The impact of Islamic banking model and Islamic financial development on bank performance. Evidence from dual banking economies.

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Abstract

Purpose – The purpose of this study is to develop an Islamic Banking Index representing Islamic banking model and to investigate its impact on the performance of Islamic and conventional banks. The study also investigates the impact of Islamic financial development on bank performance.

Design/methodology/approach – We collect the data from 23 countries during the period from 2010 to 2018 and develop a composite Islamic Banking Index. We apply generalized method of moments on 3,542 bank-year observations for both Islamic and conventional banks to analyze the impact of Islamic Banking Index on bank performance. The results of the study are robust to time-fixed effects, country level time-varying factors, and endogeneity issues.

Findings – We find that Islamic Banking Index positively contributes to return on assets (ROA_{it}) of Islamic banks only and this impact becomes highly significant in countries with comparatively higher Islamic financial development. This finding suggests that Islamic financial development in a country provides a supportive operating environment to Islamic banks and increases their performance. We also find that Islamic Banking Index positively contributes to the return on equity (ROE_{it}) of both type of banks.

Policy implications – We argue that moving away from interest-based products and focusing more on diversified portfolios can boost the performance of both types of banks without increasing their risk levels.

Originality – To the best of authors' knowledge, this is the first study that develops a composite Islamic Banking Index based on differentiating factors of Islamic banking model and investigates the impact of Islamic Banking Index and Islamic financial development on bank performance.

Keywords: Islamic Banking Index, Banking Model, Bank-Performance, Bank Risk, Panel Data.

1. Introduction

The two competing banking models, conventional and Islamic banking, are subject to academic as well as professional scrutiny especially after the financial crisis of 2007-08 that challenged the resilience of conventional banking model and has diverted the attention towards Islamic banking model due to superior performance of Islamic banks during the financial crisis (Hasan and Dridi, 2011). Recently, we observe a significant growth in research on Islamic banking and finance (Narayan and Phan, 2019), however, empirical evidence specifically about the Islamic banking model based on its ideology (Riba free and asset backed financing) is still not sufficient because of two plausible reasons. *First,* the findings of most of the previous empirical studies are mixed or inconclusive, such as, Srairi (2010) concludes that conventional banks are more cost effective and profit efficient than Islamic banks. Johnes et al. (2014) find that gross efficiency of both type of the banks is same but Islamic banks have significantly higher net efficiency. Mahdi and Abbes (2018) explain that both Islamic and conventional banks in MENA region tend to have riskier portfolios due to their accumulated liquid assets. Nosheen and Rashid (2019) while investigating the cost structure, credit quality and stability of Islamic and conventional banks find that the Islamic banks are less cost-efficient, have higher credit quality, and have higher capitalization than conventional banks. *Second,* most of these studies compare the different determinants of performance in Islamic and conventional banks and investigate the impact of these determinants on bank performance, stability, and efficiency. For example, a study investigates the impact of bank size on the stability of Islamic banks (Ibrahim and Rizvi, 2017). Another study investigates the impact of competition and diversification on bank stability in dual banking economies (Azmi et al., 2019). A study carried out for Turkish banking sector finds that Islamic banks are more inclined towards financing small businesses (Aysan et al., 2016). However, a few studies try to compare the business model of the two competing banking systems, for example Beck et al. (2013) compare the two models based on fee income, non-deposit funding, and loan-deposit ratio. Further, researchers also tried to develop some indexes such as Bank Maqashid Index (IBMI) and Islamicity Performance Index (IIP) to measure compliance with Islamic banking principle (Mutia et al., 2019, Ascarya et al., 2016). However, we find definitional and scope problems with these indexes. Some models are limited in their scope and others include many different ratios that dilute the impact of the key differentiating element i.e. interest.

