Do Islamic Banks Contribute to Risk Sharing?

Thorsten Beck, Zamir Iqbal, Rasim Mutlu[1]

Draft: March 03, 2016

Abstract: Theory suggests that Islamic banks which operate on profit and loss sharing financial contracts rather than debt contracts might facilitate better inter-temporal risk sharing. We utilize the consumption smoothing parameter as our risk sharing proxy since better risk sharing should enable agents to diversify against income shocks and smooth their consumption. Using two different data sources for Islamic banks as well as different balance-sheet based measures of the systemic importance of Islamic banks, we do not find a significant relationship between risk sharing in the financial system and contribution of Islamic banks. However, we find some evidence that select financial instruments operating on profit-loss sharing principles are associated with better inter-temporal risk sharing. One explanation for the results is that Islamic banks are actually not practicing true risk-sharing finance and therefore, are not contributing to systemic level risk-sharing. Islamic banks' avoidance of risk-sharing prompts for development of financial systems which are conducive to risk-sharing and provide enabling environment for risk-sharing.

Keywords: Risk Sharing, Consumption Smoothing, Islamic banking, Financial Sector

---

1. Introduction

Across the globe, Islamic banks, also known as participation or Shariah-compliant banks have in recent years experienced faster growth rates than the conventional banks.[2] In 2013, the Islamic banks, on aggregate, grew by 16% worldwide while the total assets of the biggest 1000 global banks during the same period grew by a meager 0.6% on year on year basis (IFSB 2015). Total assets of Islamic banks worldwide have reached the size of 1.48 trillion USD as of first half of 2014 and Islamic banks have become systematically important in various countries such as Islamic Republic of Iran, Pakistan, Malaysia, Kingdom of Saudi Arabia and Sudan. Growth of Islamic banks has not been confined to countries where the majority of population is Muslim, but also in many Western countries such as UK, and Germany where fully fledge Islamic banks or Islamic windows are offering Shariah-compliant products and services.[3]

The basic features that distinguish Islamic banks from conventional banks are the (i) risk-sharing and asset-based financial instruments on both sides of the balance sheet as opposed to debt-based risk-transfer financial intermediation; (ii) materiality or preference for financing of real economic transactions; and (iii) avoidance of activities with excessive uncertainty such as short selling or trading of financial derivatives.[4] Due to these features, in theory, Islamic banks would pose less systemic risk in the financial sector. Islamic banks can also help increase financial inclusion by offering financial products that comply with the religious beliefs of a certain segment of population which are underbanked. In addition, *sukuk* (Islamic bonds) have been used as an alternative source for market-based financing to meet the growing demand for long term financing such of infrastructure projects (World Bank, 2015).

In this paper, we focus on the profit-loss sharing (risk sharing) aspect of Islamic banks and gauge whether a more prominent role of Islamic banks in a country's banking system is associated with higher inter-temporal risk sharing and consumption smoothing. Lack of enough risk sharing in the financial system and heavy reliance on debt-like financial instruments have been argued to be one of the main contributors to the reoccurring financial crisis during past eight centuries (Reinhart and Rogoff, 2008). Shiller (2009), asserts that a system that enables

---

[2] We opt to use Islamic Banking instead of Islamic Banking in order to emphasize its main distinct operational principal of profit-loss sharing rather than its religious background.

[3] Islamic Window is called a department of a conventional bank offering Islamic financial services

[4] Iqbal and Mirakhor (2011)

better risk sharing offers a more stable economic environment and enhances the welfare of the societies. The vitality of risk sharing in creating a more stable and efficient financial system is also stressed by the Global Chief Economist of Citigroup William Buiter: '*academic literature, which stressed debt's main advantage as allowing a quiet life for creditors (i.e., no need for costly, ex-post monitoring of borrowers by risk and return-sharing investors), probably contributed to the relaxed attitude many lenders and analysts took toward the serious risks that excessive debt entails*'.[5]

Theory suggests that Islamic banks can play an important role in strengthening inter-temporal risk-sharing, given their focus on profit and loss sharing based intermediation rather than deposits with fixed pre-determined payoffs. Well-functioning financial markets (both conventional and Islamic banks) should increase the risk sharing opportunities of the individuals through borrowing and lending. Individuals who have savings could invest these through financial intermediaries and accumulate wealth that they could use as buffer against future risks, while households and firms who are in the need of credit could borrow from financial intermediaries to smooth their consumption and weather the effects of negative income shocks. Thus, higher risk sharing should enable agents to diversify against shocks to their income stream which in turn would decrease the correlation between changes to their income and consumption. In this paper we address the question whether Islamic banks are better positioned to support this inter-temporal risk sharing than conventional banks.

We relate the systemic importance of Islamic banks to the degree of consumption smoothing in an economy. Specifically, we regress changes in consumption on changes in income and use the consumption smoothing parameter as our proxy for risk sharing in a country. Using two different sources, Bankscope and Islamic Banks Information System (hereafter IBIS), to construct measures of the importance of Islamic banks we test whether their importance in a country is indeed related to more inter-temporal risk sharing, as proxied by consumption volatility. To our best knowledge, this is the first study that empirically tests this relationship. We use different balance-sheet based measure of the significance of Islamic banks, the importance of specific products offered by these banks and different econometric methodologies to test our hypothesis.

---

[5] http://willembuiter.com/if.pdf

This paper is related to a growing literature on Islamic finance. Beck et al. (2013) find in a large cross-country sample that Islamic banks are less cost-effective, but have higher intermediation ratios, higher asset quality and are better capitalized, which also explains their better performance during the recent crisis. Similarly, Abedifar et al.(2013) find evidence that Islamic banks have lower credit risk and are more stable than conventional banks and their loan quality is less responsive to domestic interest rate shocks (see also Čihák and Hesse (2010), Pappas, Izzeldin, Fuertes and Ongena (2013), among others). On the country level, Baele et al. (2014) find lower defaults for Islamic than for conventional loans even among the same borrower and same bank in Pakistan, while Zaheer, Ongena and Wijnbergen (2013) show that since Islamic banks' operations are under interest free arrangements, the credit channel of monetary policy might weaken as the size of Islamic banks in a financial sector increases. Using data from Turkey Ongena and Şendeniz-Yüncü (2011) find that Islamic banks mainly deal with young, multiple-bank, industry-focused and transparent firms, while Beck et al. (2015) find that customers of Islamic banks are more willing to deal with bank branches farther away from their enterprise, suggesting that distance plays less of a role for these borrowers.

Our paper is also related to the literature on income smoothing. While the permanent income hypothesis states that consumption is determined by permanent income and not by transitory changes to income, empirical work shows that consumption varies with output in an economy. Theory points to a positive impact of household credit on relaxing liquidity constraints on households, thus resulting in lower excess sensitivity of household consumption to business cycle variations (Jappelli and Pagano, 1989; Bacchetta and Gerlach, 1997; Ludvigson, 1999). On a more aggregate level, some studies suggest that a more developed financial system is associated with reduced growth volatility (Easterly et al., 2000; Denizer et al., 2002; Raddatz, 2006), while others find no robust relationship between these variables (Beck et al., 2006).

Our results do not provide clear evidence of a significant contribution of Islamic banks in inter-temporal risk sharing. Overall, there is at best elusive and insignificant contribution from Islamic banks towards risk sharing. However, when we dig deeper and analyze the composition of Islamic banks financing, we observe that *mudarabah* investment accounts on the liabilities side that operate according to profit-loss sharing principles have a stronger relationship with inter-temporal risk sharing. Our results suggest that Islamic banks which in their current state tend to use financing modes that are basically following replication of conventional fixed income financial

products ought to put more emphasis on developing the financing modes that are more suitable to the principles of risk sharing in order to contribute to risk sharing in a more solid manner. We are not not surprised by the findings as their contribution to risk-sharing is not expected if they are not practicing risk-sharing finance in its true sense. Islamic banks shy away from risk-sharing finance due to prevailing financial sector with legal and regulatory environment which is less supportive of risk-sharing finance. This is particularly the case in majority of Muslim countries where financial sector is under-developed and financial infrastructure does not exist to promote risk-sharing finance. The paper concluded that policy-makers need to pay attention to the development of financial sectors to enable risk-sharing in order to fully benefit from features of Islamic finance.

The remainder of paper is organized as following. Section 2 provides a brief description of the nature and intermediation model of Islamic banks and the risk-sharing concept. Section 3 provides details about the data and the econometric methodology, while Section 4 presents the results. Section 5 provides policy recommendations.

2. Risk Sharing and Islamic Financial Intermediation

The core principle of Islamic finance[6] is risk sharing among the investors and the users of funds that stipulates that both share the outcome of the business or asset being financed —whether positive or negative.[7] Unconditional prohibition of interest in any form by Islamic Law eliminates unsecured debt from the financial system. Instead, preference is given to asset-backed and equity or participatory finance, as well as financing of trading and exchange activities.

Encouraging financial instruments that promote risk sharing and asset-backed financing could help deleverage financial systems and make them more stable and resilient to economic shocks. A financial system based on asset-backed financing would encourage real transactions and growth in real sector. A financial system based on risk-sharing principles would smooth out the boom-bust cycles in the economy, creating a more just and equitable society, since such system the distribution of profit and loss would be determined according to the risks each agent bear.[8]

An economic system based fully on the principle of risk-sharing mitigates the negative effects of recessions on certain investors, while enabling the returns during high-growth episodes to be distributed in a more equitable manner. Hence the risk-sharing principle not only can help create

---

[6] For further details of risk-sharing aspects of Islamic finance, See Askari, Iqbal, Krichene, and Mirakhor (2010).
[7] Arrow (1971, 121–33, 143, 239–66) demonstrated that in a competitive market economy, in which markets are complete and Arrow securities whose pay offs are State-contingent are available, it would be Pareto optimal for the economy if its members were to share risk according to each participant's ability to bear risk (Askari and Mirakhor 2014).
[8] See Askari, Iqbal, and Mirakhor (2012) - Stability

smoother business cycles but can also enhance a more sound and equitable pattern of income distribution in a society.

Financial systems are crucial for the efficient allocation of resources in a modern economy (see Levine, 2005, for an extensive discussion of the theoretical and empirical literature). Financial intermediaries not only channel resources from capital surplus agents (generally households) to capital-deficit ones (businesses) but also allow intertemporal smoothing of households' consumption and businesses' expenditures, enabling both firms and households to share risks.

Although both Islamic and commercial banks are financial institutions performing the basic intermediation described above, in principle they operate under different set of rules.[9] The core pillars on which Islamic banks operations are structured could be summarized as following (Iqbal and Mirakhor 2011):

- *Prohibition of interest, and debt.* Pre-determined *ex ante* return is replaced by payoffs dependent *ex post* returns.

- *Risk sharing:* because interest is prohibited, suppliers of funds become investors instead of creditors. The provider of financial capital and the entrepreneur share risks in return for a share of the profits.

- *Asset based/backed transactions:* money is treated as "potential" capital and there is close linkages and materiality between the financing and underlying real economic activity.

- *Prohibition of speculative behavior* discourages hoarding and prohibits transactions featuring extreme uncertainties, gambling, and excessive risks.

In the conventional banking system, which is based on debt contracts, risks and rewards are shared asymmetrically, with the debtor bearing both the upside and downside risk while lenders' stake being limited to the debt payment. Debt contracts are used to overcome the problem of asymmetric information, requiring careful screening and close monitoring, which can be delegated to an institution acting on behalf of the collectivity of depositors and investors. Banks thus act as delegated monitor on behalf of depositors.

---

[9] For historical developments and further details on intermediation models, see Iqbal and Mirakhor (2011)

For Islamic financial institutions, the nature of financial intermediation, including the function of banking, is different from that of conventional financial institutions. This difference is the key to understanding the difference in the nature of conventional and Islamic banking. The basic concept is that both the mobilization and (in theory) the use of funds are based on some form of profit sharing among the depositors, the bank, and the entrepreneurs (users of funds). A typical Islamic bank performs the functions of financial intermediation by screening profitable projects and monitoring the performance of projects on behalf of the investors who deposit their funds with the bank.

