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**Finance-Growth Nexus and Dual Banking System:  
Relative Importance of Islamic Banks**

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**Abstract.** This paper investigates the relationship between the coexistence of Islamic banks alongside their conventional counterparts and the quantitative and qualitative development of commercial banking and economic welfare. We study 22 Muslim countries with a dual banking system during the 1999-2009 period and find a positive relationship between the market share of Islamic banks and the development of financial intermediation and economic growth. The results also show a negative linkage between Islamic banks' presence and income inequality and poverty. Moreover, a greater market share of Islamic banks is associated with lower credit risk and cost inefficiency of conventional banks in certain countries. The extent and modality of the relationships considerably depend on the institutional environment within which a dual banking system operates.

*JEL Classifications:* G21

*Keywords:* Banking System Structure, Financial Development, Finance-Growth Nexus, Islamic Banking.

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## **1. Introduction**

The financial system is expected to mobilize savings and efficiently allocate them to productive projects. The existing literature shows that a well-functioning financial market and efficient financial intermediation can spur capital productivity and foster economic growth.

Different financial structures may differently affect economic growth, as some structures can be more influential than others. Berger et al. (2004) study the role of community banks in the economic growth of 49 countries between 1993 and 2000. Their findings suggest that financial systems with larger market share and efficiency of small, private, domestically-owned banks can better boost economic growth. In this paper we attempt to study whether the coexistence of Islamic and conventional banking contributes to financial development and economic welfare.

During the recent decades, Islamic finance has evolved and grown rapidly in many Muslim countries. According to The Banker (2013) Islamic finance grows at the rate of 15% to 20% per annum. Globally, Islamic banking assets held with commercial banks are set to cross to \$1.7t in 2013 (Ernst & Young's Report, 2013-2014). Alongside the growth of Islamic banking, the empirical work on this topic has grown accordingly. The extant literature analyzes various features of Islamic banking and finance: investment financing (Aggarwal and Yousef, 2000), securitization (Jobst, 2007), mortgage loans (Ebrahim, 2009), stability (Čihák and Hesse, 2010), relationship banking (Ongena and Şendeniz-Yüncü, 2011), business model (Beck et al, 2013), risk (Abedifar, et al., 2013), efficiency (Johnes et al, 2014; Saeed and Izzeldin, 2014), loan default rates (Baele et al, 2014), mutual funds (Abdelsalam et al, 2014) and valuation (Elnahass, et al, 2014). However there is a handful of work on the role and relative importance of Islamic banking in the transformation of the banking system and the finance sector of the respective countries. Using a sample of twenty countries for the 2000-2005 period , Gheeraert (2014) shows

that development of Islamic banking in Muslim countries boosts banking sector development. Using a similar sample, Gheeraert and Weill (2014) claim that the development of Islamic banking improves macroeconomic efficiency. The recent development of Islamic banking has changed the financial structure of many countries by introducing a dual financial system where both Islamic and conventional finance are operated. This paper attempts to fill the void by investigating the characteristics of Islamic banking from the finance-growth perspective.

Islamic banking is expected to offer financial products and services that are compatible with Islamic doctrine, and hence convince Muslim individuals and firms with religious concerns to have access to finance or move from the informal to the formal financial system. This suggests a positive impact of a dual banking system on the size of the financial intermediation sector by boosting savings mobilization. How efficiently savings are allocated in such an environment is another important subject which we attempt to examine in this paper. In a dual banking system, Islamic and conventional banks do not merely play a supplementary role to one another, they compete with each other in absorbing clients and investors because a portion of Muslims may have a low sensitivity to religious issues. As such, we expect the presence of Islamic banking to also improve the quality and efficiency of financial intermediation.

The extant literature shows that financial development can foster economic growth. Recent studies (for instance Berger et al., 2004; Koetter and Wedow, 2010) suggest that, beside an increase in size, an improvement in quality of the financial sector can also spur economic growth. In this paper we investigate whether the presence of Islamic banks in a dual banking system can directly contribute to economic growth: On the one hand, Islamic banks may be more risk-averse than conventional banks and hence discourage firms' business expansion; on the other hand, since they invest their funds in the real economy and are not allowed to get involved

in speculative activities, they might stimulate economic growth more strongly than their conventional counterparts. Moreover, Islamic banks have the capacity to mitigate income inequality and poverty because they are expected to have more incentives to support social and development projects. Alternatively, it can be argued that Islamic banks do not contribute to poverty reduction differently from their conventional counterparts because they also follow profit-maximization strategies. However, from the demand side, the presence of Islamic finance can alleviate poverty by lessening financial exclusion, since some poor Muslims may prefer to use Sharia-complied financial products and services.

Conventional banks might operate more efficiently in a dual banking system due to competition pressure enforced by the presence of Islamic banks. The competition pressure might be even stronger on conventional than Islamic banks, because Muslims with religious concerns would prefer Islamic to conventional finance; however, other Muslims are expected to be indifferent between the two systems. As such, one may anticipate that credit risk and cost inefficiency of conventional banks would decline with an increase in the market share of Islamic banks. Alternatively, operating in a dual banking system may deteriorate the quality of conventional banks' performance, since their competitors, i.e. Islamic banks, might be more inefficient as they offer *Sharia*-compliant financial products and Muslims have no other choice but to bank with them.

Merton and Bodie (2004) point out that overall financial development matters more than the type of financial structure in place to better fuel economic growth. Nevertheless, our focus in this paper is on banks and not the financial system as a whole. Financial intermediation and financial markets have both substantial roles in economic growth. As Boyd and Smith (1998) show in their model, credit and equity markets are complementary components of the whole

financial system rather than substitutes for each other. Beck and Levine (2004) also find that the development of both the banking system and financial markets is positively linked with economic growth implying that financial services provided by stock markets are different from those supplied by banks. In developing countries, however, the other components of the financial system such as stock and bond markets, pension funds and insurance firms are not as developed as their banking systems. In fact, banks have the key role in mobilizing deposits and channelling them for investments.

For our study, we focus on commercial banking industries of 22 Muslim countries where a dual banking system is practiced during the 1999 - 2009 period. We pursue our analysis using two sub-samples of countries based on the share of Muslim population<sup>1</sup>. Overall, we find that the effect on financial development and performance of conventional banks of having a dual banking system (where Islamic banks operate alongside their conventional counterparts) considerably depends on the level of financial development and market structure. For instance, the results show that higher market share of Islamic banks is associated with greater bank deposits, annual growth rate of private credit and private credit allocation to new businesses especially in sub-samples of countries with relatively lower development of their financial sector, i.e. countries with greater share of Muslims in their population. Presence of Islamic banks can also boost the real economy in countries with relatively lower share of Muslims in their population, where the financial sector is more developed and the market share of Islamic banks is relatively higher.

We also observe that the market share of Islamic banks is negatively linked to income inequality and poverty in countries with greater share of Muslims in their population and hence

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<sup>1</sup> Interestingly, countries with a lower share of Muslim population have on average a more developed financial sector and a higher market share of Islamic banks.

greater financial exclusion (as in such countries the financial sector is relatively less developed and Islamic banks have on average a lower market share).

Our bank-level analyses indicate that presence of Islamic banks reduces credit risk and cost inefficiency of conventional banks in countries with lower share of Muslims in their population, where the market is relatively less concentrated. Table A1 in the appendix provides the summary of our results.

The remainder of the paper is organized as follows. Section 2 presents the research motivation and econometric specifications, section 3 describes our sample of observations and section 4 discusses the results. Finally, section 5 concludes.

## **2. Research Motivation and Econometric Specifications**

### **2.1. FINANCIAL INTERMEDIATION AND ECONOMIC WELFARE**

The existence of Islamic financial institutions together with their conventional counterparts increases the number of participants and financial products which may deepen the financial system and improve the efficiency of the whole financial sector. We attempt to investigate whether the presence of Islamic banks alongside conventional banks can affect financial intermediation in terms of savings mobilization and funds allocation. We also explore whether presence of Islamic banks can affect the real economy, mitigate income inequality and alleviate poverty.

