). Financial risk measured by leverage differs between banks with IBs having the lower mean value (5.687 for IBs vs 8.537 for CBs and 7.651 for HBs). Mollah et al. (2016) and Sorwara et al. (2016) find similar results for leverage in IBs compared to CBs. The higher leverage in CBs and HBs explain the higher ROE in these categories of banks.

We control for differences in governance mechanisms. The Ethical/Shariah governance is captured by two dummy variables:

- i. *Ethical_Committee* that takes 1 if the bank has a SSB (For IBs and HBs). 44,66% of banks have a shariah governance in their governance structure.
- ii. *EthicGov_Mod* that takes 1 if a national or centralized ethical committee body exists in the country. Regulators across countries have adopted one of two models regarding the Shariah governance. First, a centralized *Shariah* governance approach where the central banks dispose of national SSBs that have the overall authority on Shariah governance framework and policy of the country. Second, a decentralized Shariah governance model where each IBs disposes of its independent SSB without being under a centralized shariah authority.

Costs, *Size* and *Growth_Assets* are included also as control variables in the estimation of our models (Abedifar et al., 2013; Beck et al., 2013).

- i. The logarithm of total asset is considered as a proxy for *Size*. Larger banks can first benefit from both scale economies and higher degree of product and loan diversification than smaller banks which reduces risk. Reduced risk and economies of scale lead to increased operational efficiency, size is expected to have a positive effect on bank profitability, at least up to a certain level (Abedifar et al., 2013; Dietrich and Wanzenried, 2011). Extremely large banks might show a negative linkage between size and profitability due to higher agency costs, overhead of bureaucratic processes

and other costs related to managing extremely large firms (Pasiouras and Kosmidou, 2007). IBs appear to be slightly smaller in size (14,74 vs 15,76 for CBs and 16,42 for HBs).

- ii. *Growth_Assets* reflects the growth strategy of banks (Abedifar et al., 2013). IBs are observed to have greater growth asset ratio (23,59% vs 15,10% for CBs and 15,10% vs 15, 52% for HBs).
- iii. Efficiency and expenses management measures include *Costs_Ratio* (Athanasoglou et al., 2008; Dietrich and Wanzenried, 2011; Mokni and Rachdi, 2014). The ratio is expected to be negatively related to profitability, since improved management of these expenses will increase efficiency and therefore raise profits. IBs are observed with higher costs with 67,96% indicating a lower costs efficiency in these banks. Previous studies reported the same results (Beck et al., 2013; Kabir et al., 2015; Mokni and Rachdi, 2014). Larger banks might be more efficient due to scale economies explaining the differences in efficiency between IBs, CBs and HBs. Our literature review reports also that agency, informational and transaction costs are different in IBs and might increase the overall costs in IBs.

We also introduce two country level factors to control for cross-country variations.

- i. First we control for the degree of religiosity using two proxies: the *Muslim_pop* that reflects the share of Muslim population in each country; and the *Legal_System* which is an index of the legal system of the country (Abedifar et al., 2013; Mollah et al., 2016). In the latter case, the index is a dummy variable that takes 1 if the Islamic law is considered in the country legislation.
- ii. Second, we control for the growth in the prosperity of the population and the inflation by including the following variables *GDP_Growth* and *Inflation*. *GDP_Growth* is expected to have a positive influence on bank profitability according to the literature on the association between economic growth and financial sector profitability (Athanasoglou et al., 2008; Dietrich and Wanzenried, 2011).

Table 2: Variables definitions

The table presents the dependent, the explanatory and the control variables of the study, their calculation procedure and their sources.

Variables	Definitions	Sources
Profitability		
<i>ROA</i>	Return on average assets	Bankscope
<i>ROE</i>	Return on average equity	Bankscope
<i>ROD</i>	Return on average customer deposits.	Bankscope
	- For CBs: Interest paid on deposits / Average deposits	
	- For IBs: Returns paid on deposits and PSIAs/Average deposits and PSIAs	
<i>NIM</i>	Net interest margin.	Bankscope
	- For CBs: (Interest income-Interest expenses)/Total gross income	
	- For IBs, Net financing income margin = (Income generated from financing activities- income attributable to depositors and PSIA holders)/Total gross income	

Diversification		
<i>HHI_Revenue</i>	$HHI_revenue_{i,t} = \sum_{a=1}^4 \frac{(r_{i,t}^a)^2}{R_{i,t}}$ <p>The index captures the level of diversification of revenue for a bank. $r_{i,t}^a$ is the share of one revenue source from the total revenue $R_{i,t}$ for the bank i at time t. We consider 4 components: Net interest income*, income on trading & derivatives, net fees & commissions and other operating income. For IBs: * sales, lease and equity financing income</p>	Authors' calculation based on Bankscope
<i>HHI_Assets</i>	$HHI_assets_{i,t} = \sum_{b=1}^2 \frac{(a_{i,t}^b)^2}{A_{i,t}}$ <p>The index measures the degree of assets diversification for a bank. $a_{i,t}^b$ is the share of one component of asset from the total assets $A_{i,t}$. We consider 2 components: Earning assets, Non-earning assets</p>	Authors' calculation based on Bankscope
<i>HHI_EarningAss</i>	$HHI_earningass_{i,t} = \sum_{c=1}^4 \frac{(a_{i,t}^c)^2}{EA_{i,t}}$ <p>The index measures the degree of earning assets diversification for a bank. $a_{i,t}^c$ is the share of one component of earning assets from the total earning assets $EA_{i,t}$ for a bank i at year t. we consider laons*, laons and advances to banks, derivatives**, other securities***. For IBs: * sales, lease and equity financing contracts (Asset value of Murabaha, Istisna, Ijara, Salam, Musharaka, Mudharaba, Wakala)(Olson and Zoubi, 2016) **structured products *** shariah compliant securities like sukuk, shares, etc.</p>	Authors' calculation based on Bankscope
<i>HHi_liabilities</i>	$HHI_Liabilities_{i,t} = \sum_{d=1}^2 \frac{(l_{i,t}^d)^2}{L_{i,t}}$ <p>The index measures the degree of diversification of funding sources for a bank. $l_{i,t}^d$ is the share of one funding source from the total funding sources $L_{i,t}$ for a bank i at year t. We consider 2 components: Interest bearing liabilities, non-interest bearing liabilities.</p>	Authors' calculation based on Bankscope
<i>HHi_fundings</i>	$HHI_funding_{i,t} = \sum_{e=1}^4 \frac{(d_{i,t}^e)^2}{D_{i,t}}$ <p>The index measures the degree of diversification of the funding sources for a bank. $d_{i,t}^e$ is the share of one funding source from the total funding sources $D_{i,t}$ for a bank i at year t. We consider 4 components: customers deposits (Cuurent, saving and term)*, deposits from banks, other short term deposits and other interest bearing liabilities**. For IBs : *Mudharaba and non-Mudharaba based deposits: unrestricted PSIAs + Murabaha deposits, medium term Wakala financing + saving accounts + current accounts ** trading liabilities and long term funding (+ Derivatives for CBs)</p>	Authors' calculation based on Bankscope