Table 1-a presents a stylized balance sheet of an Islamic bank, displaying different activities and financial instruments. It serves as a good starting point for understanding the dynamics of the risks inherent in Islamic banks.

Table 1-a: Stylized Balance Sheets of Islamic and Conventional Banks

Islamic Banks		Conventional Banks	
Assets	*Liabilities*	*Assets*	*Liabilities*
Trade Financing, Commodity financing, Leases, *Mudarabah* Financing	Investments By Depositors	Loans (Consumer, Corporate)	Deposits
Securities Investment		Securities Investments	
Fees	Capital	Fees	Capital
Main Characteristics			
- Depositors are investors rather than lenders - Risk Sharing through profit and loss sharing accounts - Assets and liabilities are matched		- Deposits are loans to the bank as debt - Assets invested in fixed income securities and loans - Bank has fixed obligations on deposits but uncertainty on asset returns	

| Banks cannot create leverage | Bank is exposed to asset and liabilities mismatch |
| Financing of real assets | Banks can create leverage through borrowing |

Source: Iqbal and van Gruening (2007), Askari, Iqbal, and Mirakhor (2012)

The liabilities side of the balance sheet is based on the "two-window" theoretical model of an Islamic bank. In addition to equity capital, this model divides the "liability" or funding side of the bank balance sheet into two deposit windows, one for demand deposits (current account) and the other for investment or special investment accounts. The choice of window is left to the depositors. Unlike conventional commercial banking, the investment accounts of an Islamic bank are not liabilities in a strict sense because depositors in a conventional bank create immediate claims on the bank, whereas investors-depositors in Islamic banks are like partners.

Money deposited in investment accounts, in contrast, is placed with the depositors' full knowledge that their deposits will be invested in risk-bearing projects; no guarantee is needed or justified. Investment account holders are investors or depositors who enter into a *mudarabah* contract with the bank, where investors act as the supplier of funds (*rab al-mal*) to be invested by the bank on their behalf, as the agent (*mudarib*). The investors share in the profits accruing to the bank's investments on the assets side. Therefore, such profit-sharing investment deposits are not liabilities. Investors' capital is not guaranteed, and they incur losses if the bank does; the form is closer to that of a limited term, non-voting equity or a trust arrangement. Some Islamic banks also offer special investment accounts developed on the basis of a special-purpose or restricted *mudarabah* or on profit and loss sharing (*musharakah*). These special investment accounts, which are similar to close-end mutual funds, are highly customized and targeted toward high-net-worth individuals.

ADD RISK SHARING

In the following we will discuss first different forms of financing undertaken by Islamic banks (asset side) and then different forms of funding of Islamic banks (liability side)

2.1. Financing Instruments

Islamic banks primarily finance obligations arising from the trade and sale of commodities or property. Financing instruments also include instruments generating rental cash flows against

exchange of rights to use the assets such as *ijarah* and *istisnah*. Financing instruments are closely linked to a sale contract and therefore are collateralized by the product being financed. These instruments are the basis of short-term assets for the Islamic banks.

Murabahah, a cost-plus sales contract, is one of the most popular contracts for purchasing commodities and other products on credit. The concept is that a financier purchases a product— that is, a commodity, raw materials, and so forth—for an entrepreneur who does not have his or her own capital to do so. The financier and the entrepreneur agree on a profit margin, often referred to as markup, which is added to the cost of the product. The payment is delayed for a specified period of time during which the entrepreneur produces the final product and sells it in the market. *Murabahah* was originally a sales transaction in which a trader would purchase a product and then sell it to the end user at a price calculated using an agreed profit margin over the costs incurred by the trader. Today, banks have taken over the trader's role of financier.

Bay al-muajjil, or sale with deferred payment, allows the sale of a product on the basis of a deferred payment in installments or a lump sum. The price of the product is agreed upon by the buyer and the seller at the time of the sale and cannot include any charges for deferring payments. *Bay' al-salaam*, or purchase with deferred delivery, is similar to conventional forward contracts in terms of function but is different in terms of the payment arrangements. In the case of *bay' al-salaam*, the buyer pays the seller the full negotiated price of a specific product that the seller promises to deliver at a specified future date. The main difference between *bay' al-salaam* and a conventional forward contract is that the full negotiated price is payable at the time of the contract, as opposed to the latter, where the full payment is not due in advance. This forward sale benefits both the seller and the buyer. The seller gets cash to invest in the production process, and the buyer eliminates uncertainty in the future price.

An *ijarah* contract, comparable to a conventional lease, gives something in return for rent. Technically, it is a contract of sale, but it is not the sale of a tangible asset; rather, it is a sale of the usufruct (right to use the object) for a specified period of time. The word *ijarah* conveys the sense of both hire and lease. In general, it refers to the lease of tangible assets such as property and merchandise, but it also denotes the hiring of personal services for a fee. Compared with the conventional form of financing, which is generally in the form of a debt, leasing provides financing in relation to a particular asset. In a sense, it combines financing and collateral, because the

ownership of the asset serves as collateral and security against any future loss. An *istisnah* contract facilitates the manufacture or construction of an asset at the request of the buyer. Once the manufacturer undertakes to manufacture the asset or property for the buyer, the transaction of *istisnah* comes into existence. Both parties—namely, the buyer and the manufacturer— agree on a price and on the specification of the asset to be manufactured. At the time of delivery, if the asset does not conform to the specifications, the party placing the order has the right to retract the contract.

2.2. Investment Instruments

Investing instruments are vehicles for capital investment in the form of a partnership. There are two types of investing instruments: fund management (*mudarabah*) and equity partnerships (*musharakah*). *Mudarabah*, which can be short, medium, or long term, is a trust-based financing agreement whereby an investor entrusts capital to an agent to undertake a project. Profits are based on a prearranged, agreed ratio. A *mudarabah* agreement is akin to a Western-style limited partnership in which one party contributes capital, while the other runs the business; profit is distributed based on a negotiated percentage of ownership. The investor bears the loss, but the agent does not share in any financial loss unless there is evidence of misconduct or negligence. Mudarabah is used on both the liabilities and the assets side. Musharakah, which can be either medium or long term, is a hybrid of *shiraka* (partnership) and *mudarabah*, combining the act of investment and management. In the absence of debt security, the Shariah encourages this form of financing. The Shariah is fairly comprehensive in defining different types of partnerships, in identifying the rights and obligations of the partners, and in stipulating the rules governing the sharing of profits and losses. *Musharakah* is a form of partnership in which two or more persons combine either their capital or their labor, share the profits and losses, and have similar rights and liabilities. Within *musharakah* there are further sub-classifications of partnerships with respect to the level of the partners' authority and obligations and the type of his or her contribution, such as management skills or goodwill.

3. Data and Methodology

This section introduces the different data sources and variables we use and presents our methodology. Table A2 provides an overview of the different data sources we use. Table 1 presents descriptive statistics for Islamic banks and Table 2 presents correlation coefficients.

3.1. Data

Only two countries—Islamic Republic of Iran and Sudan have banking system fully following Islamic banking principles. While the rest of the countries, Islamic banks operate parallel to conventional banks. In order to observe any meaningful impact of Islamic banks on risk-sharing, we use the significance of Islamic banks in a country through their share in the financial system as a proxy. Countries with sizeable presence of Islamic banks are expected to make contribution to risk-sharing. We use two different sources, Bankscope and IBIS, to construct measures of the significance of Islamic banks in a country's banking system. The two databases have their strength and weaknesses, and by conducting our analysis using both data sources we aim at both doing a robustness check to see whether our results are sensitive to the data source we use and, second, to combine the relative strengths of each data set. Although Bankscope is comprehensive in terms of coverage and reliability of data for Islamic banks, it is not an exhaustive representation of the overall size of Islamic banks since Bankscope does not include Islamic windows and in order to standardize balance sheets of commercial and Islamic banks some accounts are included within unclear category of the balance sheet. Furthermore, the classification of Islamic banks according to Bankscope is problematic, since due to their nature some of the Islamic banks are treated as investment banks. On the other hand IBIS data for Islamic banks is collected from the respective central banks of the jurisdictions the banks are located. IBIS database enables us to analyze the product composition of Islamic banks and to perform a robustness check using aggregate variables. As can be seen in the correlation Table 2, there is a high but not perfect correlation in the importance of Islamic banks across the two data sources for the countries for which we have data from both. Finally, the country coverage using these two databases does not completely overlap, which provides us with another sensitivity test.

We use annual data for the period from 1990 to 2011. Our sample consists of 31 and 32 countries depending on whether we use Bankscope or IBIS data source, respectively. The list of countries in Bankscope and IBIS database is provided in Table A3. As one can see, some countries are included only in Bankscope while some countries are peculiar to IBIS database, which reflects the difficulty in identifying which bank is actually a Islamic bank or commercial bank. As can be seen in Table 1, the share of Islamic banks' total assets (loans) as a share of GDP ranges from 7.52-06 (.0000239) to 1.301(.537) in IBIS database and from 0.000037 (.00001) to .879(.474) in Bankscope database.

In order to single out the contribution of Islamic banks to risk sharing, we include several proxies for other factors that theory predicts might be associated with better risk sharing. Specifically, we utilize the Chin-Ito financial openness index to capture the effects of international risk sharing. [10] In quantifying the contribution of welfare state on risk sharing, we choose to use the ratio of overall government expenditures over GDP.[11] Finally, we use several proxies such as domestic credit to private sector, stock market turnover and traded value, and gross savings in order to capture the contribution of financial markets to risk sharing and thus isolate the effect of Islamic banks beyond the effect of overall financial sector development. As can be seen in Table 1, there is a large cross-country variation in the control variables.

3.2. Methodology

In order to estimate the risk sharing parameter (consumption smoothing), we rely on data from the Penn World Tables.[12] In quantifying the consumption smoothing parameter, denoted as λ, we follow the basic approach of Campbell and Mankiw (1989) and estimate the following equation, using annual data from 1990 to 2011:

$$\Delta c_t = \alpha + \lambda \Delta y_t + \varepsilon_t, \qquad\qquad (1)$$

Where $\Delta c_t (\Delta y_t)$ are four year change in private consumption (real GDP). The coefficient λ measures the extent of how movements in private consumption are related to the movements in real income. Once we estimate λ coefficient, we exclude the countries for which the coefficient is not statistically significant.

Furthermore, since Δy_t might be correlated with the disturbance term ε_t we instrument Δy_t with its own lags Δy_{t-2}, Δy_{t-3} and Δy_{t-4}. We use the F-test to test the validity of the instruments and keep only the countries for which the instruments of lagged changes in income are statistically significant predictors of the current change in income. Per our logic, defined in prior sections, the

---

[10] Using sum of trade and export as the proxy for financial openness produced similar results.
[11] The main reason we opt to use general government expenditure as the proxy in measuring the strength of welfare state was to increase the number of observations in our analysis, since data for better measures of welfare state such as Coverage of social safety nets is not available for most of the countries with Islamic banking.
[12] Detailed information about each variable and the source is provided in Table A2.

higher is λ the lower is risk sharing in an economy. Hence λ coefficient becomes our proxy for the risk sharing in a country.

Since the number of countries with Islamic banking is limited, in order to increase the number of observations in our analysis, we conduct the regressions both with the λ estimated from basic OLS regression and λ estimated from Instrumental Variable (IV) regression. Overall the IV and basic OLS regressions make use of 120 (151) observations respectively and λ coefficient ranges from .0015 to 1.029 (from .0012 to 1.137) respectively (Table 1).