#### ***2.1.a. FINANCIAL INTERMEDIATION***

Many Muslims do not use traditional financial products and services, since they believe that they are against their religious beliefs. They would preferably use the financial services

provided by the informal market<sup>2</sup>. A number of surveys highlight that a considerable proportion of Muslims prefer *Sharia*-compliant financial products and services. In Algeria, for instance, a study shows that around 20.7% of micro-enterprise owners do not apply for loans primarily due to religious concerns (Frankfurt School of Finance and Management, 2006). In Indonesia, around 49% of the rural population of East Java prefers Islamic finance and believes that interest is prohibited (C.G.A.P., 2008). Honohan (2008) finds that in Islamic Development Bank's member countries (i.e. all OIC-member countries except Guyana) only 28 percent of the adult population, including Muslims and non-Muslims, uses the formal or semi-formal financial products and services for deposit accounts or borrowing activities. Given the relatively low access to finance in most Muslim countries, there is a considerable potential for outreaching Islamic finance; hence Islamic banking can contribute to financial intermediation development by transferring lenders and borrowers from the informal to the formal market, depending on whether the informal market is more or less efficient than the formal market<sup>3</sup>. As such, Islamic banks are expected to play a complementary role to conventional banks in collecting deposits.

Islamic and conventional banking may also play a substitutive role for each other in a dual banking system, as a portion of Muslims may have a low sensitivity to religious issues. As such, Islamic banks can absorb lenders and borrowers from conventional financial institutions who have chosen conventional finance in the absence of Islamic finance.

We explore whether the presence of Islamic banks has as a substitutive or complementary role in deposits mobilization. As such, first, we investigate how the deposits of the banking

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<sup>2</sup> Often known as the curb market and may play a substantial role in developing countries.

<sup>3</sup> Some economists believe that curb markets are more efficient in savings and investment intermediation (van Wijnbergen, 1983; Taylor, 1983, Buffie, 1984); however, Fry (1988) argues that informal markets are not necessarily as efficient as formal markets. Chandavarkar (1992) claims that curb markets are unorganized and do not play a substantial role in financial resource intermediation to boost economic growth. The main problem for examining the potential contribution of informal markets to economic growth is the lack of data.

system as a whole are affected by the presence of Islamic banks and then we study how the private credit grows in a dual banking system. We also examine the relationship between the volume of private credit allocated to new businesses and the market share of Islamic banks.

### 2.1.b. REAL ECONOMY

Islamic banks may boost or hinder economic growth compared to their conventional counterparts. On the one hand, existing studies show that religious individuals are more risk averse than other agents (Miller and Hoffmann, 1995; Osoba, 2003; Hilary and Hui, 2009). Similarly, Islamic financial institutions might be more risk-averse than their conventional counter-parts. As such, they might limit entrepreneurship by encouraging borrowers to select low-risk projects or excessively invest in tangible assets. On the other hand, Islamic financiers prefer to allocate their funds to the real economy; and they are not authorized to allocate their financial resources to speculative activities. Whether the presence of Islamic banks can affect economic growth is an empirical question, which we attempt to address in this study.

### 2.1.c. INCOME INEQUALITY and POVERTY ALLEVIATION

Islamic finance may affect income inequality and play a role in poverty alleviation. By establishing Islamic finance, less developed Muslim countries which suffer from lack of financial resources can attract foreign investment and capital from relatively rich Muslim countries and boost their growth and reduce income inequality (Fasih, 2012).

One may expect that Islamic financial institutions will account for poverty alleviation in their business strategy alongside profit-maximization. *Islam* like other *Abrahamic* religions (*Judaism* and *Christianity*) encourages lending provided that it is free of interest (called *Neshekh*<sup>4</sup>, *Usury*<sup>5</sup> and *Riba*<sup>6</sup> in *Judaism*, *Christianity* and *Islam* respectively). The essence of

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<sup>4</sup> Holy Hebrew Bible, Exodus, 22: 24, Leviticus 25:36-37 and Deuteronomy, 23:20-21.

strong prohibition of interest is to prevent the oppression of the poor. By interest, the rich can extract benefits from the urgent needs of the poor and would not have any incentive for business or investment. Hence, Islamic finance may potentially lessen income inequality and alleviate poverty. Two channels can be considered for the possible impact of Islamic finance on income inequality and poverty:

Profit-maximization strategy encourages financial institutions to establish their branches and network in large cities or capital-oriented areas rather than areas with low population density or low-income areas. As such, the poor have relatively limited access to financial products and services such as deposits and loans. Besides such constraints, some poor Muslims prefer to bank with *Sharia*-compliant financial institutions. Islamic financiers are expected to have more incentives for offering financial products and services to the poor clients. Islamic financiers are also expected to contribute more to social and development activities than their conventional counterparts. Moreover, they may prefer to finance projects that can be more beneficial for low income people.

Alternatively, one may argue that a specific marketing strategy of Islamic financial institutions is to offer *Sharia*-compliant financial products and services to attract clients with relatively high degree of religiosity. They would hence also follow a profit-maximization approach similar to conventional finance and there would be few differences between Islamic and conventional products apart from the label assigned to them<sup>7</sup>. Hence, Islamic finance may not be more effective in reducing poverty than conventional finance. As such, it is important to investigate whether Islamic finance has any direct impact on income inequality and poverty.

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<sup>5</sup> Sir Harry Page 'In Restraint of Usury: The Lending of Money at Interest' Chartered Institute for Public Finances and Accounts (CIPFA), London, 1985.

<sup>6</sup> Holly Quran, Chapter 1, Verses 275-279.

<sup>7</sup> Refer to Abedifar et al. (2013) for overview of Islamic finance and banking.

We adopt the following panel specification for our analyses. To control for individual unobservable heterogeneity across countries, we use the fixed effect technique in our estimation.

$$Y_{j,t} = \alpha_0 + \alpha_1 \times \text{ISB\_Share}_{j,t} + \alpha_2 \times \text{ISW\_Share}_{j,t} + \alpha_3 \times \text{Foreign\_Banks\_Share}_{j,t} + \alpha_4 \times \text{State\_Banks\_Share}_{j,t} + \alpha_5 \times \text{Inflation}_{j,t} + \alpha_6 \times \text{Trend}_t + \varepsilon_{j,t} \quad (1)$$

Where j subscript denotes individual countries and t denotes the time dimension.

$Y_{j,t}$  is our dependent variable. We use the following three proxies for our financial intermediation study: 1) Total deposits of commercial banks to GDP ratio (*Bank Deposit*) representing the volume of deposits mobilization 2) the annual growth rate of private credit (*Private Credit Growth*) and 3) the ratio of private credit to new business registration (*Private Credit per New Business*).

For our real economy analysis, we employ the annual growth rate of gross national income per capita calculated on the basis of the Atlas method (*Economic Growth*) and the value added of the industrial sector to GDP ratio (*Industry Value Added*) as the dependent variable ( $Y_{j,t}$ ).

Income inequality and poverty alleviation are explored using the following five proxies as the dependent variable ( $Y_{j,t}$ ) in Equation (1): 1) Gini index (*Gini*), 2) the share of people with less than \$1.25 a day based on purchasing power parity (PPP) in total population (*Poverty Ratio International*), 3) the share of people below national poverty line in total population (*Poverty Ratio National*), 4) the intensity of poverty of people who live with less than \$1.25 (*Poverty Gap International*) and 5) the share of people who live below the rural poverty line in total rural area population (*Poverty Ratio Rural*).

*ISB Share* represents the share of commercial Islamic banks in the total assets of the whole commercial banking industry which is our variable of interest. Islamic banking can be introduced in the financial system in two forms: Establishment of pure Islamic banks or

launching Islamic branches/window by existing conventional banks. In the former case, the presence of Islamic banking increases both the size of the financial sector and the number of financial institutions yielding higher market competition; however, in the latter form, the size of the financial system rises without any increase in the number of participants, resulting in higher market power. Our variable of interest refers to the first type of introduction. We attempt to control for the second type by including the share of commercial Islamic window banks – i.e. commercial banks offering both Islamic and conventional banking (*ISW Share*) – in the total assets of the aggregate commercial banking sector. The benchmark is then the share of pure commercial conventional banks in the total assets of the banking system, which is omitted to avoid perfect multi-collinearity.