Risk <i>Insolvency_Risk</i>	$Z - score = (ROAA + \frac{Equity}{Assets}) / (SD ROAA)$	Authors' calculation based on Bankscope
<i>Credit_Risk</i>	Reserves for impaired loans*/Non performing loans For IBs: * reserves for impaired financing and investing activities	Bankscope
<i>Liquidity_Risk</i>	Liquid assets/Customer deposits(current, saving and term)* and short term funding's	Bankscope
<i>Margin_Risk</i>	Standard deviation (NIM); last three years	Authors' calculation based on Bankscope
<i>Leverage</i>	Financial debts to shareholders equity ratio= (Deposits+short term and other interest bearing liabilities) to total equity.	Authors' calculation based on Bankscope
Bank specific control variables		Bankscope
<i>Costs_Ratio</i>	Non-interest expenses to Gross revenues	
<i>Growth_Asset Size</i>	Non-interest expenses = Personal, administrative and other overhead expenses. Growth asset ratio, Year-on-year change of total assets Ln(total assets)	Bankscope Authors' calculation based on Bankscope
Ethical governance <i>Ethical_Committee</i>	Dummy variable that takes the value of 1 if the bank disposes of an ethical committee (for IBs and HBs), 0 otherwise (for CBs).	
<i>EthicGov_Model</i>	Dummy variables that takes 1 if a national or centralized ethical committee model exists in the country, 0 otherwise.	(UKIFC and ISRA, 2016) report
Country Control variables		
<i>Legal_System</i>	Dummy variable that takes 1 if the Islamic law is considered in the country legislation, 0 otherwise	World factbook ⁴
<i>Muslim_Pop</i>	Percentage of Muslims in the population	Pew Research Center ⁵
<i>GDP_Growth</i>	Annualized growth rate of GDP per capita	World Bank database ⁶
<i>Inflation</i>	Inflation rate, Year-on-year change of consumer price index	World Bank database

⁴ <https://www.cia.gov/library/publications/the-world-factbook/fields/2100.html#136>

⁵ <http://www.pewforum.org/>

⁶ <http://datacatalog.worldbank.org>

Table 3: Descriptive statistics

This table presents the descriptive statistics for the variables used in the models for both Islamic, conventional and hybrid banks.

Variables	All Banks					IBs					CBs					HBs				
	Obs	Mean	Std, Dev	Min	Max	Obs	Mean	Std, Dev	Min	Max	Obs	Mean	Std, Dev	Min	Max	Obs	Mean	Std, Dev	Min	Max
ROA	2266	1.666	3.401	-31.147	35.102	1012	1.624	4.910	-31.147	35.102	1012	1.608	1.216	-3.262	13.152	242	2.085	1.089	-0.673	8.242
ROE	2266	11.442	12.908	-167.4	116.319	1012	9.655	16.546	-167.4	116.319	1012	12.262	9.060	-94.122	45.038	242	15.488	6.348	-6.040	40.026
ROD	2266	5.686	9.669	0	269.310	1012	9.203	13.597	0	269.310	1012	2.942	1.324	0.240	9.160	242	2.451	1.304	0.280	5.950
NIM	2266	3.389	2.889	-12.987	62.219	1012	3.692	4.130	-12.987	62.219	1012	3.127	1.071	-1.361	9.958	242	3.221	1.183	1.207	9.958
HHL_Revenue	2266	0.677	0.156	0.5	1	1012	0.745	0.180	0.5	1	1012	0.627	0.107	0.5	1	242	0.605	0.097	0.5	1
HHL_Assets	2266	0.771	0.100	0.5	1	1012	0.754	0.106	0.5	1	1012	0.779	0.094	0.516	1	242	0.803	0.081	0.554	0.957
HHL_EarningAss	2266	0.558	0.124	0.309	1	1012	0.603	0.123	0.333	1	1012	0.516	0.115	0.309	0.983	242	0.549	0.103	0.338	0.832
HHL_funding	2266	0.564	0.184	0.202	1	1012	0.650	0.190	0.202	1	1012	0.501	0.155	0.257	1.000	242	0.471	0.1	0.291	0.953
HHi_liabilities	2266	0.900	0.087	0.500	1	1012	0.883	0.091	0.5	1	1012	0.917	0.083	0.530	1.000	242	0.898	0.078	0.578	1
Leverage	2266	7.168	4.048	1.56	31.578	1012	5.684	4.020	2.99	31.578	1012	8.537	3.825	1.56	29.837	242	7.651	2.730	1.68	14.980
Insolvency_Risk	2266	75.309	88.257	8.35	940.085	1012	80.211	82.368	8.35	620.962	1012	75.034	97.654	13.18	940.085	242	55.959	65.295	14.45	475.459
Liquidity_Risk	2260	40.969	59.701	0.156	997.718	1006	56.028	84.942	0.156	997.718	1012	29.850	18.740	3.810	148.592	242	24.863	11.010	4.320	59.959
Margin_Risk	2266	0.906	1.770	0.002	32.190	1012	1.510	2.484	0.002	32.190	1012	0.430	0.401	0.009	3.327	242	0.371	0.347	0.009	3.051
Credit_Risk	2266	0.049	0.069	0	1	1012	0.054	0.093	0	1	1012	0.048	0.041	0	0.376	242	0.033	0.017	0.010	0.088
Cost_Ratio	2250	55.092	45.634	9.767	841.509	997	67.963	64.331	10.088	841.509	1011	46.389	15.238	9.767	156.562	242	38.423	8.635	15.621	58.783
Growth_Asset	2266	19.405	24.726	-56.640	419.050	1012	24.771	31.260	-56.640	419.050	1012	14.968	16.915	-35.260	155.370	242	15.520	15.092	-13.490	70.740
Size	2266	15.376	1.453	9.981	18.813	1012	14.736	1.354	9.981	18.385	1012	15.766	1.369	11.969	18.813	242	16.422	0.909	13.842	18.386
GDP_Growth	2266	4.644	4.112	-15.088	26.170	1012	4.535	4.366	-15.088	26.170	1012	4.618	3.817	-15.088	26.170	242	5.211	4.176	-5.243	26.170
Inflation	2266	5.553	6.232	-10.067	53.231	1012	7.340	7.492	-10.067	53.231	1012	4.220	4.810	-10.067	53.231	242	3.661	2.839	-4.863	15.050
Muslim_Pop	2266	0.728	0.246	0.017	0.990	1012	0.787	0.213	0.017	0.990	1012	0.664	0.282	0.055	0.990	242	0.749	0.105	0.610	0.930