The objective of this study is to develop an innovative Islamic Banking Index *(IBI$_{it}$)* based only on the core differentiating factor (interest vs. non-interest based income and expense) of the two business models (conventional vs. Islamic) and to investigate the impact of Islamic Banking Index on the performance of Islamic and conventional banks. The study contributes to the literature in manifolds: *First,* by developing an Islamic Banking Index based on non-interest income and non-interest expense, the study broadens the scope of the index by including not only income (and assets) but also the expense (and liabilities) as interest (not only the income but also the expense) is not allowed in Islamic banking. *Second,* the study investigates the impact of Islamic Banking Index on the performance of Islamic and conventional banks. *Third,*

the study investigates the moderating impact of Islamic financial development on the relationship between Islamic Banking Index and bank performance. To carry out the objective of the study, we collect data from 23 countries where both Islamic as well as conventional banks are operating, during the period from 2010 to 2018. We apply a dynamic panel data technique (GMM-System) on 3,542 bank-year observations for both Islamic and conventional banks to investigate the impact of IBI_{it} on bank-performance. The results of the study explain that Islamic Banking Index positively contributes to return on assets (ROA_{it}) of Islamic banks only, explaining that the reliance of Islamic banks on non-interest-based transactions helps reduce banking business volatility, and improve their performance. We also observe that the positive impact of IBI_{it} on return on assets (ROA_{it}) of Islamic banks becomes highly significant in countries with comparatively higher Islamic financial development, explaining that a supportive operating environment contributes to the performance (ROA_{it}) of Islamic banks. Further, we find that IBI_{it} positively contributes to the return on equity (ROE_{it}) of both type of banks, explaining that conventional banks also take advantage of the non-interest-based products to improve their profitability. Furthermore, we observe that Islamic banks operating in the selected dual banking economies face higher liquidity risk and competition as compared to their conventional counterparts, plausibly forcing them to be more efficient to optimize their portfolios of assets and liabilities. The results of our study are robust to time-fixed effects, endogeneity issues, and macroeconomic as well as institutional development.

Organization of the paper is as follows. After introducing the study in section 1, we develop theoretical framework in section 2, and section 3 describes the data, variables, and the methodology. Section 4 presents the empirical results, and section 5 puts forward the conclusions and the policy implications. We provide references at the end.

2. Theoretical framework

Theoretically, conventional, and Islamic banks' business models are poles apart. The core difference is the element of interest in business transactions. Conventional banking model bases itself on interest rate spread (difference between lending and borrowing interest rate) whereas prohibition of *riba* is the core of Islamic banking model that bases itself on *Sharia-compliant* products. Further, in Islamic banking model the business should be based on real economic transactions backed by tangible assets (Beck et al., 2013, Azid et al., 2019). However, many observe that in practice Islamic products developed by the Islamic scholars resemble conventional banking products as they have replaced interest payments with fees and contingent payment structure (Chong and Liu, 2009, Khan, 2010), and many critics observe that Islamic banking and finance (IBF) is just a change of terminology (El-Gamal, 2006, Nomani, 2006, Kuran, 2004). Alternatively, *Sharia-compliance* by Islamic banking model requires involvement of real economic transactions backed by tangible assets and consequently, Islamic banking model should be more stable and should perform better as compared to the conventional banking model (Beck et al., 2013).

Based on different arguments, researchers have developed different indexes to measure Islamicity of banks. For example, grounding on *Maqasid al Sharia'ah*, a study develops Islamic

Bank Maqashid Index (IBMI) (Ascarya et al., 2016). Another study develops Islamicity performance index based on five ratios that measure the performance of the banks on profit sharing, charity, equitable distribution, welfare of directors and employees and incomes of Islamic versus non-Islamic income source (Mutia et al., 2019). However, we tend to differ with these approaches on three grounds. *First*, conceptually interest is the fundamental difference between the business models of conventional banks and Islamic banks. Interest is not allowed in Islamic banking model whereas conventional banking model bases itself on interest. *Second*, incorporating multiple ratios into an index dilutes the impact of the core element – interest, which is the fundamental prerequisite and *Maqasid al Sharia'ah*, charity, etc. are supplementary expectations from an Islamic bank. *Third*, two dimensions of banking business involve interest: assets/loans that generate interest receipts/income, and liabilities/deposits that require interest payments/expenses. The available models incorporate income side and ignore expense side. We question Islamicity of a bank that indulges in interest-based transactions (income and/or expense) but fulfills some of the supplementary expectations of *Maqasid al Sharia'ah* and charity. Based on this and grounding only on the core concept of interest, we develop an innovative Islamic Banking Index (IBI_{it}) to compare the two competing banking models.

$$IBI_{it} = NIR_{it} * wa_{it} + NER_{it} * wl_{it} ……… (1)$$

where NIR_{it} is the ratio of non-interest income over total assets; NER_{it} is the ratio of non-interest expense over total liabilities; wa_{it} is the ratio of total assets over total liabilities plus total assets and wl_{it} is the ratio of total liabilities over total assets plus total liabilities.