We try to capture the heterogeneities associated with the structure of the banking sector in terms of ownership, using the share of total assets of foreign and state-owned banks in total assets (*Foreign Bank Share* and *State Bank Share*). The benchmark is the share of domestic private banks in total assets which is dropped out from the model to avoid perfect multi-collinearity. We also control for inflation represented by the annual growth rate of the GDP deflator (*Inflation*). Deposits mobilization, funds allocation, the real economy, income inequality and poverty are indeed influenced by inflation. Finally, we add a trend variable to capture the time trend. Table A2 in the appendix describes the variables of interest, the control variables and the dependent variable.

## 2.2. PERFORMANCE OF CONVENTIONAL BANKS

Change in market structure may affect banks' performance. We study whether lending quality, cost efficiency and profitability of conventional banks are affected when they operate in a dual banking system alongside Islamic banks.

Religious clients are more likely to prefer Islamic to conventional banking, since Islamic banks are supposed to comply with *Sharia* requirements in their operations. As such, a dual banking system segments the market: clients with religious beliefs may select Islamic banking, while others might be indifferent between Islamic and conventional financial services. Taking into account that religious people are more risk averse, we expect that borrowers' quality of conventional banks deteriorates when they operate together with Islamic banks. Alternatively, a dual banking system might discipline conventional banks more effectively which might result in higher efficiency and loan quality.

We estimate the following panel specification for our analyses using the fixed effect technique which accounts for individual unobservable heterogeneity across banks.

$$C_{i,t} = \beta_0 + \beta_1 \times ISB\_Share_{j,t-1} + \beta_2 \times ISW\_Share_{j,t-1} + \beta_3 \times HHI_{j,t-1} + \beta_4 \times Domestic\_Interest\_Rate_{j,t-1} + \beta_5 \times Per\_Capita_{j,t-1} + \beta_6 \times Per\_Capita\_Growth_{j,t-1} + \beta_7 \times Capital_{i,t-1} + \beta_8 \times Size_{i,t-1} + \sum_{y=1}^9 \beta_{9,y} \times Year\_Dummies_{t,y} + \xi_{i,t} \quad (2)$$

Where  $i$ ,  $t$  and  $j$  subscripts denote individual banks, time dimension and countries, respectively. *ISB Share* is our variable of interest and we study its impact on *Credit Risk* and *Inefficiency* of conventional banks operating in a dual banking system.

$C_{i,t}$  is our dependent variable, representing *Credit Risk* and *Inefficiency*. We use the ratio of impaired loans to gross loans (*Impaired Loans*) as a proxy for credit risk (*Credit Risk*). Impaired loans consist of non-accrual loans and loans which are past due for 90 days or more and still accruing. This proxy is widely used in the literature as an accounting-based credit risk

indicator (for instance Kwan and Eisenbeis, 1997; Gonzalez, 2005; Carbo and Rodriguez, 2007; Delis and Kouretas, 2011; Fiordelisi, et al., 2011). We employ the ratio of total noninterest expense to total operating income (*Inefficiency*) for our cost inefficiency analysis.

We control for macroeconomic factors such as market concentration (*HHI*), *Domestic Interest Rate*, *Per Capita* and *Per Capita Growth* together with bank-level controls including *Capital* and *Size*. Since the Hausman test suggests the use of the fixed effect technique, we do not include ownership dummies in our model. Finally, we capture year fixed effects using nine year dummy variables<sup>8</sup>.

Besides controlling for market share of commercial Islamic window banks (*ISW Share*), we introduce four country level variables to capture cross-country variations. We control for the impact of banking sector concentration by adding the Herfindahl-Hirschman Index (*HHI*) to our model. We take into account the level of domestic interest rates (*Domestic Interest Rate*) in our analysis. The extant literature shows the influence of domestic interest rates on banks' risk appetite (Dell' Ariccia and Marquez, 2006; Rajan, 2006; Borio and Zhu, 2008; Delis and Kouretas, 2010; Maddaloni and Peydró, 2011; Jimenez et al. 2013). On the one hand, banks have a greater risk-taking appetite when interest rates are low; on the other hand, an increase in the interest rate level can adversely affect the ability of borrowers to repay loans (Jarrow and Turnbull, 2000; Carling et al., 2007; Drehmann et al., 2010 and Alessandri and Drehmann, 2010). Finally, we try to capture the possible impact of income level and growth in the prosperity of the population by including GDP per capita (*Per Capita*) and growth in GDP per capita (*Per Capita Growth*).

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<sup>8</sup> The sample covers eleven years; however, since all accounting and macro level variables are lagged for one year, we use nine year dummies (2001-2009) in our estimations.

We also control for bank-level heterogeneities. The share of equity capital in total assets (*Capital*) is included in our model. On the one hand, an increase in equity can lower moral hazard problems and increase the monitoring incentives of banks (Diamond, 1984). On the other hand, higher equity can increase banks' risk-taking capacity. Equity capital can be considered as a risk aversion proxy (McShane and Sharpe, 1985; Maudos and De Guevara, 2004; Koetter and Noth, 2013) and banks with higher capital ratios expect higher returns. Moreover, Jensen (1986) and Harris and Raviv (1990) discuss the possible impact of capital on inefficiency. They argue that when capital is more expensive than debt (at the margin) management might endeavor to reduce operating costs to offset the higher financial costs of the increase in capital required by regulators. Alternatively, a fall in interest expenses may reduce managerial attempts to control operating expenses.

We consider the effect of size in our study by using the logarithm of total assets (*Size*) as the proxy. Larger banks can benefit from scale economies and diversification (Hughes et al., 2001). They may target riskier activities since they might benefit from safety net subsidies (Kane, 2010). They might face higher competition pressure as they have larger and more transparent clients with relatively easier access to capital markets. Larger banks may also use different technologies and business models for their operations. As such, credit risk, inefficiency and profitability might depend on size.

### 3. Data and Descriptive Statistics

#### 3.1. DATA

Our empirical analysis is based on country and bank-level data for 22 Muslim countries<sup>9</sup> where both Islamic and conventional banking are practiced in a dual banking system during the 1999-2009 period. We collect country-level data from the World Bank web-site.

The bank-level data is obtained from the Bankscope database. Bankscope classifies banks as commercial, Islamic or other types, while an Islamic bank might be a commercial or a non-commercial bank. Moreover, some commercial conventional banks have Islamic windows/branches/wings (*Islamic Window Bank*), and they cannot be classified as either Islamic or conventional banks. As such and to ensure data accuracy, we retrieve information on a bank's type from the web-site of each bank.

#### 3.2. DESCRIPTIVE STATISTICS

The performance of a dual banking system may depend on the institutional environment, such as financial development, population's wealth and the share of Muslims in population. For instance, Abedifar et al. (2013) find significant variations in performance of Islamic banks across countries with relatively greater Muslims' share in population versus other Muslim countries. Rioja and Valev (2004) show that the finance-growth nexus depends on the level of financial development. Finance fuels growth in countries with relatively developed financial sectors, whereas the finance-growth relationship is ambiguous in countries with a less developed financial system. Our sample covers quite heterogeneous countries in such aspects. As such and following Abedifar et al. (2013), we use two sub-samples of countries based on the median

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<sup>9</sup> Among Organization of Islamic countries we find a dual banking system in 22 countries: Algeria, Bahrain, Bangladesh, Brunei, Egypt, Gambia, Indonesia, Iraq, Jordan, Kuwait, Lebanon, Malaysia, Mauritania, Pakistan, Qatar, Saudi Arabia, Senegal, Syria, Tunisia, Turkey, United Arab Emirates, Yemen.

value<sup>10</sup> of Muslims' share in population collected from Pew Research Center (2009). It ranges between 51.9% in Lebanon to 99.8% in Tunisia. The median value is 95%. Countries below the median value are classified in one group called "*Low Muslim Countries*" and the rest which are those with a share of Muslims above 95% are collectively called "*High Muslim Countries*".