Table 4: Descriptive statistics of dummy variables

This table presents the descriptive statistics for the dummy variables used in the models for both Islamic, conventional and hybrid banks

Dummy Variables	All Banks	CBs (HBs included)	IBs
	Proportion	Proportion	Proportion
Ethical_Committee			
0	0.45	0.81	0
1	0.55	0.19	1
EthicGov_Model			
0	0.94	0.95	0.92
1	0.06	0.05	0.08
Legal_System			
0	0.08	0.11	0.05
1	0.92	0.89	0.95

Table 5: Mean difference between IBs, HBs and CBs

It compare the group mean of return on assets ROA, return on equity ROE, Return on average deposits ROD and net interest margin NIM between the three samples IBs, CBs and HBs.

	CBs vs IBs	CBs vs HBs
ROA	-0.07(-0.54)	-0.51 (-4.10)***
ROE	2.52(4.92)***	-3.23(-5.41)***
ROD	-5.36(-24.86)***	0.51(5.08)***
NIM	-0.48(-4.78)***	-0.12(-1.48)*
Mean difference (t-test statistic). Significance level : *** p<1%; ** p<5% ; *p<10%; significance level; t-test tests the null hypothesis that the means of the two samples are equal.		

3. Regression results

Tables 6,7,8,9 summarize the empirical results for our main profitability measures ROAA, ROAE, NIM and ROAD respectively. As Abedifar and al. (2013), we have several dummy variables that rarely change over time (Ethical_committee, EthicGov_Model, Legal_System, Islamic_Bank), and so these variables have limited within variation. We also have time invariant variables. Fixed effects estimation is inefficient at estimating variables with limited within variance and cannot be used with time invariant variables. As such we employ the random effects technique in our estimation. The last two columns report the results including all the banks in the sample. Then, and in order to investigate the impact of Islamic finance ethical principles on banks' profitability, we split the sample into three sub-samples: Columns one and two refer to IBs. Columns three and four report the results for CBs. Columns five and six refer to HBs. Furthermore, to identify the stability and significance of the coefficients, we first include only the bank-specific determinants into our model (columns one, three, five and seven). In a second step, we report the estimates of the full model with the bank- and market-specific factors (columns two, four, six and eight). The Wald tests indicate that all the models are significant.

Table 6 : Determinants of ROA								
VARIABLES	IBs		CBs		HBs		All Banks	
	ROA (1)	ROA (2)	ROA (3)	ROA (4)	ROA (5)	ROA (6)	ROA (7)	ROA (8)
HHi_revenue	1.859** (0.831)	2.032** (0.858)	0.395 (0.847)	0.764 (0.934)	-0.853 (0.697)	-0.916 (0.998)	0.963 (0.632)	1.026 (0.651)
HHi_assets	-5.051*** (1.432)	-5.168*** (1.430)	-2.249 (2.405)	-0.641 (2.254)	0.504 (0.888)	1.301 (1.192)	-4.611*** (1.073)	-4.622*** (1.210)
HHi_funding	0.181 (0.773)	0.097 (0.784)	1.377* (0.714)	1.697* (0.924)	-0.576 (0.773)	-0.701 (0.719)	0.773 (0.490)	0.699 (0.528)
HHi_earningass	-0.796 (1.019)	-0.634 (1.041)	-0.423 (2.109)	-0.640 (1.957)	2.817 (1.743)	1.265 (1.827)	-1.163 (0.998)	-1.210 (1.015)
HHi_liabilities	-3.959** (1.711)	-3.846** (1.712)	-1.735 (2.271)	-1.679 (2.140)	3.616*** (0.965)	2.370** (1.094)	-2.821*** (1.053)	-2.819*** (0.995)
insolvency_risk	0.001 (0.001)	0.000 (0.001)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.001 (0.001)	0.000 (0.000)	0.000 (0.000)
credit_risk	-4.470** (1.861)	-4.508** (1.925)	0.080 (0.953)	1.770 (1.709)	-3.315 (3.642)	-3.706 (4.730)	-3.960** (1.551)	-3.957** (1.603)
liquidity_risk	-0.007** (0.003)	-0.007** (0.003)	0.008 (0.006)	0.010* (0.006)	-0.008 (0.008)	0.002 (0.012)	-0.007*** (0.003)	-0.007*** (0.003)
margin_risk	0.041 (0.074)	0.040 (0.075)	0.088 (0.095)	0.102 (0.118)	-0.139 (0.107)	-0.212 (0.146)	0.101 (0.084)	0.108 (0.085)
leverage	-0.118*** (0.035)	-0.103*** (0.035)	-0.062*** (0.018)	-0.037** (0.017)	-0.124*** (0.048)	-0.055 (0.051)	-0.130*** (0.023)	-0.120*** (0.021)
cost_ratio	-0.036*** (0.005)	-0.036*** (0.006)	-0.051*** (0.010)	-0.052*** (0.008)	-0.047*** (0.015)	-0.056*** (0.021)	-0.042*** (0.005)	-0.042*** (0.005)
ethical_committee							0.309** (0.154)	0.233 (0.192)
ethigov_mod	-0.107 (0.213)	0.883* (0.479)				-0.457 (0.388)	-0.087 (0.142)	0.055 (0.184)
legal_syst		-1.383 (1.410)						-0.148 (0.369)
muslim_pop		1.560 (1.408)				1.463 (1.694)		-0.049 (0.406)
size		-0.038 (0.124)		-0.038 (0.167)		-0.552*** (0.200)		-0.054 (0.097)
gdp_growth		-0.007 (0.026)		0.042*** (0.012)		0.023 (0.016)		0.021 (0.013)
inflation		0.029*** (0.009)		0.010 (0.006)		0.014 (0.025)		0.012 (0.008)
gcc		0.986*** (0.368)		-0.124 (0.271)		-0.820 (0.513)		0.165 (0.168)
Constant	14.302*** (1.882)	13.993*** (2.829)	8.100* (4.725)	5.288** (2.612)	2.221 (2.330)	10.267* (5.371)	12.675*** (1.794)	13.414*** (1.998)
Observations	992	992	1,011	1,011	242	242	2,245	2,245
Year dummy	YES	YES	YES	NO	YES	NO	YES	YES
Overall R ²	0.563	0.570	0.301	0.227	0.648	0.457	0.455	0.457
Wald Chi2	691.1***	766.0***	293.4***	251.2***	4733***	1314***	610.5***	688.9***