Our IBI_{it} incorporates banking business's value-weighted ratios of non-interest income and non-interest expenses. The construction of IBI_{it} yields a continuous number that has ability to track dynamically the Islamicity of any bank over time. Considering empirical evidence of better performance of Islamic banks during recent financial crisis, we postulate that lesser reliance on interest-based transactions may help reduce banking business volatility and improve the performance of banks. We also expect a higher impact of Islamic Banking Index on the performance of Islamic banks as compared to the conventional banks as IBI_{it} represents Islamic banking model. Accordingly, we construct the following hypotheses:

Hypothesis-1: Islamic Banking Index has a significant positive effect on the performance of banks.

Hypothesis-2: The impact of Islamic Banking Index is higher on the performance of Islamic banks as compared to the conventional banks.

Further, Islamic banking model bases itself on *Sharia-compliant* products that appeal to the people who demand religiously consistent financial services. Although, *Sharia-compliant* financial assets are only a fraction of the total banking assets globally, but their importance has been increasing specifically in Islamic countries. According to International Monetary Fund (IMF), the market share of Islamic banking is very small, but its growth rate is very high in

comparison to global financial sector (International Monetary Fund, 2015). Furthermore, Islamic financial institutions have a relatively high market share in several emerging economies such as Malaysia, Saudi Arabia, and other Middle East countries. Accordingly, we expect that developed Islamic financial system can provide a supportive operating environment to Islamic banks and present our third hypothesis as under:

Hypothesis-3: The impact of Islamic Banking Index on the performance of Islamic banks is higher in the countries with comparatively higher Islamic financial development.

3. Data, variables, and methodology

3.1. Data

We draw our sample comprising both Islamic and conventional banks from 23 countries – Bahrain, Bangladesh, Brunei Darussalam, Cayman Island, Egypt, Indonesia, Islamic Republic of Iran, Jordan, Kenya, Kuwait, Malaysia, Oman, Pakistan, Philippines, Qatar, Saudi Arabia, Syrian Arab Republic, Thailand, Turkey, United Arab Emirates, United Kingdom, and United Republic of Tanzania. We choose these countries because both conventional and Islamic banks are operating there. We obtain required annual financial data of the banks for the period from 2010 to 2018 from Orbis database. After all the steps of data cleaning, 126 Islamic banks with 741 bank-year observations and 493 conventional banks with 2,841 bank-year observations remain in our final dataset. For country level variables, we obtain data for GDP growth rate, inflation rate, banking, and stock market development from the World Bank database[1]. We measure Islamic financial development using Islamic Finance Development Indicator (IFDI)[2] developed by Refinitiv Eikon following a recent study (Paltrinieri et al., 2020) and obtain data for IFDI from Refinitiv Eikon Islamic Finance Database[3]. Table 1 summarizes country-wise bank-year observations and number of banks separately for conventional and Islamic banks. Indonesia has the highest number of bank-year observations (491) for conventional banks as well as for Islamic banks (133). The table also presents the sample distribution over the sample period and the mean values for country level variable for all the sample countries.

[Insert Table 1 Here]

3.2. Variables

Measurement of bank performance

We take bank profitability as an indicator of bank performance and use return on assets (ROA_{it}) and return on equity (ROE_{it}) as proxies for bank profitability following previous significant studies (Apergis et al., 2016, Louhichi and Boujelbene, 2016, Bikker and Vervliet, 2018, Alexakis et al., 2019, Ousama et al., 2020, Toumi, 2020, Faruqi et al., 2019). A number of previous studies have used these proxies for different purposes for example a study used these to investigate the impact of diversification on bank profitability in Europe (Goddard et al., 2004). Another study used these proxies to find out the impact of banking sector concentration on

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[1] www.worldbank.org/
[2] IFDI is available for 12 out of 23 sample countries for this study.
[3] https://www.refinitiv.com/en/products/eikon-trading-software/islamic-finance/islamic-finance-database

bank profitability in Europe (Pasiouras and Kosmidou, 2007). A recent empirical study used the same proxies to investigate the role of Islamic banking in Indonesian banking industry (Rizvi et al., 2020).