Table I presents the descriptive statistics of our sample for *Low vs. High Muslim Countries*. The figures interestingly show that Islamic banks and Islamic window banks have greater market share in *Low Muslim* compared to *High Muslim Countries* (20.70% and 24.02% for *Low Muslim Countries* vs. 10.50% and 15.92% for *High Muslim Countries*). Foreigners have greater ownership of commercial banks in *High Muslim Countries* compared to *Low Muslim Countries* (29.32% vs. 20.97%); however, the governmental sector of *Low Muslim Countries* has a slightly larger stake in the commercial banking system (16.80% vs. 15.84%).

The banking system of *Low Muslim Countries* is more developed than that of *High Muslim Countries* (*Bank Deposit* is 65.13% of GDP in *Low Muslim Countries*, whereas it is merely 34.37% for *High Muslim Countries*). Private credit grows at a greater rate in *High Muslim Countries* compared to *Low Muslim Countries* (16.55% vs. 12.70%). The availability of private credit for new businesses is higher for *Low Muslim Countries* compared to *High Muslim Countries* (5.43% vs. 4.08%).

*Economic Growth* is about 8% across our sub-samples, ranging from 7.91% for *Low Muslim Countries* to 8.27% for *High Muslim Countries*. The contribution of the industrial sector to GDP is 40.73% for *Low Muslim Countries*, whereas it is significantly lower in *High Muslim Countries* (33.66%).

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<sup>10</sup> The median value in our sample is 95%.

We do not observe a significant difference between Gini index, *Poverty Ratio International* and *Poverty Gap International* of *Low* versus *High Muslim Countries*. However, poverty in rural areas is greater in *High Muslim Countries*. Moreover, the headcount ratio is higher for this group of countries when we consider the national poverty line in lieu of international poverty line.

The fifth part of the table reports other country-level indicators. The inflation rate is about eight percent across different groups of countries ranging from 7.08% in *Low Muslim Countries* to 8.55% in *High Muslim Countries*. The *HHI* index shows that commercial banking is less concentrated in *Low Muslim Countries* as compared to *High Muslim Countries*. *High Muslim Countries* face considerably higher interest rates, compared to *Low Muslim Countries* (9.90% versus 6.08%). *Per Capita* is significantly higher for *Low Muslim Countries* versus *High Muslim Countries* (\$25,000 versus \$5,700). However, we observe little differences between *Low Muslim* and *High Muslim Countries* in terms of the annual growth rate of *Per Capita* (1.62% and 1.94%, respectively).

The last part of Table I describes our bank-level variables for conventional banks operating in our countries of study. We observe that conventional banks of *Low Muslim Countries* are smaller in size, have lower credit risk and are more cost efficient than those of *High Muslim Countries*.

[TABLE I]

## **4. Empirical Results**

### **4.1. FINANCIAL INTERMEDIATION IN A DUAL BANKING SYSTEM**

To explore the relationship between the presence of Islamic banks and financial

intermediation, we estimate the Equation (1), using fixed effect technique and illustrate the results in Table II. The first three columns display our results for the *Low Muslim Countries* subsample. In the first column, we use *Bank Deposit* as the dependent variable and regress it on the market share of Islamic banks (*ISB Share*) and a set of control variables, including *ISW Share*, *Foreign Banks Share*, *State Banks Share*, *Inflation* and *Trend*. The results show little relationship between the market share of Islamic banks and *Bank Deposit*. *ISW Share* also depicts little association with the dependent variable. As expected, we observe a negative correlation between *Bank Deposit* and the market share of foreign and Governmental ownership in the commercial banking industry. *Inflation* also exhibits a negative association with *Bank Deposit*. The *Trend* variable appears with a positive coefficient suggesting that *Bank Deposit* increases over time.

In the second column, we investigate how private credit grows in the presence of Islamic banks. We use the average annual growth rate of private credit (*Private Credit Growth*) in lieu of *Bank Deposit* as the dependent variable and estimate our model. We find no significant association between *ISB Share* and the yearly growth rate of commercial banks' private credit. In the next step, we explore the linkage between private credit allocation to new businesses and the market share of Islamic banks. As such, in the third column, we replace *Private Credit Growth* with *Private Credit per New Business*. We find a positive relationship between *ISB Share* and the dependent variable. *ISW Share* also depicts a positive association with the dependent variable.

The second set of three columns display our results for *High Muslim Countries*, using the same specifications of columns (1) to (3). The market share of Islamic banks exhibits a positive linkage with *Bank Deposit*, *Private Credit Growth* and *Private Credit per New Business*. Overall, the relationship between the market share of Islamic banks and development of financial intermediation is mostly observed in *High Muslim Countries* with a relatively less developed

financial sector.

[TABLE II]

#### 4.1.b. REAL ECONOMY

We estimate Equation (1) using the annual growth rate of gross national income per capita calculated based on the Atlas method (*Economic Growth*) and the value added of the industrial sector to GDP ratio (*Industry Value Added*) as the dependent variable to investigate the relationship between Islamic banking presence in a commercial banking market and the real economy. Table III displays the results of our estimations using the fixed effect technique.

In the first column, we study the sample of *Low Muslim Countries* and regress *Economic Growth* on our variable of interest, i.e. *ISB Share*, while controlling for *ISW Share*, *Foreign Bank Share*, *State Bank Share*, *Inflation* and *Trend*. We find a positive association between *ISB Share* and our dependent variable. We also observe a negative relationship between Governmental ownership of commercial banks and *Economic Growth*. *Inflation* depicts a positive linkage with our dependent variable. In the second column we use *Industry Value Added* in lieu of *Economic Growth* and find little association with our variable of interest, i.e. *ISB Share*. Columns (3) and (4) display our results for *High Muslim Countries* which show no significant relationship between *ISB Share* and our dependent variables, i.e. *Economic Growth* and *Industry Value Added*. Overall, we find a significantly positive relationship for the *Low Muslim Countries* subsample with more developed financial sector and greater market share of Islamic banks.

[TABLE III]

#### 4.1.c. INCOME INEQUALITY and POVERTY ALLEVIATION

In this section, we explore the relationship between Islamic banking presence in the banking industry and income inequality and poverty alleviation. We estimate Equation (1) using 1) *Gini*, 2) *Poverty Ratio International*, 3) *Poverty Ratio National*, 4) *Poverty Gap International* and 5) *Poverty Ratio Rural* as the dependent variable. Table IV illustrates the results for the two sub-samples of *Low* and *High Muslim Countries*. The former group of countries is analyzed in columns (1) and (5) and the latter sub-sample is studied in columns (6) to (10).

In the first column, we regress *Gini* on *ISB Share* and control for *ISW Share*, *Foreign Banks Share*, *State Banks Share*, *Inflation* and *Trend*. The results show a negative linkage between *Gini* and the market share of Islamic banks in total commercial banking. We use *Poverty Ratio International* as the dependent variable in the second column and find no significant association with the market share of Islamic banks. In the third column, we use *Poverty Ratio National* which accounts for national poverty line in lieu of international poverty line and find no significant relationship similarly to our previous finding. In column (4) we use *Poverty Gap*, which represents the intensity of poverty, as the dependent variable. The market share of Islamic banks displays no significant relationship with *Poverty Gap*. The fifth column presents our analysis of the poverty ratio in rural areas. Our estimation shows little linkage of *ISB Share* with *Poverty Ratio Rural*.