We employ the random effects technique in our estimation; Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

All the variables are winsorized at the 1% and 99% levels to mitigate the effect of outliers

Table 7 : determinants of ROE

VARIABLES	IBs		CBs		HBs		All Banks	
	ROE(1)	ROE(2)	ROE(3)	ROE(4)	ROE(5)	ROE(6)	ROE(7)	ROE(8)
HHi_revenue	-1.753 (2.364)	-1.532 (2.327)	-12.896*** (4.478)	-11.716** (4.804)	-14.187*** (2.780)	-14.843*** (3.550)	-6.940*** (1.994)	-6.980*** (2.028)
HHi_assets	-9.775* (4.997)	-9.476** (4.583)	-0.449 (7.175)	6.040 (6.704)	-1.804 (5.945)	5.540 (8.814)	-6.751* (3.916)	-6.144 (4.113)
HHi_funding	3.001 (2.532)	4.260* (2.512)	3.928 (2.937)	5.935* (3.454)	-12.320*** (4.365)	-10.292*** (3.648)	2.047 (1.960)	3.388* (1.945)
HHi_earningass	2.605 (3.606)	2.604 (3.393)	-1.020 (6.195)	-2.668 (5.648)	11.813 (10.633)	5.655 (11.014)	-0.374 (3.560)	0.198 (3.446)
HHi_liabilities	-17.549*** (5.951)	-16.608*** (6.084)	-10.067 (8.396)	-7.354 (7.588)	23.123*** (6.984)	15.111** (6.465)	-10.322** (4.114)	-9.199** (3.977)
insolvency_risk	-0.001 (0.002)	-0.002 (0.002)	0.001 (0.002)	0.000 (0.002)	0.002 (0.003)	-0.000 (0.004)	0.001 (0.002)	0.000 (0.002)
credit_risk	-27.548*** (9.845)	-24.360** (10.044)	17.197* (9.881)	26.327*** (8.803)	-61.183** (29.698)	-44.511 (30.499)	-16.064* (9.354)	-12.692 (9.463)
liquidity_risk	-0.017** (0.008)	-0.013* (0.007)	0.036 (0.022)	0.039* (0.023)	-0.062 (0.057)	0.004 (0.059)	-0.011 (0.007)	-0.007 (0.007)
margin_risk	-0.020 (0.290)	0.023 (0.268)	0.638* (0.371)	0.567 (0.390)	0.635 (0.592)	0.865 (1.126)	0.142 (0.278)	0.157 (0.257)
leverage	0.297** (0.140)	0.076 (0.147)	0.355** (0.156)	0.375** (0.161)	0.225 (0.348)	0.449 (0.372)	0.141 (0.118)	0.051 (0.139)
cost_ratio	-0.126*** (0.016)	-0.120*** (0.016)	-0.276*** (0.030)	-0.284*** (0.040)	-0.355*** (0.096)	-0.415*** (0.130)	-0.153*** (0.016)	-0.147*** (0.017)
ethical_committee							1.652** (0.688)	1.609** (0.788)
ethigov_mod	-0.982 (1.028)	0.682 (1.676)				-2.481 (2.543)	-0.697 (0.732)	-0.719 (0.949)
legal_syst		-5.146 (5.098)						-2.274 (2.414)
muslim_pop		6.237 (4.992)				12.309 (8.733)		5.677** (2.564)
size		1.233** (0.509)		-0.110 (0.681)		-2.296** (1.116)		0.781** (0.395)
gdp_growth		0.195** (0.077)		0.206*** (0.056)		0.287** (0.120)		0.203*** (0.046)
inflation		0.134** (0.058)		0.087** (0.042)		0.122 (0.183)		0.067 (0.043)
gcc		-0.814 (1.329)		-2.060 (1.413)		-5.922** (2.913)		-2.145** (0.940)
Constant	47.204*** (7.243)	26.044*** (9.243)	43.097*** (14.245)	28.293** (11.638)	28.325** (13.919)	52.984* (27.219)	44.786*** (6.554)	27.945*** (6.974)
Observations	992	992	1,011	1,011	242	242	2,245	2,245
Year dummy	YES	YES	YES	NO	YES	NO	YES	YES
Overall R ²	0.557	0.584	0.355	0.309	0.592	0.399	0.424	0.453
Wald Chi2	877.5***	950.0***	452.4***	337.1***	18859***	273.3***	1031***	1095***