Control Variables

We control our regression models for several bank level and country level variables following significant previous empirical studies (Azmi et al., 2019, Ibrahim and Rizvi, 2017, Faruqi et al., 2019, Tan, 2016). We provide the explanation of the potential impact of these control variables on bank performance as under:

Bank size

Larger banks may reduce their cost due to economies of scale and scope (Akhavein et al., 1997, Elsas et al., 2010) and may contribute to bank-performance and stability specifically in case of Islamic banks (Ibrahim and Rizvi, 2017). Alternatively, small, and specialized banks may reduce the information asymmetry problems and following this strand of argument leads to a negative relationship between bank size and bank-performance. Therefore, we use bank size as a control variable in our study. A number of studies (Ariss, 2010, Apergis et al., 2016, Mahdi and Abbes, 2018, Aysan et al., 2016) use natural logarithm of total assets to measure bank size (SZ_{it}), we also use the same to measure it.

Bank competition

Competition leads to efficiency that may help improve bank-performance. We use Herfindahl-Hirschman Index (HHI) to measure bank competition. The Herfindahl-Hirschman Index sums the squared market share of banks in the relevant market. For this purpose, we use total assets of a bank to measure its market share. The value of HHI ranges between zero and one. The value of HHI near to zero indicates perfect competition while the value of HHI near to one suggests monopoly. The HHI is a famous measure of competition used by a number of previous similar empirical studies (Ariss, 2010, Tan, 2016, Apergis et al., 2016, Bikker and Vervliet, 2018, Azmi et al., 2019). The measurement of HHI is as under:

$$\text{HHI} = \sum_{i=1}^{n} (\text{Total assts of a bank over total assets of all the banks in a country at time t})^2$$

Bank risk

Bank risk can also increase/decrease bank-performance. Therefore, we take three types of bank risk as control variables in this study i.e. liquidity risk, credit risk, capital risk. We calculate liquidity risk as the ratio of net loans over total assets following previous studies (Altunbaş and Marqués, 2008, Mahdi and Abbes, 2018, Hassan et al., 2019). Second, we use the ratio of non-performing loans over gross loans to measure credit risk (Tan, 2016, Hassan et al., 2019). The smaller value of this ratio explains lower credit risk and higher value of this ratio explains higher credit risk. This ratio is percentage of non-productive loans and therefore, increase in this ratio will lead to a decrease in profitability. Third, we calculate capital risk as equity over total assets (Mahdi and Abbes, 2018). The higher the value of this ratio explains increased strength of a bank.

Bank efficiency

Bank efficiency such as efficient management of operating cost can contribute to bank profitability (García-Herrero et al., 2009) and may have been a plausible reason of superior performance of Islamic banks during the global financial crisis of 2007-08 (Hasan and Dridi, 2011). However, Kuran (2004) explain that although Islamic banks are different from conventional banks in form, but they do not have any advantage in efficiency and stability. Beck et al. (2013) hypothesize that Islamic banks may have lower cost efficiency due to their complex banking model and they find lower cost efficiency for Islamic banks. Empirical studies find a positive impact of cost efficiency on bank performance (Tan, 2016, García-Herrero et al., 2009). We measure bank efficiency as cost to income ratio following previous studies (García-Herrero et al., 2009, Beck et al., 2013) and include it in our regression model as a control variable due to its potential impact on bank performance.

Macroeconomic and Institutional development

According to some of the researchers, economic growth has a positive impact on the performance of the banks because of increased demand for lending during good economic conditions (Demirgüç-Kunt and Huizinga, 1999, Athanasoglou et al., 2008, Mahdi and Abbes, 2018). Alternatively, a negative relationship between economic growth and bank performance has also been found in China (Tan and Floros, 2012a) and Indonesia (Rizvi et al., 2020). We calculate economic growth as growth rate in GDP per capita following previous studies (Athanasoglou et al., 2008, Tan and Floros, 2012a, Tan, 2016, Rizvi et al., 2020). Empirical studies find insignificant negative relationship of inflation with bank performance (Doumpos et al., 2017, Mahdi and Abbes, 2018) as well as significant positive relationship of inflation with bank performance (Tan, 2016).