Columns (6) to (10) illustrate our analysis for the *High Muslim Countries* sub-sample, using the same specifications of columns (1) to (5). In column (6), we find that *Gini* is negatively associated with *ISB Share* and *ISW Share*. In column (7), we use *Poverty Ratio International* as the dependent variable and find a negative relationship with the market share of Islamic banks. *ISW Share* also depicts a negative relationship with the dependent variable. The coefficient of

*Trend* shows that *Poverty Ratio International* declines over time. In the eighth column, the national poverty line is used to define the poverty ratio. Our analysis shows a negative linkage between *ISB Share* and the dependent variable which is in line with our finding in column (7). We also observe a positive association of *Poverty Ratio National* with foreign and state-ownerships. In column (9), we look into the relationship between the presence of Islamic banks and the intensity of poverty represented by *Poverty Gap*. Our analysis shows that *ISB Share* is negatively associated with the dependent variable. *ISW Share* also depicts a negative linkage with *Poverty Gap*. The coefficient of *Trend* shows that *Poverty Gap* declines over time. Finally, in column (10), we explore the relationship between the market share of Islamic banks and poverty in rural areas and observe little linkage between them. We find a significant association between *ISB Share* and our proxies for poverty alleviation in *High Muslim Countries* where the market share of Islamic banks is relatively low compared to the share of Muslim population. Lessening financial exclusion and outreaching Muslims can be one explanation for this finding which requires detailed data for possible confirmation.

[TABLE IV]

## 4.2. PERFORMANCE OF CONVENTIONAL BANKS

### 4.2.a. CREDIT RISK

In this section, we explore the relationship between the presence of Islamic banks and loan quality (*Credit Risk*) of conventional banks. We employ the ratio of impaired loans on gross loans as the *Credit Risk* proxy and estimate Equation (2) using fixed effect technique. We analyze our sub-samples of *Low* and *High Muslim Countries*. Table VI presents the results.

Columns (1) to (3) display the results for *Low Muslim Countries*. In the first column we

regress *Credit Risk* on *ISB Share*, while controlling for *ISW Share* and year dummies. In column (2), we add our country-level variables, including *HHI*, *Domestic Interest Rate*, *Per Capita* and *Per Capita Growth* to our model. Column (3) illustrates the results when we control for *Capital* and *Size* to capture bank-level heterogeneities. We observe that *ISB Share* depicts a negative linkage with *Credit Risk*. Higher *Domestic Interest Rate* is also associated with a higher *Credit Risk* as it adversely affects borrowers' ability for loan repayments which is line with Jarrow and Turnbull (2000), Carling et al. (2007), Drehmann et al. (2010) and Alessandri and Drehmann (2010). In columns (4) to (6), we study our sample of *High Muslim Countries* using the same specifications of columns (1) to (3). The results show little relationship between *ISB Share* and *Credit Risk* of conventional banks. However, *Per Capita* depicts a negative linkage with *Credit Risk*.

Overall, we find a positive impact of the market share of Islamic banks and the loan quality of conventional banks operating in *Low Muslim Countries* wherein the commercial banking market is less concentrated with more conventional commercial banks with smaller size.

[TABLE V]

#### 4.2.b. *INEFFICIENCY MODEL*

We estimate Equation (2), using the ratio of total noninterest expense to total operating income (*Inefficiency*) as the proxy. We estimate our model for *Low* and *High Muslim Countries* sub-samples. Table VII presents the estimations.

Columns (1) to (3) illustrate the analysis for *Low Muslim Countries*. In the first column we regress *Inefficiency* on *ISB Share*, while controlling for *ISW Share* and year dummies. Country-level variables including *HHI*, *Domestic Interest Rate*, *Per Capita* and *Per Capita Growth* are added to the model in column (2). In the next step, column (3), we control for

*Capital* and *Size* of conventional banks. In all three specifications, *ISB Share* depicts a negative link with *Inefficiency*. We also find that an increase in *Domestic Interest Rate* and *Per Capita Growth* is associated with a decline in *Inefficiency*; whereas, *Per Capita* displays a positive linkage with *Inefficiency*. In columns (4) to (6) we estimate our model for *High Muslim Countries*, with the same specifications of columns (1) to (3). In spite of our findings for the *Low Muslim Countries* sub-sample, we find no significant linkage between *ISB Share* and *Inefficiency*.

Overall and similar to our credit risk analysis in the previous section, we find a significant negative relationship between *ISB Share* and conventional banks' *Inefficiency* for the *Low Muslim Countries* sub-sample with a less concentrated commercial banking market.

[TABLE VI]

## **5. Summary and Conclusion**

In this paper, we investigate whether the presence of Islamic commercial banks alongside their conventional counterparts can foster the development of the overall commercial banking sector and economic welfare. Moreover, we explore the possible implications for conventional banks of operating in a dual banking system.

During the recent decades, Islamic banking has grown fast in many Muslim countries. As such, a dual banking system has emerged, where both Islamic and conventional banks share the market. Islamic finance is expected to offer *Sharia*-compatible financial products and services. This suggests a considerable potential for lessening financial exclusion and outreaching Muslims

who refrain from using the conventional borrowing and lending instruments or prefer Islamic banking to the conventional one.

Islamic banks may behave differently from their conventional counterparts in several ways: they are not authorized to get involved in speculative activities. They are supposed to act as the agent of investment account holders for allocating their savings to profitable projects. They might be more risk-averse and have stronger preference for investing in the real economy than conventional banks. Moreover, the coexistence of Islamic and conventional banking could increase the efficiency of the whole banking system by improving competition.

We study 22 Muslim countries with a dual banking system during the 1999-2009 period. Due to considerable heterogeneity among the countries under study, we split them into two subsamples based on the relative importance of Muslim population.

First, we investigate the possible relationship between Islamic commercial banking and financial intermediation development. The results show a positive relationship between the presence of Islamic banks and bank deposits (scaled by GDP), the annual growth rate of private credit and private credit allocation to new businesses especially in countries with a less developed financial sector. In terms of the real economy, we find a significantly positive relationship between the presence of Islamic banks and economic growth in countries with a more developed financial sector and greater market share of Islamic banks.

We also explore the relationship between the presence of Islamic banks and income inequality and poverty alleviation. We observe that an increase in the market share of Islamic banks is positively associated with a decline in income inequality and poverty in countries with greater share of Muslim population; surprisingly in such countries Islamic banks are relatively less present and hence financial exclusion might be more serious.

We also investigate the relationship between Islamic banks' presence and the performance of conventional banks in terms of lending quality (credit risk) and cost inefficiency. The market share of Islamic banks is negatively linked with the credit risk and cost inefficiency of conventional banks in countries with relatively lower share of Muslim population. These countries have a relatively less concentrated market . The presence of Islamic banks in such countries might therefore discipline conventional banks more effectively and hence encourage managers to lower credit risk and cost inefficiency. Overall, the results show that the presence Islamic banks alongside conventional banks can affect financial development, economic welfare and the performance of conventional banks. The extent and modality of such effects considerably depend on the level of financial development and the market structure of countries within which a dual banking system operates.

## Appendices

Table A1. Summary of Results

This table provides a summary of our results for Financial Intermediation analysis (*Bank Deposit*, *Private Credit Growth* and *Private Credit per New Business*), Real Economy analysis (*Economic Growth* and *Industry-Value Added*), income inequality and poverty alleviation analysis (*Gini*, *Poverty Ratio International*, *Poverty Ratio National*, *Poverty Gap*, *Poverty Ratio Rural*) and conventional banks' performance (*Credit Risk* and *Cost Inefficiency*). See Table A2 for variable definitions and section 2 for econometric specifications.

	Muslim Share in Population	
	Low Muslim Countries [below median]	High Muslim Countries [above median]
<b>Financial Intermediation</b>		
Bank Deposit	0	+++
Private Credit Growth	0	++
Private Credit per New Business	++	+++
<b>Real Economy</b>		
Economic Growth	+++	0
Industry Value Added	0	0
<b>Income Inequality &amp; Poverty Alleviation</b>		
Gini	---	--
Poverty Ratio, International	0	---
Poverty Ratio, National	0	--
Poverty Gap	0	---
Poverty Ratio, Rural	0	0
<b>Conventional Banks' Performance</b>		
Credit Risk	--	0
Cost Inefficiency	-	0

+: positive relationship, significant at 10% level.  
 ++: positive relationship, significant at 5% level.  
 +++: positive relationship, significant at 1% level.  
 0: no significant relationship.