We employ the random effects technique in our estimation; Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.
All the variables are winsorized at the 1% and 99% levels to mitigate the effect of outliers

Table 8: Determinants of NIM

VARIABLES	IBs		CBs		HBs		All Banks	
	NIM(1)	NIM(2)	NIM(3)	NIM(4)	NIM(5)	NIM(6)	NIM(7)	NIM(8)
HHi_revenue	-2.234*** (0.759)	-2.254*** (0.757)	0.250 (0.655)	0.356 (0.606)	1.551*** (0.431)	1.259** (0.564)	-1.316** (0.568)	-1.377** (0.566)
HHi_assets	-5.512*** (1.632)	-5.129*** (1.719)	-1.955*** (0.527)	-1.805*** (0.510)	-2.337* (1.253)	-1.929 (1.223)	-4.521*** (1.010)	-4.185*** (1.037)
HHi_funding	-0.386 (1.009)	-0.462 (1.014)	-0.549 (0.491)	-0.789* (0.467)	-1.871** (0.906)	-1.919** (0.965)	-0.526 (0.544)	-0.676 (0.538)
HHi_earningass	-0.229 (1.233)	-0.400 (1.221)	0.165 (1.243)	0.106 (1.164)	4.917* (2.696)	4.079 (2.636)	-0.198 (0.952)	-0.349 (0.957)
HHi_liabilities	-0.146 (1.782)	-0.351 (1.842)	1.809** (0.794)	1.238 (0.898)	3.202** (1.404)	2.058 (1.312)	0.958 (0.886)	0.522 (0.914)
insolvency_risk	0.000 (0.001)	0.001 (0.001)	0.001* (0.000)	0.001* (0.000)	0.000 (0.001)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)
credit_risk	-6.654*** (1.806)	-6.886*** (1.835)	3.942 (2.781)	3.213 (2.444)	-0.001 (5.358)	-2.867 (5.775)	-4.631** (2.191)	-4.925** (2.118)
liquidity_risk	0.001 (0.003)	-0.001 (0.003)	-0.002 (0.005)	-0.006 (0.005)	-0.016 (0.010)	-0.014 (0.009)	-0.001 (0.002)	-0.002 (0.002)
margin_risk	0.179 (0.112)	0.183 (0.116)	0.127* (0.065)	0.146** (0.060)	-0.191 (0.134)	-0.095 (0.107)	0.217*** (0.084)	0.216** (0.087)
leverage	-0.071* (0.041)	-0.053 (0.038)	-0.072*** (0.018)	-0.059*** (0.013)	-0.239*** (0.088)	-0.198*** (0.075)	-0.102*** (0.023)	-0.087*** (0.021)
cost_ratio	-0.015*** (0.004)	-0.017*** (0.004)	-0.013*** (0.004)	-0.016*** (0.005)	0.001 (0.017)	0.002 (0.018)	-0.017*** (0.004)	-0.019*** (0.004)
ethical_committee							0.440** (0.201)	0.592** (0.233)
ethigov_mod	0.450** (0.185)	0.052 (0.519)				-0.944* (0.529)	-0.042 (0.206)	-0.137 (0.251)
legal_syst		-0.039 (1.627)						-1.396*** (0.446)
muslim_pop		0.099 (1.675)				-0.498 (1.793)		1.002* (0.539)
size		-0.249* (0.140)		-0.181 (0.112)		-0.472*** (0.182)		-0.211** (0.085)
gdp_growth		0.023* (0.013)		-0.003 (0.008)		0.005 (0.010)		0.009 (0.008)
inflation		-0.020 (0.014)		0.006 (0.006)		-0.026 (0.024)		-0.018** (0.009)
gcc		-0.559 (0.455)		-0.421* (0.245)		-0.925 (0.579)		-0.485** (0.193)
Constant	11.596*** (2.848)	15.478*** (3.842)	4.070*** (1.077)	7.636*** (2.424)	2.184 (2.678)	11.839*** (4.083)	9.002*** (1.794)	13.251*** (2.577)
Observations	992	992	1,011	1,011	242	242	2,245	2,245
Year dummy	YES	YES	YES	NO	YES	NO	YES	YES
Overall R ²	0.314	0.337	0.217	0.243	0.534	0.578	0.228	0.272
Wald Chi2	397.4***	458.9***	238.4***	114.1***	1.523e+06***	1429***	319.2***	409.6***

We employ the random effects technique in our estimation; Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

All the variables are winsorized at the 1% and 99% levels to mitigate the effect of outliers