The correlations in Table 2 show that consumption smoothing parameter estimated by Instrumental Variable regressions is, though insignificant, negatively correlated with all two main aggregate proxies used for the strength of Islamic Banks in a jurisdiction i.e. Total Assets and Loans as percentage of GDP from both databases. On the other hand, consumption smoothing parameter is estimated via. basic OLS is positively correlated with Islamic Bank Assets as percentage of GDP from IBIS database. When we look at the product composition we see that, Mudarabah Investment Account and Qard Hasan, Istisna and Ijara assets are negatively correlated with both of the consumption smoothing estimates. The other variables used to capture the correlation of conventional financial products, welfare state and financial openness are all negatively and most of the time significantly correlated with both measures of consumption smoothing parameter.

We then use cross-country regressions where the explanatory variables are the averages of their available values for the period from 1990 to 2011, which is the same period we use to estimate the risk sharing parameter.

$$\lambda_i = aX_i + \beta PB_i + \varepsilon_{t,} \tag{2}$$

where *PB* stands for the share of Islamic banks in a country's financial system. If Islamic banks contribute to inter-temporal risk sharing more than conventional banks, then the coefficient of Islamic banking proxy should be significant and negative. It is important to note that our coefficient estimates do not imply causality, as our regressions are subject to the usual endogeneity concerns of OLS regressions, including reverse causation and omitted variable bias.

To test the sensitivity of our results, we take advantage of the additional insights panel-data analysis might provide an estimate the risk sharing parameter using a 10 year rolling-window

for the period from 1990 to 2011 using the same methodology described above (both OLS and IV). This gives us 22 risk sharing parameters for each country. For every risk sharing lambda the explanatory variables are computed as the averages of the same 10 year period that was used in estimating the risk sharing parameter.

4. Results

We present and discuss our different regression results. We present results both using total assets and total loans of Islamic banks before turning to turning to the importance of specific products.

The results in Table 3 do not show a robust and significant relationship between the importance of Islamic banking and the degree of inter- temporal risk-sharing in an economy. Here, we first look at the relationship between overall Islamic bank assets as percentage of GDP and risk sharing (λ) using cross-country regressions. The regressions in columns 1 to 4 are based on total Islamic bank assets from the IBIS database, while the regressions in columns 5 to 8 are based on the Bankscope database. As discussed above, we include Stock market total traded value to GDP and Domestic credit to GDP variables to extract the effects of conventional financial markets on risk sharing. Government expenditure as percentage of GDP and Chin-ITO financial openness index are used to capture the effect of welfare state and financial globalization on risk-sharing. The explanatory variables are the average of their respective annual values for the period from 1990 to 2011. The values of risk sharing parameter, λ, estimated by basic OLS and instrumental variable regression methods are denoted with OLS and IV, respectively. Furthermore, we add another variable, for robustness check and to increase the number of observations that includes countries without the presence of Islamic banks, taking on the value zero.

Our findings suggest that that the contribution of Islamic banks to risk sharing is at best, elusive. Even though the coefficient of Islamic bank assets is negative in all regressions, it is significant only for regression (1), (3) and (7) that have been computed using the risk sharing parameter estimated by OLS. Turning to the control variables, we find some weak evidence that higher government expenditures to GDP and higher openness is associated with higher inter-temporal risk-sharing.

The results in Table 4 confirm our previous findings for measures of loans rather than total assets of Islamic banks. Here, we substitute the total of Islamic bank assets with total of Islamic

bank loans as the proxy for the strength of Islamic banks in the financial sector in the country they are operating.

All of the eight coefficients of the Islamic bank loans over GDP have a negative sign. All of the coefficients based on IBIS database are insignificant, implying that the positive contribution from Islamic bank loans to risk sharing is negligible. Although the coefficients of participatory bank loans based on Bankscope are of a higher magnitude, only one (column 8) is significant.

The results in Table 5 provide evidence that a more prominent role for risk-sharing accounts on both assets and liability sides of Islamic banks' balance sheets is significantly associated with higher inter-temporal risk-sharing in an economy. Here, we analyze the relationship between the importance of current accounts, *mudarabah* savings accounts and *mudarabah* investment accounts of Islamic banks and inter-temporal risk-sharing in an economy. This data is taken from IBIS and the values are the averages for the period between 1990 and 2011. Current accounts of participatory banks are similar to the accounts of commercial banks since they can be withdrawn at any time by deposit holders. On the other hand, the *mudarabah* investment and savings accounts are peculiar to Islamic banks since they are invested according to profit-loss sharing principles. Neither the return nor the principal are guaranteed in these accounts and returns/losses are determined according to the outcome of the activities of bank operations. Investors in these accounts receive their return in proportion to their investment to the projects.

The results in Table 5 show negative and significant coefficients for *mudarabah* investment account in all four regressions. As can be seen in Table 2, the correlation between *mudarabah* savings accounts and *mudarabah* investment accounts is significant and high (0.687). For this reason, we drop the *mudarabah* savings account in the regressions but as robustness check include it in the aggregate variable denoted as *mudarabah* accounts, which is the sum of *mudarabah* Investment and *mudarabah* savings accounts (columns 5-8). This aggregate measure enters negatively in all four regressions and significant in all but one (column 6).

The results in Table 6 show limited evidence for the role of specific products offered by Islamic banks. Here, we present the standardized coefficients different financial products offered by Islamic banks i.e, *musharaka, mudaraba, murabaha, qard hasan, ijara, istisna* and *salam.* We would like to stress, however, that the data obtained from IBIS, although reliable in terms of aggregate values such as loans and assets, might be less reliable when reporting data for different

product category. In addition, cross-country consistency between the same product across countries in different countries might not be perfect. In theory, one would expect that *musharaka* and *mudaraba* to be most conducive towards risk sharing due to the principles under which these products operate. Meanwhile *murabaha* loans, which are basically mark-up sale, should not contribute to risk sharing as much as the aforementioned two. Although, as expected by theory, *musharaka* and *mudaraba* loans have negative coefficients and *murabaha* have positive coefficients, when one looks at the results, only the coefficients on *Istisna* are significant and negative simultaneously in both columns.

So far all results have been based on cross-sectional regressions. As a final robustness test, we use panel data techniques and carry out robustness checks for the results presented above that were based on cross-country analysis. As has been noted before, we construct the risk sharing parameter (λ) using a 10 year rolling window for the period from 1990 to 2011. The explanatory variables are constructed as the rolling 10 year averages that correspond to the same period for which the risk sharing estimate is calculated. The risk sharing estimate (λ) is constructed using both OLS and Instrumental Variable regressions, as was the case in cross-country regressions. For each estimate of λ, calculated under two different methodologies (OLS and IV) we conduct Pooled OLS and Fixed-Random Effect regressions. We choose Fixed or Random effect model based on Hausman test.

The results in Tables 7 and 8 confirm our previous findings of limited statistical and economic significance of the relationship between the importance of Islamic banking and inter-temporal risk-sharing. We use asset and loan shares in these regressions, with Table 7 reporting results using IBIS data and Table 8 reporting results using Bankscope data. In Table 7, although in majority of regressions the coefficients of proxies used for Islamic banking presence (assets and loans) have negative sign, they are either insignificant and/or are of magnitude that is very close to zero. In Table 8, all Islamic bank proxies have negative sign but only two of them (columns 3 and 8) are significant.

The results in Table 9 confirm our previous findings of the importance of risk-sharing accounts for inter-temporal risk-sharing. Here, we consider the relationship of *mudarabah* investment accounts and current accounts of Islamic banks with inter-temporal risk sharing. Given the significant and large correlation (0.79) depicted in Panel B of Table 1, between *mudarabah*

investment accounts and *mudarabah* saving accounts, we dropped the latter. All four coefficients of *mudarabah* investment accounts are negative and the coefficient of regression (1) is significant.

Finally, Table 10 analyzes the correlation between risk sharing and different types of financial instruments offered by Islamic banks that are grouped in two different categories, risk sharing accounts and fixed income accounts. All the variables are in logarithm in order to smooth the variation. Risk sharing account is the sum of *musharaka, murabaha,* and *qard hasan* assets, which in theory should be more conducive towards risk sharing while fixed income account is the sum of *murabaha, istisna, ijara* and *salam* assets. When we look at the results, the coefficients of Risk Sharing accounts and Fixed income accounts are as expected, i.e. negative for Risk sharing and positive for fixed income in all four regressions. However the coefficients of risk sharing accounts are not statistically significant.

5. Policy Recommendations

In this paper, we test empirically whether Islamic banks contribute to risk sharing more than the commercial financial institutions. In theory, when there is perfect risk sharing in an economy, this should decrease correlation between the changes in consumption and income. Based on this logic we employ the consumption smoothing parameter as our risk sharing parameter, as the smoother the consumption, the higher is the degree of risk sharing in the given jurisdiction. We use various proxies to extract possible contribution of welfare state, financial globalization and conventional financial products to risk sharing in order to isolate the contribution of Islamic banks to risk sharing.

Our results based on cross-country regressions suggest that the contribution of Islamic banks, when tested with aggregate variables such as total assets and total loans is at best elusive. The coefficients of participatory banks' total assets and total loans are either very close to zero or insignificant. However, when we conduct the same analysis with different products of Islamic banks, we find that products like *mudarabah* investment accounts which operate according to profit loss sharing, are more conducive towards risk sharing than current accounts of Islamic banks.

The discrepancy in our findings, aggregate vs. different categories might arise due to the fact that Islamic banks over-rely on *murabaha* type of investments, which according to some are just repackaging of conventional fixed income products. Hence, one could argue that for Islamic banks

to fulfill their promise as true risk sharing financial institutions they should focus on developing products such as *mudaraba* and *musharaka* that operate according to profit-loss sharing principles.

Risk sharing has been an integral part of human activities long before the formation of modern day corporations, banks and other financial institutions. It has been a natural activity, whereby parties find it profitable to pool resources, be it financial, entrepreneurial, technical and requiring other inputs, as opposed to operating individually. The sharing of risk is undertaken with the expectation that the combination of numerous participants (investors, entrepreneurs, scientists and those from many other professions and walks of life), larger resources, and diversified skills and technologies would result in greater output and larger profits than operating individually; and in some instances, projects that for a variety of reasons would not have been undertaken would be developed and pursued. Partners in business ventures have contractual arrangements that define the contribution of each party, including the financing, the managerial, the technical and contingencies that could arise, and the distribution of the fruits of their undertaking. Risk-sharing enterprises have evolved over the centuries into the modern corporate structure that have diversified equity ownership and are the dominant source of economic output and employment in most advanced economies.

On the one hand, Islam prohibits, and without any exceptions, explicit and implicit interest-based contracts; on the other hand, it lauds risk sharing in all its forms as the structure for economic activities; and goes even further to require mandatory risk sharing with the poor, the deprived and the handicapped based on its principles of property rights, which specify a right for the less able to share in the income and wealth of the more able, as the latter use more resources to which all are entitled. Through its redistributive mechanisms, such as zakat, Islam incorporates the duty of sharing into all economic relations. In other words, Islam prescribes that the more able have the duty to share in the risks faced by the poor and vulnerable social classes. As part of its incentive structure, the Quran promises that these sharing arrangements, far from reducing income and wealth of the more able, increase income and wealth by multiples.

Risk is a fact of human existence. The exposure of income to risk is important and can play havoc with a person's livelihood. Reduction in income risk is, therefore, welfare enhancing, by lowering volatility to allow smoothing of consumption. This is accomplished by risk sharing and risk diversification, which are facilitated by trade and exchange. By relying on exchange, the Quran promotes risk sharing. Arguably, it can be claimed that through its rules governing just exchange, distribution, and redistribution, the entire Quranic position on economic relations is oriented toward risk sharing. This is perhaps the reason why in the Quran there is more emphasis placed on rules governing exchange distribution, and redistribution—to affect a balanced risk sharing—than on production.

Indeed, there is some evidence that stock market and social interaction are related (Hong, et. al., 2004; Huberman, 2001). Shiller (2003) has recognized the potential benefits of risk sharing for

mankind and points out: "Massive risk sharing can carry with it benefits far beyond that of reducing poverty and diminishing income inequality. The reduction of risks on a greater scale would provide substantial impetus to human and economic progress."