-: negative relationship, significant at 10% level.  
 --: negative relationship, significant at 5% level.  
 ---: negative relationship, significant at 1% level.

Table A2. Variable Description

This table presents description of variables used in this study.

Variables	Description
<b>Commercial Banks Structure</b>	
<i>ISB Share</i>	The share of Islamic banks in total assets of all commercial banks.
<i>ISW Share</i>	The share of total assets of commercial banks offering both Islamic and conventional products in total assets of all commercial banks.
<i>Foreign Banks Share</i>	The share of foreign-owned banks in total assets of commercial banks.
<i>State Banks Share</i>	The share of state-owned banks in total assets of commercial banks.
<b>Financial Intermediation</b>	
<i>Bank Deposit</i>	The ratio of commercial bank deposits on GDP.
<i>Private Credit Growth</i>	The annual growth rate of private credit.
<i>Private Credit per New Business</i>	The ratio of private credit on the number of new business registration.
<b>Real Economy</b>	
<i>Economic Growth</i>	The annual growth rate of gross national income per capita calculated based on Atlas method.
<i>Industry Value Added</i>	The value added of the industrial sector to GDP ratio.
<b>Income Inequality &amp; Poverty Alleviation</b>	
<i>Gini</i>	The Gini coefficient used as a measure of income inequality.
<i>Poverty Ratio International</i>	Percentage of population below the international poverty line defined as \$1.25 a day (PPP).
<i>Poverty Ratio National</i>	Percentage of population below the national poverty line.
<i>Poverty Gap</i>	Poverty gap – measuring the intensity of poverty - at the international poverty line.
<i>Poverty Ratio Rural</i>	Percentage of rural population below the rural poverty line.
<b>Other Country Level Heterogeneities</b>	
<i>Inflation</i>	The annual inflation rate measured by GDP deflator.
<i>HHI</i>	Hirschman-Herfindahl index (HHI) is a proxy for market concentration: $HHI_{c,t} = 100 \times \frac{\sum_{i=1}^n (Total\_Assets_{i,t,c})^2}{\sum_{i=1}^n Total\_Assets_{i,t,c}}$ . It has a value between zero and one hundred. Higher values show that the market is more concentrated.
<i>Domestic Interest Rate</i>	Deposit interest rate provided by the World Bank website; for years and countries with missing observations, the data is obtained from the central bank web-sites.
<i>Per Capita</i>	GDP per capita (th. \$), measured by PPP approach (constant 2005 international).
<i>Per Capita Growth</i>	The annual growth rate of GDP per capita
<b>Bank-Level Analysis</b>	
<i>Credit Risk</i>	Represented by the ratio of impaired loans to gross loans ( <i>Impaired Loans</i> ).
<i>Inefficiency</i>	The ratio of total noninterest expense on total operating revenue.
<i>Size</i>	The logarithm of total assets.
<i>Capital</i>	Equity capital to asset ratio.

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Table I. Descriptive Statistics

This table presents the descriptive statistics for 22 countries where commercial Islamic and conventional banking are practiced for the 1999-2009 period. We split the sample into two parts, on the basis of the median value of Corruption Perception Index and Muslims Share in population.

Variables	Countries with Muslims Share in Population below the Median (95%)					Countries with Muslims Share in Population above the Median (95%)					T-Stat.†
	Obs	Mean	S.D.	Min	Max	Obs	Mean	S.D.	Min	Max	
<i>Banking System Structure</i>											
ISB Share	110	20.70	25.47	0.00	100.00	114	10.50	17.14	0.00	72.25	3.51***
ISW Share	110	24.02	22.27	0.00	83.59	114	15.92	28.09	0.00	91.20	2.39**
Foreign Banks Share	110	20.97	19.98	0.00	92.75	114	29.32	29.11	0.00	97.23	-2.51**
State Banks Share	110	16.80	24.86	0.00	100.00	114	15.84	23.31	0.00	98.41	0.30
<i>Financial Intermediation</i>											
Bank Deposit	82	65.13	28.51	25.07	139.38	109	34.37	22.44	6.98	105.91	8.07***
Private Credit Growth	61	12.70	13.00	-38.6	42.18	92	16.55	17.39	-24.6	110.05	-1.56
Private Credit per New Business	17	5.43	2.67	2.69	11.58	36	4.08	3.11	0.77	13.99	1.62
<i>Real Economy</i>											
Economic Growth	91	7.91	8.33	-15.2	31.03	103	8.27	9.60	-21.1	44.83	-0.28
Industry Value Added	84	40.73	12.65	20.19	71.56	110	33.66	13.64	12.53	66.76	3.73***
<i>Income Inequality &amp; Poverty Alleviation</i>											
Gini	13	35.55	5.70	28.99	46.21	25	38.28	4.68	30.02	47.28	-1.49
Poverty Ratio International	16	19.45	19.79	0.00	58.59	25	13.99	14.28	0.00	44.19	0.95
Poverty Ratio National	17	18.59	11.38	3.60	48.90	23	28.76	11.99	13.00	55.20	-2.7***
Poverty Gap International	16	4.87	5.73	0.00	18.61	25	3.65	4.19	0.00	14.34	0.74
Poverty Ratio Rural	17	22.84	11.29	7.10	52.30	19	39.71	12.27	19.00	65.10	-4.3***
<i>Conventional Banks Characteristics</i>											
Total Assets (\$ m)	1582	3,380	6,790	5.67	59,400	837	5,356	11,200	2.21	87,900	-4.7***
Impaired Loans	1098	10.81	13.03	0.00	72.19	500	12.30	14.33	0.08	72.19	-1.98**
Inefficiency	1397	55.38	31.27	8.72	208.73	716	62.76	36.75	8.72	208.73	-4.6***
Capital	1582	13.46	10.90	0.58	61.66	837	13.57	11.04	0.58	61.66	-0.25
<i>Other Country Level Heterogeneities</i>											
Inflation	110	7.08	8.54	-24.3	29.02	114	8.55	11.93	-30.1	54.18	-1.06
HHI	110	21.94	14.57	6.19	86.17	114	27.99	13.89	9.51	58.69	-3.2***
Domestic Interest Rate	104	6.08	3.80	0.94	25.74	113	9.90	12.13	1.63	78.43	-3.2***
Per Capita	110	25,169	24,434	932	74,164	114	5,736	5,543	1,513	20,565	8.14***
Per Capita Growth	110	1.62	4.27	-11.99	14.18	114	1.94	3.14	-7.04	15.73	-0.63

† T-Stat. of mean equality test. \*\*\*, \*\* and \* indicate significance at 1%, 5% and 10% respectively. See Table AI for variable definitions.

Table II. Financial Intermediation Analysis

This table illustrates the estimation of the Equation (1), using bank deposits on GDP ratio (*Bank Deposit*), the annual growth rate of private credit (*Private Credit Growth*) and the ratio of private credit to new business registration (*Private Credit per New Business*) as the dependent variable. We employ the fixed effect technique for our estimation.

We split our sample into two groups on the basis of the median value of the share of Muslims in country's population. Countries below the median value of Muslims share in total population are classified in one group (*Low Muslim Countries*) and the rest in the other group called *High Muslim Countries*. The median value of Muslims share in population is 95%. The results for *Low Muslim Countries* are presented in columns (1) to (3), whereas columns (4) to (6) display our analysis for *High Muslim Countries*.

We regress our dependent variables, i.e. *Bank Deposit*, *Private Credit Growth* and *Private Credit per New Business*, on our variable of interest, i.e. *ISB Share* and control variables (*ISW Share*, *Foreign Banks Share*, *State Banks Share*, *Inflation* and *Trend*). In columns (1) and (4) we use *Bank Deposit* as the dependent variable. Columns (2) and (5) present our analysis when we use *Private Credit Growth* in our analysis in lieu of *Bank Deposit*. Finally, *Private Credit per New Business* is used as the dependent variable in columns (3) and (6).