Table 9: Determinants of ROD

VARIABLES	IBs		CBs		HBs		All Banks	
	ROD (1)	ROD (2)	ROD (3)	ROD (4)	ROD (5)	ROD (6)	ROD (7)	ROD (8)
HHi_revenue	2.544*** (0.879)	2.757*** (0.858)	-0.142 (0.521)	0.331 (0.495)	-1.797*** (0.473)	-0.983 (0.954)	2.910*** (0.874)	2.729*** (0.873)
HHi_assets	-4.041** (1.631)	-2.634 (1.682)	-0.013 (0.624)	0.828 (0.686)	-0.181 (0.991)	0.814 (1.777)	-4.534*** (1.249)	-2.824** (1.276)
HHi_funding	4.269*** (1.125)	4.149*** (1.143)	1.071** (0.437)	0.770* (0.437)	1.392 (0.870)	2.648** (1.138)	3.768*** (0.771)	3.538*** (0.798)
HHi_earningass	1.370 (1.240)	1.156 (1.182)	-1.905*** (0.551)	-2.205*** (0.464)	-0.235 (1.385)	-2.564 (1.765)	-1.903* (1.007)	-2.014** (0.997)
HHi_liabilities	-0.258 (2.228)	-0.232 (2.225)	1.109 (0.774)	-0.933 (0.923)	-1.281 (1.139)	-4.315*** (1.430)	-0.392 (1.418)	-1.466 (1.447)
insolvency_risk	0.002 (0.001)	0.002 (0.001)	0.000 (0.000)	-0.000 (0.000)	-0.001 (0.001)	-0.001 (0.001)	0.000 (0.001)	0.000 (0.001)
credit_risk	-4.050*** (1.495)	-4.370*** (1.482)	4.156 (3.029)	2.661 (2.227)	-3.990 (4.079)	-13.376** (6.006)	-5.836** (2.593)	-6.125*** (2.349)
liquidity_risk	-0.002 (0.003)	-0.003 (0.003)	0.001 (0.003)	-0.006 (0.004)	0.007 (0.009)	0.028** (0.014)	-0.000 (0.003)	-0.004 (0.003)
margin_risk	0.213*** (0.083)	0.209*** (0.080)	0.213 (0.138)	0.268** (0.119)	-0.021 (0.121)	0.300 (0.196)	0.704*** (0.203)	0.702*** (0.189)
leverage	0.121** (0.049)	0.133** (0.052)	0.040** (0.019)	0.108*** (0.024)	0.132*** (0.038)	0.256*** (0.044)	-0.048 (0.032)	-0.042 (0.034)
cost_ratio	-0.002 (0.003)	-0.003 (0.003)	-0.003 (0.005)	-0.011** (0.005)	-0.004 (0.009)	0.011 (0.013)	-0.012*** (0.004)	-0.014*** (0.004)
ethical_committee							3.269*** (0.357)	3.596*** (0.333)
ethigov_mod	0.086 (0.254)	-1.716* (0.977)				-0.584 (0.393)	-0.972 (0.650)	-1.656*** (0.625)
legal_syst		5.131* (3.036)						-0.573 (0.668)
muslim_pop		-4.610 (3.152)				-0.356 (1.446)		1.249 (0.899)
size		-0.421** (0.178)		-0.449*** (0.070)		-0.638*** (0.159)		-0.382*** (0.128)
gdp_growth		0.040 (0.025)		0.046*** (0.015)		0.038** (0.017)		0.052* (0.030)
inflation		0.054** (0.024)		0.031*** (0.010)		0.026 (0.016)		-0.005 (0.023)
gcc		-1.894** (0.752)		-0.088 (0.163)		-0.050 (0.545)		-1.719*** (0.306)
Constant	2.636 (2.728)	6.934* (3.800)	1.666 (1.311)	10.007*** (1.917)	4.003* (2.232)	14.369*** (5.223)	3.531* (2.037)	9.259*** (3.122)
Observations	992	992	1,011	1,011	242	242	2,245	2,245
Year dummy	YES	YES	YES	NO	YES	NO	YES	YES
Overall R ²	0.741	0.768	0.342	0.313	0.734	0.611	0.538	0.571
Wald Chi2	5170***	6382***	612.5***	290.9***	50950***	2631***	1006***	1829***

We employ the random effects technique in our estimation; Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.
All the variables are winsorized at the 1% and 99% levels to mitigate the effect of outliers

Overall, we observe some significant differences in the results of the different bank categories in terms of significance and size of coefficients.

Several previous studies have investigated the effects of diversification on CBs (Berger et al., 2010; Chiorazzo et al., 2008; Köhler, 2014b; Lee et al., 2014; Meslier et al., 2014) but the results are still uncertain regarding profitability. Table 10 summarizes the significant impact of the five dimensions of diversification used in our study on the profitability of IBs, CBs and HBs. The table shows the significant variables of the regressions that include the country-level factors. We find that the effect of diversification diverges across the different types of banks. Generally, the profitability of IBs is affected mostly by revenue and asset diversifications (Asset side structure); while the profitability of CBs is affected mostly by deposits diversification and finally, HBs profitability is impacted by funding sources and liabilities diversification (Liabilities side structure).

Table 10: Impact of diversification on bank’s profitability
(Results from regressions with country-level variables)

Bank Type Profitability	IBs				CBs				HBs			
	ROA	ROE	NIM	ROD	ROA	ROE	NIM	ROD	ROA	ROE	NIM	ROD
Revenue diversification.	-**		+***	-***		+**				+***	-**	
Assets diversification	+***	+**	+***				+***					
Earning assets diversification								+***				
Funding sources diversification		-*		-***	-*	-*	+	-*		+***	+**	-**
Liabilities diversification	+**	+***							-**	-**		+***

The (+) impact is associated to a negative coefficient in the regressions in table,7,8 and 9 (and vice versa). See table 1 on the calculations of HHI variables. The lower the HHI is; the well diversified the bank portfolio is.
*** p<0.01, ** p<0.05, * p<0.1.

As for revenue diversification, the impact on CBs performance has been broadly addressed in an emerging economy (Meslier et al., 2014), European countries (Chiorazzo et al., 2008; Elsas et al., 2010; Köhler, 2014a) and Asia-Pacific region (Berger et al., 2010; Lee et al., 2014) but no consensus has been reached. (Chiorazzo et al., 2008; Elsas et al., 2010; Köhler, 2014a; Lee et al., 2014) find that bank performance can be improved through the diversity of revenues. (Berger et al., 2010) find that more diversified banks are associated with lower profits and higher costs. Our results confirm a positive impact on ROE and NIM, a negative impact on ROD and no significant impact on ROA if we consider all banks. Conversely, results show a change in the relationship between diversification and bank profitability if we consider the different categories of banks.