Moreover, financial institutional development such as banking and stock market development can also affect bank performance. Developed banking sector increases the demand for banking services and attract more competitors (Tan and Floros, 2012a, Tan, 2016). On the other hand, developed stock market may reduce the financing cost for the firms by reducing information asymmetry and the firms may prefer equity financing over debt (Tan and Floros, 2012b, Tan, 2016). Further, development of Islamic financial institutions can provide a supportive operating environment to the Islamic banks and contributes to the performance of Islamic banks. A recent study explains that Islamic financial development increases sustainability performance of the Islamic banks (Paltrinieri et al., 2020), and empirical evidence explains significant impact of sustainability performance on financial or market performance of the banks (Buallay, 2019). In Table 2, we present our dependent and all the independent variables used in the study, their model name, measurement proxies and source.

[Insert Table 2 Here]

3.3. Methodology

To analyze an unbalanced panel of 741 bank-year observations for Islamic banks, and 2,841 bank-year observations for conventional banks, we consider Generalized Method of Moments (GMM-System) analysis as an appropriate technique. Generalized Method of Moments (GMM-

System) is a dynamic panel data technique that controls for potential endogeneity issue because of reverse causality between bank performance and bank level control variables. The same is used in recent similar studies (Tan, 2016, Louhichi and Boujelbene, 2016, Ibrahim, 2016, Athari et al., 2016, Rahman et al., 2019). To investigate the impact of Islamic Banking Index on bank performance (hypothesis 1), we develop our regression model in the following equation:

$$P_{it} = \beta_0 + \beta_1 P_{it-1} + \beta_2 Cont_{it} + \beta_3 IBI_{it} + \mu_t + \varepsilon_{it} \dots (2)$$

where P_{it} is one of the two measures of bank-performance (ROA$_{it}$, ROE$_{it}$) for the ith bank at time t. $P_{i,t-1}$ is one year lag of one of the two measures of bank-performance (ROA$_{it}$, ROE$_{it}$) for the ith bank at time $t-1$. $Cont_{it}$ are bank specific (SZ_{it}, HHI_{it}, LDR_{it}, NPL_{it}, CAP_{it}, EFF_{it}) control variables for the ith bank at time t as defined in table 2. IBI_{it} is Islamic Banking Index for the ith bank at time t. μ_t is year fixed effects; and finally ε_{it} is the remainder error component for the ith bank at time t.

To investigate our second hypothesis (The impact of Islamic Banking Index is higher on the performance of Islamic banks as compared to the conventional banks), we extend our base model as under:

$$P_{it} = \beta_0 + \beta_1 P_{it-1} + \beta_2 Cont_{it} + \beta_3 IBI_{it} + \beta_4 SP_i + \beta_5 IBI_{it} * SP_i + \mu_t + \varepsilon_{it} \dots (3)$$

where SP_i is a dummy variable representing bank specialization (1 for Islamic banks and 0 otherwise). $IBI_{it}*SP_i$ is interaction term of Islamic Banking Index with a dummy for bank specialization. Other variables are same as explained in equation 1.

Next, to investigate our third hypothesis (The impact of Islamic Banking Index on the performance of Islamic banks is higher in the countries with comparatively higher Islamic financial development), we extend our equation 3 as under:

$$P_{it} = \beta_0 + \beta_1 P_{it-1} + \beta_2 Cont_{it} + \beta_3 IBI_{it} + \beta_4 SP_i + \beta_5 IBI_{it} * SP_i + \beta_6 IFDI_i$$

$$+\beta_7 IBI_{it} * SP_i * IFDI_i + \mu_t + \varepsilon_{it} \dots (4)$$

where $IFDI_i$ is a dummy variable for Islamic Finance Development Indicator (1 for high median value of $IFDI$ and 0 otherwise). $IBI_{it}*SP_i*IFDI_i$ is interaction term of Islamic Banking Index with a dummy for bank specialization and a dummy for Islamic Finance Development Indicator. Other variables are same as explained in equation 1.