In 1958, Franco Modigliani and Merton Miller showed that, in the absence of frictions, a firm's financial structure would be indifferent between debt and equity. In the real world, there are a number of frictions that bias financial structures in favor of debt and debt-based contracts, with the two most important being tax and information. The tax treatment of equity returns and interest in industrial countries is heavily biased against equities. Informational issues (information asymmetry and the subsidies and policies that encourage of moral hazard and adverse selection) are conceived in favor of debt or debt-based contracts. Broadly speaking, legal-financial systems in advanced countries are structured in favor of debt and debt-based transactions.

Risk-sharing finance is trust intensive, and trade financing during the Middle Ages was based on risk sharing, which, in turn, was based on mutual trust (Goitein, 1964). Alesina, et. al. (2002) have shown that catastrophic and traumatic experience contributes to the breakdown of trust in a community and among its members.

In sum, the appreciation of the importance of risk, arbitrage pricing and efficient markets are the relatively recent foundations of conventional finance. At its core, conventional finance is seen today as the management of risk (Shiller, 2003). At the same time it is important to recognize that Islamic finance is built on the foundation that risk must be shared between parties in any endeavor as opposed to being all assumed by one party or the other. On the face of it, modern finance should provide practitioners of Islamic finance added tools to achieve their central goal of better risk sharing. Moreover, as Islam prohibits financial gain without the assumption of some measure of risk, on the one hand, it would appear that efficient markets and the random walk behavior of financial assets and commodities are implicitly, if not explicitly, assumed in Islamic teachings.

The last two decades of the 20th Century witnessed a number of global bouts with financial instability and debt crises with devastating consequences for a large segment of humanity, thus raising consciousness regarding vulnerability and fragility of the financial systems which are based, at their core, on fixed-price debt contracts. As previously emphasized, legal and institutional developments, along with good governance and adoption of standards of best practice in transparency and accountability at the level of individuals, firms, and state, buttressed by

information technology advances, will mitigate the informational problems leading to less reliance on debt-based contracts. It is on the basis of such reasoning that we see an increasingly prominent role for equity finance and thus risk-sharing, not only in Islamic countries, but also the world over.

Islamic finance is all about risk sharing. It encourages risk sharing in its many forms but generally discourages risk shifting or risk transfer, in particular interest-based debt financing. It is in part so designed to promote social solidarity by encouraging finance to play an integrating role. This form of finance would be inclusive of all members of society and all entities, especially the poor, in enjoying the benefits of economic growth, and to bring humankind closer together through the sharing of risk. Since risk sharing is the foundation and a basic activity in Islamic finance, it is governed by rules that, if and when observed, lead to lower transaction costs than in conventional finance.

All societies face the crucial question of how to allocate economic risks that are an every day fact of life. Kenneth Arrow, one of the pioneers of conventional modern finance, provided (1964) an answer: risks in the economy should be shared according to the risk-bearing ability of the participants. More fundamentally, he (along with Gerard Debreu) proposed the design of instruments that could accommodate risk sharing according risk-bearing desires of participants. His contribution became the foundational theory for pricing assets and derivatives through the notion of primitive securities, also commonly referred to as Arrow-Debreu (AD) securities.

Perfect risk sharing (PRS) in consumption is defined as a case where there is perfect correlation of an individual's consumption with aggregate consumption. Hence, this is the case when individual consumption is not affected by idiosyncratic income shocks. When a laborer is unemployed, his consumption is not impaired and is related directly to aggregate consumption through risk sharing.

At the international level, full consumption risk sharing means that agents across countries will equalize the inter-temporal marginal rates of substitution state by state. This fundamental condition states that the international ratio of marginal utilities from consuming any good must be constant across states of nature. In statistical terms, this condition states that the national marginal utilities from consuming any good are positively and perfectly correlated across countries. Without an international contingency claims market, risk sharing cannot be achieved among countries. Opening the stock market to foreign investors enables domestic agents in a small open economy to share risk with the rest of the world.

The agency problem has been generalized to bank lending. Banks, being highly leveraged institutions that borrow short (deposits) and lend long, are exposed to an asset-liability mismatch that creates potential for liquidity shocks and instability. Stiglitz (1989) suggests that to protect their financial resources, banks generally discourage risk taking. Additionally, their behavior toward risk often creates informational problems that lead to phenomena that can be classified as market failure, such as credit rationing. In contrast to Stiglitz's position, Hellwig (1998, p. 335) argues that there is an oft-neglected informational problem in the lending behavior of banks, which he refers to as "negative incentive effects on the choice of risk inherent in the moral hazard of riskiness of the lending strategy of banks." This risk materialized dramatically in the period of run up to the recent financial crisis (see Askari, et. al., 2010; Sheng, 2009).

At the same time, it should be noted that there is an important moral dimension to Islamic risk sharing as it strengthens social solidarity by enhancing cooperation among all economic agents, which would also go some way in easing the coordination problem (for detail of these and other rules governing the economy. Moreover, when risk is spread by means of risk-reward sharing contracts, closer coordination is forged between the real and financial sectors of the economy. Risk transfer by means of interest-based debt contracts, in contrast, weakens that linkage. Particularly when risk transfer is combined with high leverage, the growth of interest-based debt contracts and their pure financial derivatives—those with little or no connection to real assets—outpace the growth of the real sector leaving the liabilities in the economy a large multiple of real assets needed to validate them. This phenomenon is called "financial decoupling" (Menkoff and Tolkorof, 2001) or financialization (Epstein, 2006; Palley, 2007), whereby finance is no longer anchored in the real sector. The result is financial instability leading to frequent crises. Reinhart and Rogoff (2009) have catalogued the high frequency of historical occurrences of crises in the conventional interest-based system and have clearly shown that all crises, whether classified as a currency or banking crisis, have been at their core a debt crisis.

Xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Alaa paper

Having said that, the Shari'ah compliant industry appears to mitigate 17% of risk shifting incentives, on average, in general. In other words, incentives for pervasive risk shifting are lower in a majority of Islamic banks even though they are not fully eliminated. This could provide some

useful insights regarding the way forward for shared prosperity. The deterring impact of Islamic banking is worth strengthening through the expansion of risk sharing and removal of risk transfer incentives in the present regulatory and supervisory framework. This could be achieved through market-oriented approach to incentivising risk sharing. IFSA 2013 may provide significant impetus in this regard.

This is evident of risk shifting in conventional banks in OIC member countries, and is consistent with the reviewed literature on risk shifting in the US, Japan and other countries.

To the extent that β1 captures the net effect of the tension between banks' risk shifting incentives and outside disciplining forces, the positive estimate suggests that the former dominates in the conventional segment of OIC's dual banking systems. The inadequacy of outside discipline seems to render risk-shifting behaviour value maximizing. Banks are able to expropriate wealth from deposit insurers and taxpayers by increasing their overall risk and shifting the burden of any resulting losses and erosion of assets' value to the public. This is captured by the higher fair value of deposit insurance premium for every unit of additional risk. IPP depends on the probability distribution of the asset values in relation to the face value of deposits on the audit date. It is worth more as the probability that the value of bank assets falls below a certain level of deposits, resulting in bankruptcy, increases (Duan et al., 1992; Merton, 1977). From taxpayers' perspective, it is the cost incurred by them if/when a bank fails (Ruud, 2007).

The significantly negative coefficient of the bank capital interacted term provides evidence that maintaining more equity capital in the asset structure of the bank incentivizes shareholders to act more prudently and shift less risk. This is in line with the arguments put forth by Nassim Talib (2013) and operationalized by Basel Committee on Banking Supervision regarding having more "skin in the game". A similar skin-in-the-game effect arises from bank's ex-post profitability.

Turning to aspects of the country's financial system, the stock market interacted term is consistently and significantly positive in all relevant specifications. The presence of stock markets in OIC member countries seems to expand opportunities for opportunistic risk shifting behaviour. This confirms that while stock markets are arguably the first best avenues for risk sharing (Brav, Constantinides, and Geczy 2002); there are necessary conditions for this to hold. Yartey (2008), for example, finds that political risk, law and order, democratic accountability and efficient bureaucracy are crucial for the viability and proper functioning of stock markets. An examination

of the current state of affairs in the contemporary Muslim world reveals numerous adversities (Al-'Alwani, 1993). Exploitation, corruption, political instability and lack of trust are just a few (Ng, 2014). Whereas, furthermore, stock markets are almost non-existent in most Muslim counties, they are plagued with informational problems and governance issues where they exist (Askari, et. al, 2012; Mirakhor and Askari, 2010; Iqbal and Mirakhor, 2007; Chapra, 2000). Both characteristics are likely to undermine the integrity of stock markets and impair efficient resource allocation, aggravating at the same time risk shifting moral hazard.

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXx

Obiya and Mirakhor

Banking's fragility is due to risks being concentrated and not dissipated as needed. Mutual funds another financial intermediary, operates in an even more hazardous environment but does not appear to have the fragility that banks have. What is different between the two is that Mutual Funds operate in a risk-sharing not a risk-transfer model. In a mutual fund an investor's funds are tagged directly to a specific portfolio. His returns depend entirely on the portfolio performance. The investor pays for the convenience and ability of the fund manager. If things go wrong, the fund manager loses his job, but the fund manager company remains in fact. The company is never in danger even though the stock market is a much more volatile than the real-sector that banks operate in. What makes the mutual fund much less fragile is that unlike a bank, there is a direct link between the asset and liabilities of the mutual funds balance sheet. Investment risks on the asset-side are shared fully with investor funds/deposits on the liability side. It is this risk-sharing that makes the mutual fund model anti-fragile and the lack of which keeps banking on its perpetual knife-edge equilibrium.

Our proposed banking model is essentially based on the risk-sharing framework of mutual funds. Aside from the shariah requirements that financing should be of a risk-sharing nature with returns determined ex-post, the shariah provides for a number of contracts that are well suited for the matching of asset and liability side risk-profiles. In essence, under our proposal a majority of Islamic bank's assets would be securitized by the issuance of sukuk that have the same underlying contract and average "duration" of customer financing. It is obvious that the securitization has to take different forms. Where an asset is large enough to justify an issuance against it, papers can be issued to securitize it. Where the assets are small, they would have to be pooled into tranches of

similar maturity and then securitized. The securitized papers or sukuk obviously cannot be subjected to the lengthy current process for sukuk issuance. Rather, banks should be provided a master template on which the securitized papers are to be issued.

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXx

Tarik (Risk Sharing Index)

The multi-dimensional composite risk-sharing friendliness index (RSFI) encompasses different aspects of the concept of the risk-sharing. Inspired from the earlier works on forming composite indexes to gauge the level of risk-sharing, this study attempts to construct the index on the basis of four dimensions including (i) Institutional scaffolding; (ii) Governance and legal environment; (iii) Financial sector development; and (iv) Multidimensional inclusion (Alaabed, Iqbal, & Rostom, 2014; Askari, Iqbal, & Mirakhor, 2014; Rehman & Askari, 2010). Each of these dimensions stand for an important aspect of the prerequisites of a risk-sharing financial system and their significance in the risk-sharing is discussed in detail in (Askari, Iqbal, & Mirakhor, 2014).

Current state of affairs shows that majority of OIC countries do not meet the pre-requisites of a risk-sharing financial system which raises the question of viability of further development of Islamic finance in these countries. Given that the financial system in OIC countries is dominated by conventional form of "risk-transfer" financial system, viability of developing "risk-sharing" friendly system is a serious challenge.

As a group, it would appear that OIC countries lack effective institutions, rational rules and regulations, their monitoring and enforcement, and sound governance. This is the initial conclusion of several benchmarking efforts on broad-based, economic, developmental, and financial indicators (Alaabed, Askari, Iqbal, & Ng, 2014; Alaabed, Iqbal, et al., 2014; Rehman & Askari, 2010). Absence of these foundational elements for human, economic, and social development should be the first priority of policy makers and governments of these countries.