The results reveal that IBs net financing income margin (NIM) can be improved through revenue diversification. However, the results show no significant effect of revenue diversification on NIM of CBs and an opposite result for HBs. Results for IBs are in line with Köhler (2014a) findings which show that banks will be significantly more profitable if they increase their share of non-interest income indicating that substantial benefits are to be gained from revenue diversification and that such benefits are particularly large for more retail oriented banks. Beck et al. (2013) find that IBs are more involved in fee-based businesses

than CBs and HBs and though they have a significant higher share of fees and commissions income than the other types of banks. Dietrich and Wanzenried (2011) argue that margins in fees and commissions income are usually higher than margins in interest operations which increase consequently the profitability of banks. This feature explains the positive impact of revenue diversification on NIM for IBs as argue Dietrich and Wanzenried (2011). Additionally, a larger share of fee based non-traditional activities is found to significantly reduce the probability of failure during the crisis improving thus the bank profitability. Results for HBs are in line also with (Stiroh, 2004) who finds that non-interest diversification is negatively linked with performance. Deyoung and Torna (2013) show that a larger share of income from asset-based non-traditional activities, such as investment banking and asset securitization increased significantly the likelihood of distressed banks failing which harms banks performance. Dietrich and Wanzenried (2011) show that a higher share of interest income relative to the total income impacts negatively banks profitability. However, Lee et al. (2014) find that conventional banks cannot achieve the goal of diversification through increasing fees and commission incomes but through net interest, net trading revenue and other revenues.

Furthermore, the results show that a high diversification of sources of revenue increases the return on equity in CBs and HBs and has no significant impact on ROE of IBs (table 7). HHi revenue captures the diversification between the interest income and the non-interest income (fees and commissions income, trading and derivatives income and other operating income). Theoretically, the market-oriented activities (trading activities, derivatives, etc.) increase the risk of assets portfolio for the conventional banks (HBs included); the income from this type of activities is usually of high volatility because it's closely linked with market evolution. This high risk characteristic of these activities explains the positive impact on the return on equity in CBs and HBs. Consequently, their respective shareholders require higher returns in compensation of the higher risk taken by the bank (compared to IBs shareholders). Our findings suggest the presence of greater benefits from revenue diversification for CBs and HBs shareholders that is derived from a higher involvement of these banks in the market oriented and the non-interest generating activities such as trading securities and derivatives. This result is consistent with the findings of Chiorazzo et al. (2008) and Meslier et al. (2014) on a sample of banks from Europe and emerging markets.

We conclude that the non interest income (fees and commissions, trading activities and derivatives) has different effects on IBs and CBs. in IBs the fees and commission increase profitability (NIM) while they do not for CBs. On the other side, trading activities and derivatives increase the CBs profitability (ROE) while they do not for IBs because they are more prohibited.

Regarding assets diversity between earning assets and non-earning assets, we find that assets diversification contributes to a better bank performance in IBs; it increases their return on assets, return on equity and net margin. We find no significant impact on CBs profitability except for the net interest margin. Descriptive statistics shows a lower HHi_assets for IBs revealing high non-earning assets in IBs. In line with our result, Beck et al. (2013) find that IBs have a significant high proportion of fixed assets (as a component of non-earning assets). These holdings would be the result of investing more in real estate by IBs. Fixed assets act as a cushion for the bank which stabilizes its income in case of adverse situations which in turn

increase the IBs profitability. Previous research has shown that fixed assets affect both efficiency and stability of banks (Beck et al., 2013).

Funding sources diversification tends to decrease profitability of banks. This result is consistent with (Köhler, 2014a) who confirms that banks with more diversified funding structure are significantly less profitable than specialized banks. Berger et al. (2010) also find that deposits diversification is associated with reduced profits and increased costs. When we look further into the effect on each bank category, we find that impact differs. In fact, funding sources diversification is observed to decrease the return on equity of both IBs and CBs but it increases that in HBs. Based on the descriptive statistics, HBs appear to be more-investment oriented banks and have more diversified funding sources in their portfolios. This result shows that HBs are more involved in market oriented activities and raise more LT funds from financial markets which increase their risk and consequently increases the return on equity of shareholders.

Furthermore, funding sources diversification tends to increase the net interest margin of CBs and HBs but has no significant impact on IBs. This result is in line with (Köhler, 2014a) who argues that more oriented-investment banks tend to be more stable and profitable if they increase their share of non-deposit funding, which supports the disciplining effect that comes from sophisticated wholesale financiers. The wholesale funding may reduce bank risk through a better monitoring of banks by sophisticated financiers and a better diversification of funding sources. Finally, liabilities diversification is associated with higher return on equity and return on assets in IBs. However, we find an opposite result in HBs and no significant impact in CBs. Retaining a special reserve to IBs such as profit equalization reserves and investment risk reserves creates a cushion against expected losses and allow the bank to avoid using its capital to cover large losses improving thus risk management especially in periods of crisis, which in turn improves bank profitability.

Regarding the impact of risk on profitability, the impact diverges between bank groups. The results show a significant positive impact of leverage (a proxy of the financial risk) on the return on equity of CBs like in Dietrich and Wanzenried (2011) research, but no significant impact on that of IBs. This result is expected and leverage effect appears to be limited in IBs. For CBs, our result is consistent with the financial theories of capital structure which are based on the assumption that funds can be raised through debt and equity and that the introduction of debt increases a firm financial risk which is borne by shareholders; who in turn require a larger rate of return as compensation to accepting this risk. For IBs, our result is consistent with the theoretical finding of Al-Deehani et al. (1999) who investigate the leverage effect in IBs considering the absence of debts and the presence of PSIA deposits in the liabilities side. The special feature of these particular deposits is that they are not guaranteed unlike in the conventional context since they are Mudarabah based. Theoretically, PSIA deposits don't increase the financial risk and in consequence, IBs shareholders don't require higher return on equity compared to shareholders in CBs who require higher return on equity when debts (and though risk) increase. Shareholders and PSIA depositors share the same risk conversely to the conventional banking framework where only the CBs

shareholders absorb financial risk. So the generated returns from assets, which are funded jointly by PSIA and equity, increase shareholders return on equity without having these shareholders to incur additional financial risk (Al-Deehani et al, 1999). In a conventional context, high return on equity takes its origin from the return on assets and the financial structure (the effect of financial leverage). However, in an Islamic context, the return on equity is largely explained by the return on assets.

Credit risk (the ratio of reserves for impaired loans) which is a measure of credit quality, does not have a statistically significant effect on CBs profitability, except for ROE where we find a positive impact. However, the ratio reflects a negative impact on IBs profitability with the coefficients being significant at 5% and 1% level. This is not surprising; given that first the IBs have higher reserves for impaired loans with higher volatility than do the CBs and HBs during the period of the study, and second IBs have less diversified portfolios in terms of earning assets which implies that IBs rely more heavily than CBs and HBs on financing and investing assets (equivalent to loans in the conventional context) which decreases the quality of credit portfolio and though increases the credit risk.