Finally, to check the robustness of the results, we control our models for macroeconomic development first and then institutional development and present our equations as under:

$$P_{it} = \beta_0 + \beta_1 P_{it-1} + \beta_2 Cont_{it} + \beta_3 IBI_{it} + \beta_4 SP_i + \beta_5 IBI_{it} * SP_i + \beta_6 IFDI_i$$

$$+\beta_7 IBI_{it} * SP_i * IFDI_i + \beta_8 Mac_t + \mu_t + \varepsilon_{it} \dots (5)$$

$$P_{it} = \beta_0 + \beta_1 P_{it-1} + \beta_2 Cont_{it} + \beta_3 IBI_{it} + \beta_4 SP_i + \beta_5 IBI_{it} * SP_i + \beta_6 IFDI_i$$

$$+\beta_7 IBI_{it} * SP_i * IFDI_i + \beta_8 Ins_t + \mu_t + \varepsilon_{it} \dots (6)$$

where Mac_t in equation 5 represents two macroeconomic variables i.e. INF_t is annual inflation rate, and GDP_t is annual per capita GDP growth rate. Ins_t in equation 6 represents two institutional variables i.e. BD_t is banking development, and SMD_t is stock market development. Other variables are same as explained in equation 2. We control for macroeconomic and institutional development separately in different models to avoid multicolinearaity issue.

4. Empirical results

4.1. Descriptive statistics

Table 3 presents summary statistics of all the proxies used to measure dependent and explanatory variables for conventional and Islamic banks, along with the results of mean comparison T-test. The mean value of 0.014 of ROA_{it} for Islamic banks and 0.014 for conventional banks with statistically insignificant t-statistic indicate that there is no difference in return on assets ratio for both type of banks. The mean value of 0.098 of ROE_{it} for Islamic banks and 0.101 for conventional banks indicate higher return on equity ratio for conventional banks, however, the difference is not statistically significant. Further, the mean values for SZ_{it} (14.962 for Islamic and 14.792 for conventional), NPL_{it} (0.154 for Islamic and 0.137 for conventional), LDR_{it} (0.564 for Islamic and 0.546 for conventional), and CAP_{it} (0.164 for Islamic and 0.150 for conventional) are higher for Islamic banks and the difference is statistically significant, explaining that the Islamic included in our sample are bigger in size, and face higher competition, and have higher liquidity and capital ratio as compared to their conventional counterparts. Further, the mean values for NPL_{it} (0.081 for Islamic banks and 0.089 for conventional banks) and EFF_{it} (0.597 for Islamic banks and 0.621 for conventional banks) are higher for conventional banks included in our sample, explaining that conventional banks have higher non-performing loans, and are less efficient as compared to Islamic banks, however, the mean difference is statistically insignificant. Moreover, the mean value of 0.046 for IBI_{it} and standard deviation of 0.065 for Islamic banks and the mean value of 0.041 and standard deviation of 0.106 for conventional banks indicate that non-interest based assets/liabilities portfolios and consequent income/expense of Islamic banks is stable as compared to conventional banks.

[Insert Table 3 Here]

4.2. Correlation analysis

Table 4 presents the results of pairwise correlation for Islamic (Panel A) and conventional (Panel B) banks, separately. We observe a significant positive correlation between Islamic Banking Index (IBI_{it}) and return on assets (ROA_{it}) for Islamic as well as conventional banks, favoring hypothesis 1 of the study. However, the correlation between Islamic Banking Index (IBI_{it}) and return on equity (ROE_{it}) is negative and insignificant for both type of banks. Further, we observe a significant positive correlation of bank size (SZ_{it}) and significant negative correlation of cost to income ratio (EFF_{it}) with the performance (ROA_{it}, ROE_{it}) of both type of banks, explaining that bigger size and cost efficiency contribute to bank performance, irrespective to bank type. Moreover, we observe positive (negative) correlation between

Islamic Finance Development Indicator ($IFDI_t$) and return on assets (return on equity) for Islamic banks and observe opposite for conventional banks (negative with ROA_{it} and positive with ROE_{it}).