Here is short summary of reforms policy makers should consider in countries who are serious in implementing Islamic finance according to its essence of risk-sharing:

(i) Development of economic and legal institutions reflecting core principles of Islam. Optimal functioning of an Islamic financial system, or for that matter of any system, requires that

underlying economic and legal institutions are in place. The Islamic economic system is a rule-based system which dictates rules concerning property rights, contracts, and expected behavior of economic agents, market discipline, and social capital according to the teaching of Islam (Askari et al., 2012). Without such institutions, contracts promoting risk-sharing could not be developed and benefits of a risk-sharing financial system at macro level leading to sustainable development cannot be envisioned. A financial sector conducive to risk-sharing finance could be developed with institutional foundation rooted in the principles of Islamic economics. Current practices of replicating conventional products within under-developed financial sectors in majority of OIC countries designed for conventional risk-shifting financial contracts is leading to sub-optimal results. For instance, implementing deposit insurance schemes for Islamic banks give rise to significant challenges (Grira, Hassan, & Soumaré, 2016). This trend would lead to stagnation and dilution of essence of Islamic finance.

(ii) Governance is more critical for risk-sharing finance. It should be clear that poor governance; transparency; accountability; inadequate judicial system; and weak property, creditor, and investor rights all have played a role in the poor development of financial sector. These are results of neglecting the development of the legal and institutional developments prescribed by Islam. Given the informational asymmetry issues of debt (risk-transfer) and equity (risk-shifting) contracts, a risk-sharing contract would require closer monitoring, enhanced transparency, and governance. Therefore, development of sound governance framework is vital for developing a risk-sharing financial system. While adoption, implementation, and development of Islamic institutions may be slow, implementation of international best practice of transparency and accountability plus development of an independent and effective judiciary and the reform of the legal system—to protect property, creditor, and investor rights and enforce contracts—and promotion of financial sector development could increase investment, employment, and income leading to reduction in poverty.

(iii) Development of asset-backed and equity-based financial products. A risk-sharing financial system has set of financial instruments built upon partnership-based, asset-backed, and equity-style financing. Equity-based securities and their efficient trading should be encouraged; in this respect, development of a stock market operating according to Islamic principles, which prohibits the use of leverage (use of margin accounts) and excessive speculation (including short sales) should be encouraged. Advancement in financial engineering and successful track record of

26

securitization should be benefited by utilizing it for the development of asset-backed securities. Development of Sukuk (Islamic bonds) market offers great potential for mobilizing financing on the principles of asset-based finance and therefore, should be given priority by the policy makers to develop robust markets for asset-backed securities along with stock markets.

(iv) Development of redistributive instruments. Notion of risk sharing as the preferred organizational structure for all economic activities in Islam a comprehensive one as it deals with not only risk-sharing in financial contracting but also sharing risks of the society and vulnerabilities of less fortunate members of the society. Islam requires mandatory risk sharing with the poor, the deprived, and the handicapped based on its principles of property rights, which specify a right for the less able to share in the income and wealth of the more able, as the latter use more resources to which all are entitled. Islam's instruments of redistribution including zakah (mandatory levy on wealth), qard-al-hassan (benevolent loan), waqf (endowment for social welfare), and sadaqat (voluntary contributions) are shown to be instruments of risk-sharing, financial inclusion, and social protection (Askari et al., 2014). Policy makers need to revive, revitalize, and instrumentalize these instruments of redistribution to overcome serious poverty issue in majority of OIC countries. Given restraining fiscal environments for the governments, alternative financing through redistributive instruments could serve the catalyst for poverty alleviation (Mohieldin, Iqbal, Rostom, & Fu, 2012).

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

Trust paper (ZI/AM)

4.1 Development of Financial Sector is Vital

Relationship between trust and the degree of financial sector development is interactive one. As financial sector gets developed, it establishes much needed trust in the financial system and as this trust grows further; it leads to further development of the financial sector. Similarly, this relationship could be reversed, i.e. distrust could dampen the development of financial sector which can become an obstacle in building the trust.

Figure 1 depicts the relationship of trust in the banking sector with the level of financial sector development measured by the ratio of domestic credit to private sector to GDP. The chart if divided into four quadrants—upper left (high trust but less developed financial sector), upper right (high trust and highly developed financial sector), lower left (low trust and less developed financial sector), and finally, lower right (low trust and highly developed financial sector). One can observe that the relation between trust and financial development is negative, in OIC countries (red spades in the graph). This is simply interpreted by the fact that less sophisticated financial systems seems to exhibit less trust. On the other hand, in the developed economies (blue squares), the relation is positive. It is evident that there is a

threshold of around 60% of GDP, where the slope depicting the relation between trust and financial development becomes flatter. Above this threshold, the financial development index increases indicating larger trust in the financial system as it becomes more advanced. The immediate interpretation is that as financial systems become more advanced this couples with institutional development that reinvigorates public's trust in the system and its performance.

Figure 1: Trust and Financial Development:
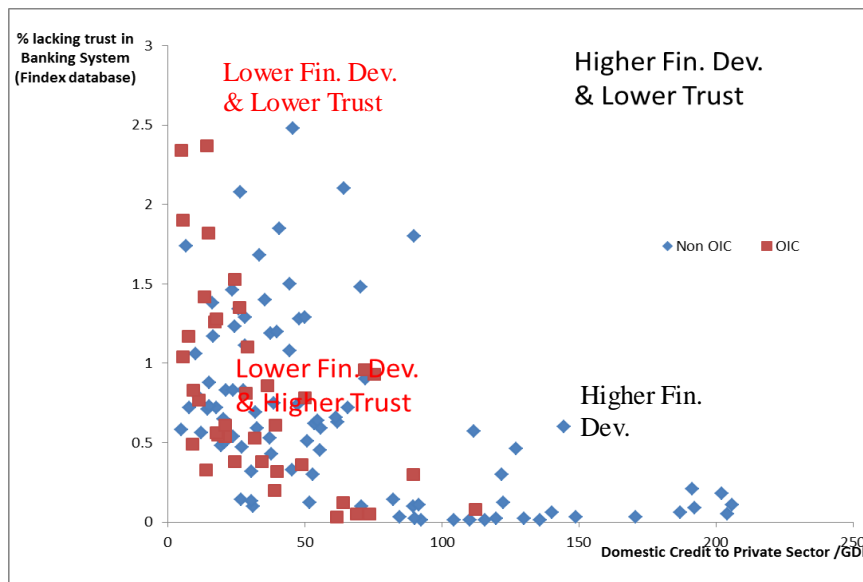
This reinforce the fact that policy-makers in OIC countries should pay special attention to this relationship and take measures to develop financial sector through improving legal institutions, investors' protection, transparency, information disclosure, and better governance.

4.2 Enhanced Trust needed to Promote Risk-sharing Instruments

Ng, Ibrahim, and Mirakhor (2013) point to the significance of social capital (especially the trust component) for a risk-sharing financial system such as Islāmic finance and argue that when the risks of life are shared among society, it promotes the wider use of equity-based contracts and the corresponding reduced reliance on interest-based debt financing. Trust also facilitates rule-compliance and cooperation which are key ingredients for a risk-sharing financial system. Islāmic financial system is a risk-sharing system in its ideal form, but its current implementation is far from being ideal because of dominance of debt-like products[13] whom the policy makers or finance managers outspokenly term as 'debt securities'[14]. Without adequate level of trust in the financial system, the industry will keep replying on debt-like or risk-transfer financial products.

Therefore, the policy-makers interested in promoting Islāmic finance need to undertake measures for enhanced trust to provide confidence to investors and depositors to invest in risk-sharing Islāmic products such as *Muḍārabah* and *Mushārakah*. If such trust in the financial or banking system does not exist, the investors and financial intermediaries will have preference for debt-like products. The needed measures

---

[13] See Askari, Iqbal, Krichene, and Mirakhor (2012) and Askari, Iqbal, and Mirakhor (2010)

[14] See, for example, Pakistan Economic Survey, 2014-15 [… five debt securities were issued which include two domestic Sukuk amounting to Rs. 26 billion, one international Sukuk of Rs. 100 billion (US$ one billion) and two Privately placed Term Finance Certificates amounting Rs. 6 billion] http://www.finance.gov.pk/survey/chapters_15/Highlights.pdf

to promote trust in the financial sectors include reduced information asymmetry, enhanced transparency, enhanced financial literacy and developed capital markets.

4.3 Enhanced Quality of Information and Transparency

There is critical need to enhance the quality of information and the transparency of disclosures in OIC countries. Theoretically, enhanced quality of information and transparent disclosure reduce information asymmetry in the financial systems and transactions and as a result provide enabling environment for risk-sharing financial products in the system as opposed to a debt-based risk-transfer financial system.

For markets, policy makers, financial authorities and multi-laterals (IMF and World Bank) appropriate coverage and quality of information is becoming increasingly critical for their capacity to assess risks and vulnerabilities. Regulators are looking for better information on range of financial institutions' activities such as 'off balance sheet' risks (involving better consolidated supervision), and the risks of financial inter-linkages. New regulatory and supervisory environment will be "information-focused" and financial institutions will be required to enhance the information collection and disclosure as required by the regulators (IMF, 2009).This means that the financial institutions will have to improve, enhance, and upgrade overall flow and the quality of information in their operations and business.

Quality of information is relevant to both investors and the regulators but in several countries where Islāmic banks operate, general quality of information is considered low. Table 1 shows a comparison of information disclosure index of Middle East and North Africa (MENA) countries with G7 countries while Table 2 shows depth of credit information in the region. This index measures the rules and the practices affecting the coverage, scope and accessibility of credit information available through either a public credit registry or a private credit bureau. The index shows relatively low levels compared to developed economies of G-7.

Table 1- "Extent of Disclosure Index Protecting Investors" Index

	2005	2006	2007	2008	2009	2010
Average MENA	5.86	5.86	5.94	6.13	6.44	6.56
Average GCC	6.5	6.5	6.5	6.83	6.83	6.83
Average MENA Non-GCC	5.6	5.6	5.6	5.7	6.2	6.4
Average G7	7.71	7.71	7.71	7.71	7.71	7.71

Source: Doing Business Database, World Bank.

Table 2 - Depth of credit information index (0-6) Getting Credit

	2005	2006	2007	2008	2009	2010
Average MENA	1.93	2.21	2.69	3.13	3.5	3.69
Average GCC	3	3	3.33	3.83	3.83	3.83
Average MENA Non-GCC	1.5	1.9	2.3	2.7	3.3	3.6
Average G7	5.71	5.57	5.57	5.57	5.57	5.57

Source: Doing Business Database, World Bank.

General level of transparency and disclosure of information is low in the Islāmic financial services industry. The impact of quality of information on Islāmic financial institutions could be from two directions. At the institutional level, they would require to enhance the flow and quality within the institution which could demand automation of manual monitoring processes, upgrading information systems, and improving the transparency of data and information for reporting purposes. This could be a challenge considering that majority of Islāmic financial institutions are of small size and do not have surplus funds to invest in the information infrastructure.

National authorities and regulators need to take concrete steps to enhance information at systemic level so that all participants in the system can benefit from it. Enhancing the flow and quality of information can be considered as a key driver where Islāmic finance industry needs to pay attention.

4.4 Trust is Important Determinant of Stock Markets Depth and Efficiency

Several studies have documented the relationship between capital markets especially the stock markets and the level of social capital including trust in the economy. Using data from 73 jurisdictions covering the period from 2009 through 2011, Ng, Ibrahim, Mirakhor (2014) examine the existence of social capital thresholds in the stock market development and macroeconomic performance nexus. Their empirical results demonstrate that stock market liquidity is significant and positive in influencing GDP and Total Factor Productivity (TFP) growth respectively only after the attainment of a certain threshold level of firms' ethical behavior. They find that market liquidity is also significant and positive in promoting GDP and TFP growth in cases of high trustworthiness and confidence. The evidence is supportive of productivity growth as an important channel where stock market development promotes economic growth.