Variables	Low Muslim Countries			High Muslim Countries		
	Bank Deposit	Private Credit Growth	Private Credit Per New Business	Bank Deposit	Private Credit Growth	Private Credit Per New Business
	(1)	(2)	(3)	(4)	(5)	(6)
ISB Share ( $\alpha_1$ )	0.043 (0.24)	0.190 (1.14)	0.148** (5.17)	0.148*** (3.43)	0.671** (2.79)	0.389*** (5.10)
ISW Share ( $\alpha_2$ )	0.187 (0.58)	0.060 (0.40)	0.122** (4.65)	0.247*** (5.46)	0.211 (0.65)	0.530** (2.91)
Foreign Banks Share ( $\alpha_3$ )	-0.312*** (-3.49)	-0.060 (-0.43)	0.139 (1.27)	-0.037 (-0.78)	0.158 (1.16)	-0.067 (-1.19)
State Banks Share ( $\alpha_4$ )	-0.281* (-2.23)	0.012 (0.16)	-0.062 (-2.03)	-0.065 (-1.53)	0.361** (2.77)	0.007 (0.16)
Inflation ( $\alpha_5$ )	-0.670*** (-3.54)	0.072 (0.26)	-0.054 (-0.65)	-0.101 (-1.27)	0.009 (0.02)	0.056* (2.30)
Trend ( $\alpha_6$ )	0.809 (0.95)	1.515 (1.88)	0.344 (2.64)	1.250*** (7.22)	0.853 (1.56)	0.265* (2.14)
Constant ( $\alpha_0$ )	73.461*** (6.19)	0.363 (0.05)	-6.581 (-2.24)	25.681*** (12.45)	-9.490 (-0.76)	-3.551 (-0.91)
Observations	82	61	17	109	92	36
R-squared	0.322	0.181	0.489	0.639	0.109	0.715
Number of Country	10	8	3	11	11	6

Robust z-statistics are reported in parentheses. \*\*\*, \*\* and \* indicate significance at 1%, 5% and 10% respectively. See Table A2 for variable definitions.

Table III. Real Economy Analysis

This table illustrates the estimation of the Equation (1), using the annual growth rate of gross national income per capita calculated based on Atlas method (*Economic Growth*) and the value added of the industrial sector to GDP ratio (*Industry Value Added*) as the dependent variable. We employ the fixed effect technique for our estimation.

We split our sample into two groups on the basis of the median value of the share of Muslims in country's population. Countries below the median value of Muslims share in total population are classified in one group (*Low Muslim Countries*) and the rest in the other group called *High Muslim Countries*. The median value of Muslims share in population is 95%. The results for *Low Muslim Countries* are presented in columns (1) and (2), whereas columns (3) and (4) display our analysis for *High Muslim Countries*.

We regress our dependent variables, i.e. *Economic Growth* and *Industry Value Added*, on our variable of interest, i.e. *ISB Share* and control variables (*ISW Share*, *Foreign Bank Share*, *State Bank Share*, *Inflation* and *Trend*). In columns (1) and (3) we use *Economic Growth* as the dependent variable. Columns (2) and (4) present our analysis when we use *Industry Value Added* in our analysis in lieu of *Economic Growth*.

Variables	Low Muslim Countries		High Muslim Countries	
	Economic Growth	Industry Value Added	Economic Growth	Industry Value Added
	(1)	(2)	(3)	(4)
ISB Share ( $\alpha_1$ )	0.356*** (4.07)	0.008 (0.10)	-0.078 (-0.83)	-0.009 (-0.08)
ISW Share ( $\alpha_2$ )	0.241 (1.78)	0.064 (1.02)	-0.182 (-1.63)	-0.144 (-1.40)
Foreign Banks Share ( $\alpha_3$ )	0.012 (0.16)	0.077 (1.59)	0.065 (0.82)	-0.019 (-0.37)
State Banks Share ( $\alpha_4$ )	-0.146** (-2.87)	0.031 (0.83)	0.052 (0.59)	-0.059 (-0.92)
Inflation ( $\alpha_5$ )	0.293** (2.96)	0.156*** (6.74)	0.197 (1.06)	0.138** (2.98)
Trend ( $\alpha_6$ )	-0.124 (-0.23)	0.176 (0.73)	1.071*** (3.44)	0.230 (0.96)
Constant ( $\alpha_0$ )	-3.796 (-0.98)	35.131*** (14.02)	1.719 (0.39)	35.326*** (20.64)
Observations	91	84	103	110
R-squared	0.364	0.375	0.176	0.312
Number of Country	11	9	11	10

Robust z-statistics are reported in parentheses. \*\*\*, \*\* and \* indicate significance at 1%, 5% and 10% respectively. See Table A2 for variable definitions.

Table IV. Income Inequality and Poverty Alleviation Analysis – Low Muslims vs. High Muslims Countries

This table illustrates the estimation of the Equation (1), using 1) Gini index (*Gini*), 2) the share of people with less than \$1.25 a day based on purchasing power parity (PPP) in total population (*Poverty Ratio International*), 3) the share of people below national poverty line in total population (*Poverty Ratio National*), 4) the intensity of poverty of people who live with less than \$1.25 (*Poverty Gap*) and 5) the share of people live below the rural poverty line in total population of rural area (*Poverty Ratio Rural*) as the dependent variable. We employ the fixed effect technique for our estimation.

We split our sample into two groups on the basis of the median value of the share of Muslims in country's population. Countries below the median value of Muslims share in total population are classified in one group (*Low Muslim Countries*) and the rest in the other group called *High Muslim Countries*. The median value of Muslims share in population is 95%. The results for *Low Muslim Countries* are presented in columns (1) to (5), whereas columns (6) to (10) display our analysis for *High Muslim Countries*.

We regress our dependent variables, i.e. *Gini*, *Poverty Ratio International*, *Poverty Ratio National*, *Poverty Gap International* and *Poverty Ratio Rural*, on our variable of interest, i.e. *ISB Share* and control variables (*ISW Share*, *Foreign Bank Share*, *State Bank Share*, *Inflation* and *Trend*). In columns (1) and (6) we use *Gini* as the dependent variable. Columns (2) and (7) present our analysis when we use *Poverty Ratio International* in our analysis. *Poverty Ratio National* is employed as the dependent variable in columns (3) and (8). In columns (4) and (9), *Poverty Gap International* is used as the dependent variable. Finally, in columns (5) and (10), we use *Poverty Ratio Rural* as the dependent variable in our analysis.