[Insert Table 4 Here]

4.3. Regression results

Table 5 presents separately the results of GMM-System analysis for ROA_{it} and ROE_{it} to investigate the impact of Islamic Banking Index (IBI_{it}) and Islamic financial development ($IFDI_i$) on the performance of Islamic and conventional banks. Model 1 includes bank-level control variables along with IBI_{it}. We find positive but insignificant relationship of IBI_{it} (Islamic Banking Index) with bank performance (ROA_{it}), explaining that Islamic Banking Index does not have any impact on return on assets (ROA_{it}) of Islamic banks as well as conventional banks (*against hypothesis 1*). However, in model 4, we observe a moderately significant positive relationship between IBI_{it} and return on equity (ROE_{it}), explaining that Islamic Banking Index positively contributes to the return on equity (ROE_{it}) of both type of banks, (favoring hypothesis 1). This finding suggests that moving away from interest-based products (financial assets and liabilities) and diversifying portfolios help banks to perform better and improve profitability (ROE_{it}), irrespective of bank type. This finding may be encouraging for proponents of Islamic banking. Further, in model 2, we observe that the insignificant relationship of IBI_{it} with ROA_{it} turns to weakly positive significant when interacting ($IBI_{it} \times SP_i$) with a dummy for bank specialization (1 for Islamic banks and 0 for conventional banks), favoring hypothesis 2. We also observe a weakly significant positive relationship between ROE_{it} and Islamic Banking Index (IBI_{it}) when interacting ($IBI_{it} \times SP_i$) with a dummy for bank specialization (model 5). Based on these weakly significant positive relationships of interaction terms ($IBI_{it} \times SP_i$) with bank performance, we argue that lesser reliance of Islamic banks on interest-based transactions may help reduce their banking business volatility and improve their performance. Further, in model 3 we observe that the weakly significant positive relationship of interaction term ($IBI_{it} \times SP_i$) with ROA_{it} turns to highly significant positive when interacting ($IBI_{it} \times SP_i \times IFDI_i$) with a dummy for Islamic Finance Development Indicator (1 for high median value of $IFDI_i$ and 0 otherwise), favoring our hypothesis 3. This positive relationship of interaction term ($IBI_{it} \times SP_i \times IFDI_i$) with bank performance (ROA_{it}) explain that the utility of a supportive operating environment for effectiveness of Islamic banking model to add economic value (ROA_{it}) as it bases itself on *Sharia-compliant* products that appeal to the people who demand religiously consistent financial services. Accordingly, we observe that the Islamic banking model contributes more to the performance (ROA_{it}) of Islamic banks operating in the countries with relatively higher Islamic financial development. However, this relationship of interaction term ($IBI_{it} \times SP_i \times IFDI_i$) with ROE_{it} is insignificant.

Talking about our control variable i.e. SZ_{it} (natural logarithm of total assets) has insignificant relationship and HHI_{it} (Herfindahl-Hirschman Index) has significant negative relationship with bank performance (ROA_{it}, ROE_{it}) in most of the regression models, explaining that bank size does not contribute to bank performance, however, higher competition probably forces the banks operating in our sample countries to be efficient that increases their performance.

Further, we observe significant negative relation of liquidity (LDR_{it}) and credit risk (NPL_{it}) with the performance (ROA_{it}, ROE_{it}). These negative relationships explain that increased liquidity and credit risk decreases the performance (ROA_{it}, ROE_{it}) of the banks. Furthermore, significant positive relationship of capital ratio (CAP_{it}) with return on assets (ROA_{it}) and significant negative with return on equity (ROE_{it}) explain that higher use of equity reduces capital risk and increases return on assets, however, it reduces return on equity of the bank operating in our sample countries. Lastly, we observe a significant negative association between cost of income ratio (EFF_{it}) and bank performance (ROA_{it}, ROE_{it}), explaining that better cost management contributes to the performance of the banks.