Vibrant stock markets are vital for developing risk-sharing financial system and Islāmic finance. In absence of interest based debt securities due to prohibition of *ribā*, raising capital through equity financing in stock markets becomes vital for economies to operate on the principles of Islāmic economics and finance. Given the relationship between trust, stock markets, and impact on economic growth, policy makers need to take measures to strengthen operations for stock markets through improving legal environment, transparency, and governance. A damage to trust in the market place will have a negative and serious impact on the economy.

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Policy (AIM)

The one thing that all economists and financial experts can surely agree upon is the importance of institutions in all areas of economic activity. In the case of Islamic finance, as its operational essence is risk sharing, it is essential to promote the development of an institutional environment that is conducive for market participants to implement risk-sharing principles. An enabling environment where risk and reward are shared in a fair and systematic manner, rather than being transferred or shifted, can further foster trustworthiness, social solidarity, cooperation and the protection of property rights.

It should be obvious that effective institutions are at the foundation of all successful economic

and financial systems. In the absence of institutions, countries and their economic and financial

systems become a jungle. Market participants, producers and consumers, savers and investors,

and buyers and sellers cannot have access to the reliable information they need for sound

decision making; information and data become useless as their accuracy cannot be trusted; there can be little idea about future economic and financial developments; government policies are invariably haphazard; property rights are not enforceable; contracts become worthless papers as they may not be enforceable; uncertainty and risk become prohibitive to productive activities; and in short, all productive endeavors are threatened, and economic and social development become endangered.

To our mind, the most important and foundational institutional reforms in Muslim countries include:

a. Political reforms that enable participatory governments and governance

b. An independent judicial system

c. Business rules and regulations (such as those dealing with competition and corrupt practices) conducive to growth

d. Financial rules and regulations that emphasize risk-sharing finance and 100 percent reserve banking

e. An independent taxing authority

f. Labor market rules and regulations that ensure labor rights and labor market flexibility

g. Independent agencies to monitor and enforce business, financial, tax and labor rules and regulations

h. A limited public sector that operates transparently and affords equal opportunities to all

i. An institutional structure to provide an adequate social safety net

j. A free press

References

Abedifar, Pejman, Philip Molyneux, and Amine Tarazi. "Risk in Islamic banking." Review of Finance 17.6 (2013): 2035-2096.

Bacchetta, Philippe, and Stefan Gerlach. "Consumption and credit constraints: International evidence." Journal of Monetary Economics 40.2 (1997): 207-238.

Baele, Lieven, Moazzam Farooq, and Steven Ongena. "Of religion and redemption: Evidence from default on Islamic loans." Journal of Banking & Finance 44 (2014): 141-159.

Beck, Thorsten, Asli Demirgüç-Kunt, and Ouarda Merrouche. "Islamic vs. conventional banking: Business model, efficiency and stability." Journal of Banking & Finance 37.2 (2013): 433-447.

Beck, Thorsten, Mattias Lundberg, and Giovanni Majnoni. "Financial intermediary development and growth volatility: Do intermediaries dampen or magnify shocks?." Journal of International Money and Finance 25.7 (2006): 1146-1167.

Beck, Thorsten, Steven Ongena, and Ilkay Sendeniz-Yuncu. "Keep Walking? Geographical Proximity, Religion, and Relationship Banking." Geographical Proximity, Religion, and Relationship Banking (July 24, 2015) (2015).

Campbell, John Y., and N. Gregory Mankiw. "Consumption, income and interest rates: Reinterpreting the time series evidence." NBER Macroeconomics Annual 1989, Volume 4. MIT Press, 1989. 185-246.

Čihák, Martin, and Heiko Hesse. "Islamic banks and financial stability: An empirical analysis." Journal of Financial Services Research 38.2-3 (2010): 95-113.

Denizer, Cevdet A., Murat F. Iyigun, and Ann Owen. "Finance and macroeconomic volatility." Contributions in Macroeconomics 2.1 (2002).

Easterly, William, Roumeen Islam, and Joseph E. Stiglitz. "Shaken and stirred: explaining growth volatility." Annual World Bank conference on development economics. Vol. 191. 2001.

Islamic Financial Services Board (IFSB): Stability Report 2015

Jappelli, Tullio, and Marco Pagano. "Consumption and capital market imperfections: An international comparison." The American Economic Review (1989): 1088-1105.

Kammer, Mr Alfred, et al. Islamic Finance: Opportunities, Challenges, and Policy Options. No. 15. International Monetary Fund, 2015.

Levine, Ross. "Finance and growth: theory and evidence." Handbook of economic growth 1 (2005): 865-934.

Ludvigson, Sydney. "Consumption and credit: a model of time-varying liquidity constraints." Review of Economics and Statistics 81.3 (1999): 434-447.

Ongena, S., and İ. Şendeniz-Yüncü, 2011, "Which Firms Engage Small, Foreign, or State Banks? And Who Goes Islamic? Evidence from Turkey," Journal of Banking and Finance 35, 3213-3224.

Pappas, V., M. Izzeldin, A.-M. Fuertes, and S. Ongena, 2013, A Survival Analysis of Islamic Bank Failure Risk, Lancaster University, Lancaster, Mimeo.

Raddatz, Claudio. "Liquidity needs and vulnerability to financial underdevelopment." Journal of financial economics 80.3 (2006): 677-722.

Reinhart, Carmen M., and Kenneth S. Rogoff. This time is different: A panoramic view of eight centuries of financial crises. No. w13882. National Bureau of Economic Research, 2008.

Shiller, Robert J. The new financial order: Risk in the 21st century. Princeton University Press, 2009.

World Bank. 2015. Global financial development report 2015-2016 : Long-term Finance. Washington, D.C.: World Bank Group.

Van Greuning, Hennie, and Zamir Iqbal. Risk analysis for Islamic banks. World Bank Publications, 2008.

Zaheer, Sajjad, Steven Ongena, and Sweder JG van Wijnbergen. "The Transmission of Monetary Policy Through Conventional and Islamic Banks." International Journal of Central Banking 9.4 (2013): 175-224.

Appendix and Tables and Regression Results

Appendix Table A2: Data Sources

Variable	Source
Total Islamic bank assets and loans	Bankscope and IBIS
GDP and private consumption	Penn World Tables 8.1
Total Mudarabah (Savings +Investment) and Current accounts	IBIS
Total of Murabaha, Mudaraba, Musharaka, Qard Hassan, Istisna, Salam	IBIS
Domestic credit to private sector (% of GDP)	WDI
Stock market total value traded to GDP (%)	WDI
General government final consumption expenditure (% of GDP)	WDI
Gross domestic savings (% of GDP)	WDI
Domestic credit to private sector (% of GDP)	WDI
Stock market turnover ratio (%)	WDI
Bank lending-deposit spread	WDI
Chin-ITO Financial Openness Index	http://web.pdx.edu/~ito/Chinn-Ito_website.htm

Appendix Table A3: List of Countries with Islamic Banking data in two data sources

Bankscope		**IBIS**	
Bahrain	Qatar	Albania	Lebanon
Bangladesh	Russian Federation	Algeria	Malaysia
Egypt, Arab Rep.	Saudi Arabia	Australia	Pakistan
Gambia, The	Senegal	Azerbaijan	Philippines
Indonesia	Singapore	Bahrain	Qatar
Iran, Islamic Rep.	South Africa	Bangladesh	Saudi Arabia
Iraq	Sudan	Bosnia and Herzegovina	South Africa
Jordan	Syrian Arab Republic	Egypt, Arab Rep.	Sri Lanka
Kenya	Tanzania	Gambia, The	Sudan
Kuwait	Thailand	Indonesia	Switzerland
Lebanon	Tunisia	Iran, Islamic Rep.	Syrian Arab Republic
Malaysia	Turkey	Iraq	Tunisia
Maldives	United Arab Emirates	Jordan	Turkey
Mauritania	United Kingdom	Kazakhstan	United Arab Emirates
Pakistan	Yemen, Rep.	Kenya	United Kingdom
Philippines		Kuwait	Yemen, Rep.

Table 1 Descriptive Statistics

	Obs.	*Mean*	*Std. Dev.*	*Min*	*Max*
λ_{OLS}	151	.4806	.233	.00125	1.1376
λ_{IV}	120	.5254	.237	.00152	1.0291
Islamic Bank Assets IBIS (% of GDP)	32	.147	.289	7.52e-06	1.301
Islamic Bank Loans IBIS (% of GDP)	32	.071	.124	.00002	.537
Islamic Bank Assets Bankscope (% of GDP)	31	.120	.219	.00003	.879
Islamic Bank Loans Bankscope (% of GDP)	31	0633	.116	.00001	.474

Current Account (% of GDP)	31	.017	.032	.00001	.2965
Mudarabah Investment Account (% of GDP)	22	.059	.086	1.35e-06	.296
Mudarabah Savings Account (% of GDP)	20	.0136	.017	.00022	.0816
Mudaraba Assets (% of GDP)	15	.0176	.051	3.86e-06	.201
Musharaka Assets (% of GDP)	19	.005	.0103	4.80e-06	.0383
Murabaha Assets (% of GDP)	31	.0507	.095	.000023	.4800
Qard Hasan Assets (% of GDP)	18	.0008	.002	4.01e-08	.0065
Istisna Assets (% of GDP)	13	.004	.004	.00008	.0163
Ijara Assets (% of GDP)	23	.0081	.012	9.09e-07	.0387
Salam Assets (% of GDP)	9	.0015	.0021	1.45e-07	.0058
Domestic credit to private sector	176	42.958	38.745	1.902	195.11
Stock market total value traded to GDP	108	23.72	38.363	.019	229.87
Government expenditure	175	16.19	5.920	4.930	42.52
Chin-ITO Financial Openness Index	181	.220	1.394	-1.88	2.389
Stock market turnover ratio (%)	108	42.01	43.912	.361	197.489

Table 2 Correlations Between Variables

Panel A: Cross Country Analysis.

λ_{OLS} and λ_{IV} are estimated using cross-country regressions using annual data for the period from 1990 to 2011. Rest of the variables are averages of the available data for the same period. * indicate significance levels at 5%.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
λ_{OLS}	1																			
λ_{IV}	0.8824*	1																		
Islamic Bank Assets IBIS	0.0778	-0.1110	1																	
Islamic Bank Loans IBIS	-0.0397	-0.1701	0.8617*	1																
Islamic Bank Assets Bankscope	-0.2195	-0.3000	0.6853*	0.8735*	1															
Islamic Bank Loans Bankscope	-0.2272	-0.2876	0.6211*	0.8806*	0.9872*	1														
Current Account	0.0941	-0.0331	0.8361*	0.8983*	0.6365*	0.6554*	1													
Mudarabah Investment Account	-0.2230	-0.3296	0.6051*	0.8624*	0.8875*	0.9159*	0.6215*	1												
Mudarabah Savings Account	0.0645	0.0605	0.4491*	0.7851*	0.5482*	0.6419*	0.7562*	0.6871*	1											
Mudaraba Assets	0.2840	0.0981	0.8102*	0.5449*	0.2294	0.1519	0.6140*	0.2102	0.1640	1										
Musharaka Assets	0.2334	0.0820	0.8901*	0.8596*	0.5487*	0.5313*	0.8813*	0.5306*	0.6269*	0.8335*	1									
Qard Hasan Assets	-0.0982	-0.0663	0.6838*	0.9422*	0.8950*	0.9366*	0.8202*	0.8878*	0.8538*	0.2511	0.6910*	1								
Murabaha Assets	0.0047	-0.1744	0.1872	0.4444*	0.3035	0.3773	0.4070*	0.3307	0.9031*	-0.0103	0.3408	0.5466*	1							
Istisna Assets	-0.3960*	-0.5105*	0.3269	0.3680*	0.3502	0.3515	0.2369	0.5333*	0.1110	0.1929	0.1433	0.2789	-0.1265	1						
Ijara Assets	-0.3558	-0.4358*	0.3049	0.4109*	0.5970*	0.5762*	0.1692	0.5013*	0.0625	-0.0028	0.0772	0.3870*	-0.0494	0.6954*	1					
Salam Assets	0.0815	0.0324	0.4764*	0.7431*	0.5696*	0.6357*	0.6696*	0.5725*	0.7932*	0.2247	0.6530*	0.7557*	0.4874*	0.2125	0.3714*	1				
Domestic credit to private sector	-0.2188*	-0.2009*	-0.2075	-0.1706	-0.0397	-0.0242	-0.1872	-0.1147	-0.1788	-0.1928	-0.2185	-0.1116	-0.1394	-0.0518	0.1116	-0.1284	1			
Stock market total value traded to GDP	-0.2737*	-0.1262	-0.1627	-0.1672	-0.1340	-0.1233	-0.0772	-0.2302	-0.1712	0.2367	-0.2156	-0.1632	-0.1593	0.0965	-0.0494	-0.1959	0.6817*	1		
Government expenditure	-0.0978	-0.1936*	-0.0157	0.0426	0.2344	0.2239	0.0185	0.3645	-0.0779	-0.1782	-0.1983	0.1214	-0.1307	0.3335	0.1442	-0.2313	0.1891*	0.0706	1	
Chin-ITO Financial Openness Index	-0.2021*	-0.1366	0.0302	-0.0070	0.1807	0.1590	-0.0234	0.0291	-0.1166	-0.1418	-0.1627	0.0195	-0.2332	0.3699*	0.4098*	-0.0117	0.4848*	0.3533*	0.1771*	1