Variables	Low Muslim Countries					High Muslim Countries				
	Gini	Poverty Ratio International	Poverty Ratio National	Poverty Gap	Poverty Ratio Rural	Gini	Poverty Ratio International	Poverty Ratio National	Poverty Gap	Poverty Ratio Rural
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ISB Share ( $\alpha_1$ )	-1.311*** (-17.33)	0.360 (0.55)	0.414 (0.80)	0.112 (0.48)	0.428 (0.79)	-0.169** (-2.84)	-0.413*** (-5.00)	-0.329** (-2.62)	-0.126*** (-4.00)	-0.334 (-1.65)
ISW Share ( $\alpha_2$ )	-0.798*** (-13.93)	0.197 (0.44)	0.247 (0.59)	0.088 (0.58)	0.224 (0.48)	-0.257* (-2.25)	-0.543*** (-3.54)	-0.426 (-1.60)	-0.176*** (-3.38)	-0.737 (-1.06)
Foreign Banks Share ( $\alpha_3$ )	-0.571*** (-16.15)	-0.008 (-0.02)	0.188 (0.60)	0.049 (0.33)	0.248 (0.72)	0.006 (0.12)	-0.079 (-0.93)	0.195** (2.72)	-0.023 (-0.78)	-0.135 (-0.41)
State Banks Share ( $\alpha_4$ )	0.096*** (7.64)	-0.069 (-0.44)	0.073 (0.57)	0.007 (0.12)	0.043 (0.32)	0.035 (0.43)	-0.042 (-0.33)	0.294*** (3.59)	-0.006 (-0.13)	0.303 (1.29)
Inflation ( $\alpha_5$ )	0.617*** (37.83)	0.052 (0.10)	0.063 (0.27)	0.045 (0.26)	0.028 (0.09)	0.002 (0.03)	-0.130 (-1.78)	0.027 (0.29)	-0.044 (-1.84)	-0.049 (-0.28)
Trend ( $\alpha_6$ )	2.494*** (31.70)	-1.612* (-2.45)	-0.805* (-2.45)	-0.568* (-2.25)	-0.919* (-2.66)	-0.410 (-1.86)	-1.032** (-3.23)	-1.503*** (-3.86)	-0.301** (-2.76)	0.083 (0.08)
Constant ( $\alpha_0$ )	72.140*** (22.14)	22.923 (0.91)	7.721 (0.37)	3.583 (0.41)	11.882 (0.53)	45.529*** (8.87)	35.373*** (4.30)	38.007*** (3.70)	10.240*** (3.63)	54.668* (2.24)
Observations	13	16	17	16	17	25	25	23	25	19
R-squared	0.997	0.579	0.442	0.514	0.450	0.531	0.684	0.855	0.684	0.531
Number of Country	6	5	4	5	4	9	9	8	9	7

Robust z-statistics are reported in parentheses. \*\*\*, \*\* and \* indicate significance at 1%, 5% and 10% respectively. See Table A2 for variable definitions.

Table V. Credit Risk Analysis

This table presents the estimation of Equation (2), using the ratio of impaired loans on gross loans as the proxy for credit risk (*Credit Risk*). We apply fixed effect technique for our estimation.

We split our sample into two groups on the basis of the median value of the share of Muslims in country's population. Countries below the median value of Muslims share in total population are classified in one group (*Low Muslim Countries*) and the rest in the other group called *High Muslim Countries*. The median value of Muslims share in population is 95%. The results for *Low Muslim Countries* are presented in columns (1) to (3), whereas columns (4) to (6) display our analysis for *High Muslim Countries*.

We regress *Impaired Loans* as the proxy for *Credit Risk* on our variable of interest, i.e. *ISB Share*, and control variables (*ISW Share*, *HHI*, *Domestic Interest Rate*, *Per Capita*, *Per Capita Growth*, *Capital*, *Size* and year dummies). In the first column we regress *Impaired Loans* on *ISB Share*, while controlling for *ISW Share* and year dummies. In column (2), we include *HHI*, *Domestic Interest Rate*, *Per Capita* and *Per Capita Growth* in our model. Column (3) illustrates the result when we add *Capital* and *Size* to our model. Columns (4) to (6) depict the result when we use *High Muslim Countries* sub-sample.

Variables	Low Muslim Countries			High Muslim Countries		
	(7)	(8)	(9)	(10)	(11)	(12)
ISB Share ( $\beta_1$ )	-0.149 (-1.56)	-0.299** (-2.00)	-0.306** (-2.19)	-0.267 (-1.65)	-0.202 (-1.02)	-0.216 (-1.15)
ISW Share ( $\beta_2$ )	-0.051 (-0.72)	-0.115 (-1.04)	-0.131 (-1.32)	-0.031 (-0.24)	0.049 (0.31)	0.032 (0.22)
HHI ( $\beta_3$ )		-0.070 (-0.39)	-0.020 (-0.13)		-0.254 (-1.42)	-0.267 (-1.42)
Domestic Interest Rate ( $\beta_4$ )		0.473*** (2.68)	0.484*** (2.63)		-0.119 (-0.77)	-0.139 (-0.92)
Per Capita ( $\beta_5$ )		0.415 (1.32)	0.469 (1.65)		-5.250* (-1.78)	-5.108* (-1.93)
Per Capita Growth ( $\beta_6$ )		0.209 (1.25)	0.194 (1.15)		0.131 (1.22)	0.114 (1.06)
Capital ( $\beta_7$ )			-0.122* (-1.88)			0.055 (0.29)
Size ( $\beta_8$ )			-0.084 (-0.16)			-0.921 (-0.72)
Constant ( $\beta_0$ )	14,044*** (9.32)	4,928 (1.15)	6,457 (0.82)	13,923*** (7.53)	52,226** (2.57)	64,758** (2.34)
Observations	911	911	911	421	421	421
R-squared	0.110	0.134	0.142	0.094	0.137	0.146
Number of Bank	184	184	184	92	92	92

Robust z-statistics are reported in parentheses. \*\*\*, \*\* and \* indicate significance at 1%, 5% and 10% respectively. See Table A2 for variable definitions.

Table VI. Cost Inefficiency Analysis

This table presents the estimation of Equation (2), using the ratio of total noninterest expense on total operating income (*Inefficiency*) as the proxy for cost inefficiency. We apply fixed effect technique for our estimation.

We split our sample into two groups on the basis of the median value of the share of Muslims in country's population. Countries below the median value of Muslims share in total population are classified in one group (*Low Muslim Countries*) and the rest in the other group called *High Muslim Countries*. The median value of Muslims share in population is 95%. The results for *Low Muslim Countries* are presented in columns (1) to (3), whereas columns (4) to (6) display our analysis for *High Muslim Countries*.

We regress *Cost Inefficiency* on our variable of interest, i.e. *ISB Share*, and control variables (*ISW Share*, *HHI*, *Domestic Interest Rate*, *Per Capita*, *Per Capita Growth*, *Capital*, *Size* and year dummies). In the first column we regress *Cost Inefficiency* on *ISB Share*, while controlling for *ISW Share* and year dummies. In column (2), we include *HHI*, *Domestic Interest Rate*, *Per Capita* and *Per Capita Growth* in our model. Column (3) illustrates the result when we add *Capital* and *Size* to our model. Columns (4) to (6) depict the result when we use *High Muslim Countries* sub-sample. Year dummies are included by not reported in the table. All the right-hand-side variables are lagged for one period.

Variables	Low Muslim Countries			High Muslim Countries		
	(1)	(2)	(3)	(4)	(5)	(6)
ISB Share ( $\beta_1$ )	-0.224** (-2.01)	-0.315* (-1.93)	-0.318* (-1.92)	-0.142 (-1.20)	-0.156 (-1.31)	-0.159 (-1.24)
ISW Share ( $\beta_2$ )	-0.150 (-1.48)	-0.218 (-1.61)	-0.211 (-1.57)	0.262 (1.12)	0.299 (1.26)	0.300 (1.29)
HHI ( $\beta_3$ )		0.286 (1.34)	0.261 (1.13)		-0.404** (-2.59)	-0.352* (-1.97)
Domestic Interest Rate ( $\beta_4$ )		-0.665** (-2.14)	-0.670** (-2.10)		0.040 (0.27)	-0.017 (-0.10)
Per Capita ( $\beta_5$ )		0.783** (2.40)	0.792** (2.47)		-7.023 (-1.62)	-7.289* (-1.70)
Per Capita Growth ( $\beta_6$ )		-0.606** (-2.41)	-0.605** (-2.39)		0.810*** (2.88)	0.748*** (2.81)
Capital ( $\beta_7$ )			0.086 (0.92)			0.217 (1.06)
Size ( $\beta_8$ )			0.156 (0.21)			-1.408 (-1.06)
Constant ( $\beta_0$ )	56.555*** (20.99)	54.360*** (13.94)	51.426*** (4.34)	66.281*** (22.10)	108.908*** (4.51)	126.102*** (3.86)
Observations	1,151	1,151	1,151	576	576	576
R-squared	0.027	0.039	0.040	0.117	0.163	0.179
Number of Bank	207	207	207	115	115	115

Robust z-statistics are reported in parentheses. \*\*\*, \*\* and \* indicate significance at 1%, 5% and 10% respectively. See Table A2 for variable definitions.