A negative interaction is found between the liquidity risk and the return on equity and the return on assets in IBs while an opposite result is found for CBs. This is not surprising since IBs hold in average almost double of liquid assets compared to CBs and HBs. Because the holding of liquid assets has an opportunity cost this implies a negative relationship between the profitability and liquid assets. Previous studies confirm that higher liquidity is associated with a lower profitability in IBs and CBs (Dietrich and Wanzenried, 2011; Pasiouras and Kosmidou, 2007; Srairi, 2008). Mokni and Rachdi (2014) find a positive relation with ROA. In practice, a bank may meet its liquidity needs by adjusting its highly liquid assets or assets that are nearly liquid to manage liquidity problems. On the liabilities side, this can be achieved by increasing short-term borrowings or short-term deposit liabilities, or by increasing the maturity of liabilities and ultimately by increasing capital. Consequently, IBs are constraint in practice to hold more liquid assets (and more equity) to mitigate liquidity risk as a result of the reduced opportunities of Shariah compliant solution in the liabilities side. Greuning et al. (2008) suggest that is one of the most critical risks facing IBs for the several reasons. First, Prohibition by Shariah law from borrowing on the basis of interest in case of need and the absence of an active interbank money market have restricted Islamic banks' options to manage their liquidity positions efficiently. Second, the financial instruments that can be traded in the secondary market are limited, and the Shariah imposes limitations on the trading of financial claims, unless such claims are linked to a real asset. Third, the interbank market, secondary market for debt instruments and the lender of last resort (central bank) are all considered as based on interest and, therefore, are not acceptable. Toumi et al. (2011) add that IBs are highly exposed to withdrawal risk by PSIA depositors, which increases banks liquidity risk and thus the proportion of liquid assets to manage this risk.

The impact of margin risk on the return of IBs and CBs profitability is positive, it seems that volatility in profits and returns do not have the expected effect on bank earnings and increase banks profitability.

Besides bank's diversification and risk profile, banks profitability depends on other variables as well. First, our results suggest that the coefficient of the *Cost_Ratio*, the operational efficiency measure, is negative and highly significant for all different bank groups. The higher cost savings the bank achieves; the higher profitability it scores. This result meets our expectation and stands in line with the results of Athanasoglou et al. (2008) and Dietrich and Wanzenried (2011). Second, the relation with ethical governance measured by the *Ethical_Committee* (the availability of an ethical committee or as named a Shariah supervisory board in the bank) is positive. The monitoring role that Shariah law plays in the governance structure appears to increase profitability of banks. Our result is consistent with Mollah and Zaman (2015) who find a positive impact of the Shariah board supervisory role on the performance of IBs. Toumi and Viviani (2016) highlight the role of the Shariah board in decreasing the asymmetries of information between managers and shareholders in IBs which lead to higher capital ratio in these banks and though to a better stability. Safer banks tend to be more profitable. In another side, results about the ethical governance model *EthicGov_Model* diverge. Centralized Shariah governance model seems to have a positive impact on return on asset and net interest margin of IBs. Hamza (2013) finds that the independence of the Shariah supervisory board in their mission of supervision and the consistency of Shariah ruling are the principal components of an efficient Shariah governance structure. Centralized Shariah governance system seems to be beneficial to the Islamic finance industry in term of effectiveness and credibility of the IBs increasing thus their profitability. Hamza (2013) argues that the model of centralization is able to strengthen the position and the independence of the ethical committee and allow a better management of interest conflict and closer to consensus in Shariah interpretation between the different Shariah supervisory boards. A centralized model could consequently promote in the long term the consistency of interpretations between banks and regions since the divergence of interpretations or inconsistency between the Shariah supervisory boards of IBs can affect negatively the credibility and the reputation of the industry and in consequence their financial performance.

4. Conclusion

The purpose of this paper is to identify the determinants of profitability in Islamic banks versus conventional ones. More specifically, we explore the effect of bank-level variables such as risk, diversification, efficiency, and Shariah governance; and several country-level variables on bank profitability. Moreover, we distinguish between three types of banks according to whether Islamic bases financial services are offered or not; the fully-fledged Islamic Banks (IBs), the fully-fledged conventional banks (CBs) and the conventional banks with Islamic windows that we name the hybrid banks (HBs). For robustness check we integrate several measures of profitability; Return on Assets, Return on Equity, Return on Customer Deposits, and Net Interest Margin. We investigate the effect of several types of risks (insolvency risk, credit risk, liquidity risk, margin risk and leverage as proxies of financial risk) on profitability. We also apply the Herfindahl-Hirschman Index to examine the effect of several dimensions of diversification (HHi_Revenues, HHi_Assets, HHi_Earning_assets, HHi_funding sources and HHi_liabilities) on profitability. Furthermore we also control for the efficiency of managing costs and the Ethical governance practices and

their impact on banks' profits. The sample accumulates 206 banks, divided into 92 CBs, 92 IBs and 22 HBs, from 18 countries. The period of the study covers the years from 2005 to 2015. We find that IBs are more profitable based on return on assets, return on deposits and net margin ratio. However, IBs are observed to be less profitable based on the return on equity. IBs appear to be less diversified in terms of sources of revenue, types of earning assets and types of funding sources. Furthermore, IBs appear to have slightly more diversified portfolios in term of liabilities and assets components. Regarding risk, IBs present lower financial risk, liquidity risk and insolvency risk but higher margin risk and credit risk. We provide initial confirmation that diversification and risk impact differently the profitability of the sampled groups of banks. Regarding the impact of the Shariah governance, we find interesting results. First, the availability of a Shariah supervisory board in the governance structure increases banks profitability. Second, banks governed under a centralized Shariah governance model are found to have higher profitability. In fact, the Shariah governance model proved to increase the credibility and the reputation of IBs in the industry which in turn improves their profitability.

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