Panel B: Panel Data Analysis

λ_{OLS} and λ_{IV} are estimated by rolling regressions with 10 year rolling window using annual data for the period from 1990 to 2011. Rest of the variables are rolling 10 year averages of the available data for the period used in estimating the risk sharing estimate. * indicate significance levels at 5%.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
λ_{OLS}	1														
λ_{IV}	0.9561*	1													
Islamic Bank Assets IBIS	0.1798*	0.0421	1												
Islamic Bank Loans IBIS	0.1728*	0.0383	0.8183*	1											
Islamic Bank Assets Bankscope	-0.1005	-0.1201	0.5212*	0.4360*	1										
Islamic Bank Loans Bankscope	-0.1412*	-0.1335	0.3790*	0.3330*	0.9773*	1									
Current Account	-0.0009	-0.0369	0.1587*	0.1579*	0.5920*	0.6731*	1								
Mudarabah Investment Account	-0.2677*	-0.2302*	0.1641*	0.4101*	0.8231*	0.8653*	0.6164*	1							
Mudarabah Savings Account	-0.0493	-0.0581	0.1010	0.3443*	0.5997*	0.7020*	0.7810*	0.7906*	1						
Risk Sharing Assets	0.1843*	0.0883	0.7817*	0.9730*	0.2706*	0.1573*	-0.0122	-0.0009	-0.0233	1					
Fixed Income Assets	0.0077	-0.0885	0.6337*	0.8070*	0.7522*	0.7264*	0.5929*	0.8685*	0.7776*	0.6451*	1				
Domestic credit to private sector	-0.1399	-0.0698*	-0.1823*	-0.1457*	-0.0974	-0.0731	-0.0239	-0.0129	-0.1488*	-0.1213*	-0.0753	1			
Stock market total value traded to GDP	-0.1096*	-0.0738*	-0.1298*	-0.1682*	-0.1507*	-0.1429*	-0.0898	-0.1735*	-0.1385	-0.1770*	-0.1121	0.6387*	1		
Government expenditure	0.0721*	0.0443	-0.1370*	-0.1002	0.0225	0.0612	0.2285*	0.2895*	0.0856	-0.1353*	0.0825	0.1324*	0.0417	1	
Chin-ITO Financial Openness Index	-0.1387*	-0.0344	-0.1048*	-0.1271*	-0.0295	-0.0052	0.1229	0.0331	0.0049	-0.1163*	0.0295	0.4588*	0.3659*	0.1900*	1

Table 3: Risk Sharing and Islamic Bank Assets: Cross-country Regressions

The dependent variable λ is the consumption smoothing parameter, computed according to the methodology explained in the paper. Not IV stands for basic OLS while IV stands for Instrumental Variable regression. Explanatory variables are the averages of the period from 1990 to 2011.
P-Values calculated from robust standard errors are reported, * **, *** ,indicate significance levels at 10%, 5% and 1% level, respectively

	IBIS Database				Bankscope Database			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable (λ)	Not IV	IV	Not IV	IV	Not IV	IV	Not IV	IV
Total Islamic Bank Assets (% of GDP)	-0.235*	-0.225			-0.167	-0.213		
	(0.134)	(0.206)			(0.134)	(0.203)		
Domestic credit to private sector (% of GDP)	0.00339*	0.00371**	-0.000310	-0.000547	0.00261	0.00258	-0.000319	-0.000551
	(0.00163)	(0.00170)	(0.000583)	(0.000523)	(0.00185)	(0.00185)	(0.000582)	(0.000523)
Stock market total value traded to GDP (%)	-0.00271*	-0.00162	-0.000883	0.000199	-0.00202	-0.00104	-0.000877	0.000208
	(0.00138)	(0.00264)	(0.000865)	(0.000812)	(0.00241)	(0.00287)	(0.000864)	(0.000809)
General government final consumption expenditure (% of GDP)	-0.00413	-0.00550	-0.00259	-0.0104**	-0.00175	-0.00292	-0.00233	-0.0102**
	(0.00937)	(0.0139)	(0.00439)	(0.00502)	(0.0105)	(0.0133)	(0.00434)	(0.00496)
Chin-ITO Financial Openness Index	-0.0832*	-0.0744	-0.0372**	-0.0114	-0.0714	-0.0564	-0.0371**	-0.0114
	(0.0443)	(0.0512)	(0.0185)	(0.0217)	(0.0414)	(0.0516)	(0.0185)	(0.0217)
Total Islamic Bank Assets (% of GDP) (With 0 for no Islamic Assets)			-0.280**	-0.235			-0.245**	-0.199
	(0.134)	(0.206)	(0.00369)	(0.00379)			(0.119)	(0.156)
Constant	0.500**	0.516**	0.582***	0.703***	0.445**	0.502**	0.578***	0.700***
	(0.175)	(0.202)	(0.0651)	(0.0795)	(0.179)	(0.203)	(0.0643)	(0.0788)
Observations	22	21	96	77	22	21	96	77
R-squared	0.439	0.356	0.167	0.119	0.293	0.250	0.169	0.119

Table 4: Risk Sharing and Islamic Bank Loans: Cross-country Regressions

The dependent variable λ is the consumption smoothing parameter, computed according to the methodology explained in the paper. Not IV stands for basic OLS while IV stands for Instrumental Variable regression. Explanatory variables are the averages of the period from 1990 to 2011.
P-Values calculated from robust standard errors are reported, * **, *** ,indicate significance levels at 10%, 5% and 1% level, respectively

	IBIS database				Bankscope Database			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable (λ)	IV	Not IV	IV	Not IV	IV	Not IV	IV	Not IV
Total Islamic Bank Loans (% of GDP)	-0.239	-0.293			-0.356	-0.289		
	(0.331)	(0.213)			(0.386)	(0.254)		
Domestic credit to private sector (% of GDP)	0.00364**	0.00331*	-0.000528	-0.000298	0.00253	0.00256	-0.000548	-0.000318
	(0.00169)	(0.00163)	(0.000521)	(0.000583)	(0.00184)	(0.00184)	(0.000521)	(0.000580)
Stock market total value traded to GDP (%)	-0.00126	-0.00248*	0.000212	-0.000871	-0.000840	-0.00189	0.000224	-0.000862
	(0.00260)	(0.00135)	(0.000822)	(0.000871)	(0.00283)	(0.00238)	(0.000811)	(0.000863)
General government final consumption expenditure (% of GDP)	-0.00654	-0.00450	-0.0105**	-0.00269	-0.00343	-0.00203	-0.0103**	-0.00240
	(0.0141)	(0.00946)	(0.00503)	(0.00439)	(0.0133)	(0.0105)	(0.00497)	(0.00434)
Chin-ITO Financial Openness Index	-0.0807	-0.0902*	-0.0130	-0.0386**	-0.0598	-0.0739*	-0.0121	-0.0378**
	(0.0505)	(0.0435)	(0.0220)	(0.0187)	(0.0503)	(0.0405)	(0.0218)	(0.0185)
Total Islamic Bank Loans (% of GDP)(With 0 for no Islamic Bank Loans)			-0.278	-0.383			-0.342	-0.441*
			(0.330)	(0.277)			(0.309)	(0.247)
Constant	0.529**	0.489**	0.701***	0.580***	0.506**	0.448**	0.701***	0.579***
	(0.204)	(0.174)	(0.0798)	(0.0655)	(0.203)	(0.179)	(0.0788)	(0.0644)
Observations	21	22	77	96	21	22	77	96
R-squared	0.341	0.425	0.109	0.160	0.245	0.290	0.116	0.167

Table 5: Risk Sharing and Current Account and Mudarabah Accounts: Cross-country Regressions

The dependent variable λ is the consumption smoothing parameter, computed according to the methodology explained in the paper. Not IV stands for basic OLS while IV stands for Instrumental Variable regression. Explanatory variables are the averages of the period from 1990 to 2011. Total of Mudarabah Accounts is the sum of Mudarabah Investment Account and Mudarabah Saving Account. Last explanatory variable, Total of Mudarabah Accounts (with 0's for no Saving or Investment Account) is the sum of Mudarabah Investment Account and Mudarabah Saving Account. It takes the value of 0 if there is Islamic banking presence in a country but no Mudarabah Investment or Saving Accounts P-Values calculated from robust standard errors are reported, * **, *** ,indicate significance levels at 10%, 5% and 1% level, respectively

Dependent Variable (λ)	(1) IV	(2) Not IV	(3) IV	(4) Not IV	(5) IV	(6) Not IV	(7) IV	(8) Not IV
Current Account (% of GDP)	2.695	3.108			2.562	3.027		
	(1.710)	(2.093)			(1.986)	(2.408)		
Mudarabah Investment Account (% of GDP)	-1.614**	-1.501**						
	(0.633)	(0.682)						
Domestic credit to private sector (% of GDP)	0.00195*	0.000415	0.00157	0.000443	0.00194*	0.000396	0.00149	0.000387
	(0.000973)	(0.00130)	(0.000976)	(0.00119)	(0.000972)	(0.00131)	(0.000992)	(0.00119)
Current Account (% of GDP) (With 0 for no Islamic Assets)			2.652	3.155			2.623	3.180
			(1.620)	(2.045)			(1.868)	(2.330)
Mudarabah Investment Account (% of GDP) (With 0 for no Islamic Assets)			-1.637**	-1.542**				
			(0.600)	(0.643)				
Total of Mudarabah Accounts (Saving+Investment) (% of GDP)					-1.340*	-1.276		
					(0.711)	(0.737)		
Total of Mudarabah Accounts (Saving+Investment) (% of GDP) (With 0 for No Saving or Ivestment Account)							-1.313*	-1.262*
							(0.665)	(0.691)
Constant	0.471***	0.464***	0.493***	0.468***	0.487***	0.481***	0.495***	0.469***
	(0.102)	(0.0954)	(0.0764)	(0.0778)	(0.101)	(0.0956)	(0.0781)	(0.0788)
Observations	19	21	27	29	20	22	27	29
R-squared	0.235	0.155	0.174	0.127	0.200	0.124	0.140	0.103

Table 6: Risk Sharing and different Forms of Islamic Financing: Cross-country Regressions

The dependent variable λ is the consumption smoothing parameter, computed according to the methodology explained in the paper. Not IV stands for basic OLS while IV stands for Instrumental Variable regression. Explanatory variables are the averages of the period from 1990 to 2011. Musharaka, Mudaraba, Murabaha, Qard Hasan, Ijara, Istisna and Salam are taken from IBIS database and each of these variables are assumed to have value of 0 if the value is not available. Total of Risk Sharing Products of Islamic Bank Assets (% of GDP) is the sum of Musharaka, Mudaraba Qard Hasan assets. Total of Fixed Income of Islamic Bank Assets is the sum of Murabaha, Istisna, Ijara and Salam assets