[Insert Table 5 Here]

4.4. Robustness and diagnostics

In table 6, we control our models for macroeconomic development by introducing inflation (INF_t) and economic growth (GDP_t) in our regression models. We observe that the results of our main variables remain consistent even after controlling for macroeconomic development. Further, we observe a significant positive relationship of inflation (INF_t) and economic growth (GDP_t) with bank performance, explaining that during good economic conditions there is an increased demand for loans and consequently increased income for the banks and increased bank performance. In table 7, we control our models for institutional development by introducing banking (BD_t) and stock market development (SMD_t) in our regression models. We observe that the results of our main variables remain consistent even after controlling for institutional development. Further, we observe a significant negative relationship of stock market development (SMD_t) with bank performance (ROA_{it}, ROE_{it}), explaining that developed stock markets decrease bank performance by providing an alternate source of financing to the businesses. We also observe a weakly significant negative relationship of banking development (BD_t) with return on equity (ROE_{it}).

In addition, we carry out diagnostics to check the validity of the models. First, we calculate variation inflation factor (VIF) to check multicollinearity issue. We find that Variation Inflation Factor (VIF) for all the models is less than 10 (Table 4). Accordingly, multicollinearity is not an issue for our models (Ott and Longnecker, 2015). Further, the statistical significance of Wald-Chi-Square statistic explains the joint significance of our regression models. The results of Hensen test accepts the null hypothesis (H$_0$: over-identifying restrictions are valid) and explain that our regression models do not suffer from over-identification problem. The results of Arellano-Bond test also accepts the null hypothesis (H$_0$: No autocorrelation) for first-order autocorrelation at the level of 5% and for second-order autocorrelation at the level of 1%, indicating that our regression models do not suffer from autocorrelation issue (Roodman, 2009). Moreover, the consistency of our regression results in different regression models also indicates the validity and robustness of our results.

[Insert Table 6 and 7 Here]

5. Conclusions drawn and policy implications

The ideology behind the *Sharia-compliance* suggests that Islamic banking system shall base itself on non-interest based real economic transactions backed by tangible assets to mitigate the business risk and sustain better performance. Consequently, Islamic banks are expected to perform better as compared to the conventional banks. As such, our sample of 23 countries where Islamic banks and their conventional counterparts operate in the same business environment, provide us an opportunity to test this conceptual foundation of Islamic banks. To investigate the performance of the two competing banking models (Islamic vs. conventional), we use a dataset of 2,841 bank-year observations of 493 conventional banks and 741 bank-year observations of 126 Islamic banks taken from 23 countries around the world. We develop an innovative Islamic Banking Index based on the basic ideology of Islamic banking i.e. interest (riba) free banking and apply a dynamic technique (GMM-System) controlled for time fixed effects to investigate the impact of Islamic Banking Index on bank performance. Our results demonstrate the role of bank and banking industry specific factors such as liquidity risk, credit risk, bank capital and competition to determine bank profitability. However, we find a significant role of Islamic Banking Index to determine profitability of our sampled banks. We find a positive relationship of Islamic Banking Index with return on equity of both type of banks suggesting that moving away from interest based products (financial assets and liabilities) helps improve profitability of both the bank types without increasing risk level. This finding suggests that at policy level the conventional banks are seemingly convinced about the inherent benefits of non-interest-based products to improve their profitability. This learning might be an outcome of their contemplation about why Islamic banks performed better during financial crisis while maintaining low level of risk. Further, we find a positive relationship of Islamic Banking Index with return on assets of Islamic banks only, explaining that lesser reliance of Islamic banks on interest-based transactions helps reduce their banking business volatility and improve their performance. In addition, the positive relationship of Islamic Banking Index with return on assets of Islamic banks becomes highly significant in the countries where Islamic financial development is higher, indicating significance of a supportive operating environment that contributes to improve the performance of Islamic banks. This conclusion leads to policy implication for the financial market regulators and the society at large. A supportive policy framework in a society that internalizes the value system of non-interest based financial products to harness vibrant demand for Islamic financial products is necessary for a thriving Islamic banking industry.

Further, we observe that during good economic conditions banks perform better by catering to increased demand that may be potentially risky. However, developed stock market provide alternate financing opportunities to the firms and reduces bank performance. Using data from 23 countries may limit generalizability of our results; hence, we advocate a comprehensive study that covers all banks across the globe.

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