P-Values calculated from robust standard errors are reported, *, ** indicate significance levels at 5% and 1% level, respectively

Dependent Variable (λ)	(1) Not IV	(2) IV	(3) Not IV	(4) IV
Musharaka Assets (% of GDP)	-2.769	-3.902		
Mudaraba Assets (% of GDP)	-0.305	-0.140		
Murabaha Assets (% of GDP)	2.359	4.014		
Qard Hasan Assets (% of GDP)	-0.377	-0.467*		
Istisna Assets (% of GDP)	-1.260**	-1.321**		
Ijara Assets (% of GDP)	0.080	-0.515		
Salam Assets (% of GDP)	0.830	0.497		
Domestic credit to private sector (% of GDP)	0.010	0.286	0.248	0.392
Stock market turnover ratio (%)	0.136	0.082	-0.084	-0.142
General government final consumption expenditure (% of GDP)	0.064	-0.203	-0.120	-0.209
Chin-ITO Financial Openness Index	-0.393	-0.233	-0.564*	-0.410
Total of Risk Sharing Products of Islamic Bank Assets (% of GDP)			-0.053	-0.167
Total of Fixed Income of Islamic Bank Assets (% of GDP)			-0.102	0.029
R-squared	0.65	0.72	0.38	0.35
Observations	22	21	22	21

Table 7: Risk Sharing and Islamic Banking Assets and Loans from IBIS Database: Panel Regressions

The dependent variable λ is the consumption smoothing parameter, computed using 10 year rolling window period according to the methodology explained in the paper. Not IV stands for pooled OLS while IV stands for Instrumental Variable regression. Explanatory variables are the rolling 10 year averages of the period from 1990 to 2011. P-Values calculated from robust standard errors are reported, * **, *** ,indicate significance levels at 10%, 5% and 1% level, respectively

Dependent Variable (λ)	(1) IV	(2) Not IV	(3) Not IV	(4) IV	(5) IV	(6) Not IV	(7) Not IV	(8) IV
Total Islamic Bank Assets (% of GDP)	-0.166	-0.383*	-0.537***	-0.276				
	(0.269)	(0.184)	(0.180)	(0.346)				
Domestic credit to private sector (% of GDP)	0.00363*	0.00204	0.00264	0.00541***	0.00350*	0.00157	0.000250	0.00401**
	(0.00198)	(0.00211)	(0.00285)	(0.00172)	(0.00181)	(0.00175)	(0.00236)	(0.00202)
Stock market total value traded to GDP (%)	-0.00214	-0.00249	-0.000715	-0.00193	-0.00161	-0.00120	0.000163	-0.000860
	(0.00243)	(0.00243)	(0.00237)	(0.00221)	(0.00231)	(0.00196)	(0.00216)	(0.00246)
General government final consumption expenditure (% of GDP)	-0.00357	-0.00193	-0.0105	-0.0172	-0.00638	-0.00612	-0.00834	-0.0104
	(0.0106)	(0.0103)	(0.0137)	(0.0130)	(0.00920)	(0.00857)	(0.0107)	(0.0128)
Chin-ITO Financial Openness Index	-0.0369	-0.0648	0.0505**	0.0684***	-0.0325	-0.0558	-0.0121	0.0322
	(0.0362)	(0.0412)	(0.0207)	(0.0212)	(0.0354)	(0.0331)	(0.0281)	(0.0310)
Bank lending-deposit spread	0.0353	0.00442	-0.0692	0.0313	0.0466	0.0209	-0.0399	0.0382
	(0.0302)	(0.0309)	(0.0727)	(0.0324)	(0.0288)	(0.0277)	(0.0477)	(0.0273)
Total Islamic Loans (% of GDP)					-0.104	-0.504	-0.976*	-0.358
					(0.438)	(0.420)	(0.520)	(0.669)
Constant	0.291	0.572**	0.907	0.380	0.238	0.502**	0.886**	0.303
	(0.254)	(0.241)	(0.604)	(0.370)	(0.261)	(0.234)	(0.384)	(0.319)
Observations	127	163	163	127	116	148	148	116
R-squared	0.198	0.254	0.158	0.2342	0.202	0.235	0.102	0.078
Number of isocodeencoded			17	16			17	16
FE			YES	-			-	-
RE			-	YES			YES	YES
Hausman Test Pvalue			0.0302	0.0682			0.2874	0.6649

Table 8: Risk Sharing and Islamic Banking Assets and Loans from Bankscope Database: Panel Regressions

The dependent variable λ is the consumption smoothing parameter, computed using 10 year rolling window period according to the methodology explained in the paper. Not IV stands for pooled OLS while IV stands for Instrumental Variable regression. Explanatory variables are the rolling 10 year averages of the period from 1990 to 2011. P-Values calculated from robust standard errors are reported, * **, *** ,indicate significance levels at 10%, 5% and 1% level, respectively

Dependent Variable (λ)	(1) Not IV	(2) IV	(3) Not IV	(4) IV	(5) Not IV	(6) IV	(7) IV	(8) Not IV
Total Islamic Bank Assets (% of GDP)	-0.272	-0.0765	-0.532***	-0.221				
	(0.206)	(0.289)	(0.132)	(0.322)				
Domestic credit to private sector (% of GDP)	0.00176	0.00214	0.00113	0.00333	0.00170	0.00271	0.00402**	0.00135
	(0.00198)	(0.00206)	(0.00301)	(0.00249)	(0.00199)	(0.00197)	(0.00199)	(0.00305)
Stock market total value traded to GDP (%)	-0.000813	0.000184	-0.00118	-0.000263	-0.000649	-6.88e-05	-0.000715	-0.00117
	(0.00236)	(0.00287)	(0.00210)	(0.00315)	(0.00233)	(0.00283)	(0.00280)	(0.00217)
General government final consumption expenditure (% of GDP)	-0.00236	-0.00359	-0.0232**	-0.0163	-0.00302	-0.00542	-0.0156	-0.0214**
	(0.00921)	(0.0114)	(0.00859)	(0.0131)	(0.00925)	(0.0111)	(0.0130)	(0.00924)
Chin-ITO Financial Openness Index	-0.0509	-0.0250	0.0419	0.0555	-0.0537	-0.0243	0.0574	0.0422
	(0.0468)	(0.0442)	(0.0388)	(0.0377)	(0.0463)	(0.0433)	(0.0349)	(0.0390)
Bank lending-deposit spread	0.0237	0.0433	-0.0493	0.0285	0.0235	0.0465	0.0305	-0.0485
	(0.0242)	(0.0306)	(0.0475)	(0.0260)	(0.0261)	(0.0306)	(0.0277)	(0.0484)
Total Islamic Bank Loans (% of GDP)					-0.436	-0.0180	-0.200	-1.033**
					(0.409)	(0.500)	(0.745)	(0.408)
Constant	0.399	0.216	1.068**	0.405	0.404	0.194	0.349	1.027**
	(0.249)	(0.261)	(0.380)	(0.309)	(0.256)	(0.263)	(0.313)	(0.384)
Observations	155	123	155	123	154	122	122	154
R-squared	0.222	0.146	0.189	0.159	0.208	0.159	0.171	0.169
Number of isocodeencoded			18	17			17	18
FE			YES	-			-	YES
RE			-	YES			YES	-
Hausman Test Pvalue			0.0151	0.2218			0.1699	0.0156

Table 9: Risk Sharing and Current Account and Mudarabah Investment Accounts: Panel Regressions

The dependent variable λ is the consumption smoothing parameter, computed using 10 year rolling window period according to the methodology explained in the paper. Not IV stands for pooled OLS while IV stands for Instrumental Variable regression. Explanatory variables are the rolling 10 year averages of the period from 1990 to 2011.
P-Values calculated from robust standard errors are reported, * **, *** ,indicate significance levels at 10%, 5% and 1% level, respectively

Dependent Variable (λ)	(1) IV	(2) Not IV	(3) IV	(4) Not IV
Current Account (% of GDP)	2.726***	1.732***	2.333**	0.509
	(0.437)	(0.544)	(1.180)	(0.498)
Mudarabah Investment Account (% of GDP)	-1.132**	-0.412	-0.823	-0.192
	(0.431)	(0.420)	(1.002)	(0.557)
Domestic credit to private sector (% of GDP)	0.00295***	0.00253***	0.00380***	0.00302***
	(0.000665)	(0.000602)	(0.000670)	(0.000676)
General government final consumption expenditure (% of GDP)	-0.0150	-0.0193**	-0.0225**	-0.0211**
	(0.00866)	(0.00650)	(0.0100)	(0.00934)
Chin-ITO Financial Openness Index	0.0163	0.00107	0.0516***	0.0296
	(0.0236)	(0.0268)	(0.0173)	(0.0287)
Gross domestic savings (% of GDP)	-0.0109***	-0.0114***	-0.00990***	-0.0118***
	(0.00316)	(0.00322)	(0.00224)	(0.00387)
Stock market turnover ratio (%)	-1.87e-05	4.70e-05	0.000578	0.000288
	(0.000489)	(0.000382)	(0.000509)	(0.000400)
Constant	0.805***	0.897***	0.778***	0.898***
	(0.239)	(0.194)	(0.218)	(0.208)
Observations	124	167	124	167
R-squared	0.536	0.546	0.271	0.171
Number of isocodeencoded			15	15
FE			-	-
RE			YES	YES
Hausman Test Pvalue			0.5702	0.3418

Table 10: Risk Sharing and different Forms of Islamic Financing: Panel Regressions

The dependent variable λ is the consumption smoothing parameter, computed using 10 year rolling window period according to the methodology explained in the paper. Not IV stands for pooled OLS while IV stands for Instrumental Variable regression. Explanatory variables are the rolling 10 year log averages of the period from 1990 to 2011. Risk Sharing Accounts are the sum of Musharaka, Murabaha, Qard Hasan assets while Fixed Income Products represent the sum of Murabaha, Istisna, Ijara and Salam assets.
P-Values calculated from robust standard errors are reported, * **, *** ,indicate significance levels at 10%, 5% and 1% level, respectively

	(1)	(2)	(3)	(4)
Dependent Variable (λ)	IV	Not IV	IV	Not IV
Logarithm of Total of Risk Sharing Accounts from IBIS (% of GDP)	-0.00533	-0.00607	-0.000724	-0.00387
	(0.00361)	(0.00376)	(0.00573)	(0.00314)
Logarithm of Total of Fixed Income Accounts from IBIS (% of GDP)	0.0111***	0.0102**	0.00639**	0.00669**
	(0.00369)	(0.00409)	(0.00305)	(0.00270)
Logarithm of Domestic Credit (% of GDP)	-0.0183	-0.0299	-0.0908	-0.0826**
	(0.0324)	(0.0269)	(0.0634)	(0.0393)
Logarithm of General government final consumption expenditure (% of GDP)	0.0280	0.0632	0.0837	0.0615
	(0.0628)	(0.0769)	(0.124)	(0.0698)
Logarithm of Chin-ITO Financial Openness Index	0.00106	-0.0252	-0.0101	0.00232
	(0.0244)	(0.0290)	(0.0289)	(0.0225)
Logarithm of Gross savings (% of GDP)	-0.0989**	-0.0834**	0.0969	0.0320
	(0.0478)	(0.0344)	(0.0686)	(0.0354)
Logarithm of Bank lending-deposit spread	-0.0356	-0.0183	-0.0508	-0.0281
	(0.0317)	(0.0287)	(0.0424)	(0.0343)
Constant	0.920***	0.765***	0.507	0.658***
	(0.252)	(0.267)	(0.540)	(0.248)
Observations	1,211	1,622	1,211	1,622
R-squared	0.057	0.076	0.040	0.0379
Number of isocodeencoded			132	139
FE			YES	-
RE			-	YES
Hausman Test Pvalue			0.0023	0.0626