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4 Capital Structure, Risk Shifting and Stability: Conventional and Islamic Banking³⁹

4.1 Introduction

Risk shifting and capitalization premise postulates that due to the limited liability, equity holders of a bank get a put option on the assets of the banks from the creditors and value of their put option becomes higher, more volatile is the value of bank's assets. Thus, thinly capitalized banks are expected to take more risk due to higher debt equity ratio (higher leverage). From regulatory point of view generally Islamic banking institutions (IBIs) need to fulfill the same minimum capital requirements as the conventional banking institutions (CBIs) do. However, IBIs have an extra line of protection in the form of *mudarabah* saving and investment (S&I) deposits based on profit and loss sharing (PLS) contract.⁴⁰ IBIs share their profits or loss with these account holders. Because of this quasi equity, a priori, IBIs are expected to take lower risks in comparison to their peer counterparts. These banking institutions thus have less incentive for risk shifting in distress. Therefore, these banks expected to be more stable and have better quality.

However, the structure of the IBIs may have unique impact on the performance, risk exposure and financial stability of the total financial sector and overall economy. Specific risks are attached to the structure of IBIs. On the liability side, if the Islamic banks pay lower return to the S&I account holders than the rate paid by other banks or pass some losses to these depositors, they may withdraw their deposits from the Islamic banks. Thus there may be a greater risk of deposit withdrawal for Islamic banks than for conventional banks (Sundararajan and Errico (2002)). Especially, for small Islamic banks this risk is higher and thus more problematic. To manage this risk Islamic banks forgo part of their profit share as a *mudarib* to pay competitive returns to the S&I *mudarabah* account holders. In case IBIs incur some loss, *all* that loss may be taken to the income accounts of IBIs, which otherwise

³⁹ The chapter is based on joint work with Moazzam Farooq and Sweder van Wijnbergen. The authors acknowledge the data support from State Bank of Pakistan. All views expressed here are those of authors and do not necessarily represent the views of State Bank of Pakistan or its subsidiaries.

⁴⁰ *Mudarabah* is a partnership in which one party invests its capital (*rab-ul-mal*) and the other party exerts its skills and services in the business. The profit is distributed between parties according to a pre-agreed ratio. All the financial loss is borne by the investors. The loss of *mudarib* is in kind of sacrifice of time and efforts.

has be shared with S&I account holders. This activity exposes the equity holders of Islamic bank to a peculiar risk, called displaced commercial risk. Islamic Financial Services Board⁴¹ (2011) defines this risk as additional risk borne by shareholders of Islamic financial institutions due to volatility of returns over and above the normal risks when S&I account holders were to share the loss in accordance with *mudarabah* contract.

In other words, shareholders of an Islamic bank are exposed to additional losses which actually pertain to the S&I depositors. To mitigate this risk Islamic banks create reserve pools by paying *lower* return to S&I account holders than the actual profit when IBIs returns are higher than the market average return. One the other hand, in recession the Islamic banks try to smooth the returns through these reserves by paying *higher* than the actual returns. On the asset side, the risks of IBIs are generally similar to that of leasing in conventional finance. Apart from that Islamic banks also have *shariah* compliance risk which may also affect the goodwill of these banks.

The proponents of Islamic finance argue that financial intermediation based on Islamic principles would bring in greater stability in the domestic economy, financial markets and even in the international economy (Chapra (2008); El-Gamal (2000); Nigel (1998); Siddiqi (2006); Zaher and Hassan (2001)). In a theoretical model of interest-free banking system, Khan (1986) treats deposits of an Islamic bank as equity in the banks and replaces interest rate with expected rate of return on deposits. The author shows that Islamic banking system may better resist to the shocks to the asset side of balance sheet as these shocks can be instantaneously absorbed by the liability side. Whereas in the conventional banking system these types of adjustments take more time and can cause instability. After the current financial crisis, renewed importance has been given to the riskiness and stability of Islamic banking in comparison to conventional banking. Various empirical studies have been conducted at individual and institutional level, especially the World Bank and the IMF, level on Islamic banking performance and stability. We hope to contribute in this emerging literature through an empirical study using bank-time fixed effect model.

⁴¹Islamic Financial Services Board is an international standard-setting organization that issues global prudential standards and guiding principles for the Islamic financial industry, broadly defined to include banking, capital markets and insurance sectors.

Our results show that full-fledged Islamic banks (IBs) are more stable than conventional banking institutions (CBIs). These banks are also better capitalized than their conventional counterparts. Moreover, full-fledged IBs also have less volatility in return on their assets, have lower non-performing loans (NPLs) and, therefore, lower loan loss provisioning. Similarly, Islamic banking branches (IBBs) of mixed banks, with both conventional and Islamic windows, have better asset quality as they have lower NPLs and loan loss provisioning than that of conventional banking institutions (CBIs). The model with bank-time fixed effects show that Islamic windows of small mixed banks are better capitalized and higher return on assets. However, due to higher volatility in returns of their assets, their stability index is lower than that of conventional banking branches (CBBs) of mixed banks. Conversely, NPLs and thus loan loss provisioning by IBBs of both small and large mixed banks is lower in comparison to conventional banking branches of mixed banks. This shows that Islamic windows of mixed banks have better asset quality than their conventional windows.

The rest of the chapter is organized as follows. Section 1.2 reviews the literature on the subject, section 1.3 analyzes the hypothesis about the risks, asset quality and stability of Islamic banks, section 1.4 highlights the issues in PLS based S&I accounts of Islamic banks with reference to their accounting treatments, section 1.5 describes the data and main indicators used in the paper and section 1.6 explains the econometric techniques employed for the estimation. Finally, section 1.7 presents the results and section 1.8 concludes the study.

4.2 Review of Empirical Literature on Islamic Banking

Initial study on the stability of Islamic banks is made by Bashir (1999) at a small scale using the data of only two Islamic banks in Sudan. The author evaluates the impact of size on various bank indicators and finds that size has a positive influence on profitability and riskiness,⁴² but negative effect on capital-asset ratio of Islamic banks. Employing z-scores to test the relative strength of banks in 18 countries from 1993-2004, Čihák and Hesse (2010) find that small Islamic banks are financially stronger than small and large commercial banks, whereas, large Islamic banks are weaker than large commercial banks (See Figure 1 for

⁴² The author uses the *risk index* (so-called z-score) to measure the riskiness of the banks.

summary of empirical studies on Islamic banking). They attribute their findings to the issues of credit risk management, in large Islamic banks, related to financing based on Profit and Loss Sharing (PLS) arrangements. However, Islamic banks prefer trade and leasing for financing instead of PLS products (Aggarwal and Yousef (2000); Beck, Demirgüç-Kunt and Merrouche (2013)) and the share of PLS in Islamic banks' total portfolio is relatively small (Baele, Farooq and Ongena (2012); Chong and Liu (2009); Zaheer, Ongena and Van Wijnbergen (2013)).

In a broader study covering 141 countries over the period 1995-2007, Beck, Demirgüç-Kunt and Merrouche (2013) compare the business model, efficiency, asset quality and stability of the Islamic banks and conventional banks employing a group of indicators from their balance sheets and income statements. They note that Islamic banks are better capitalized but they do not find significant differences between the business model,⁴³ efficiency, asset quality or stability of Islamic and conventional banks. Using loan level data of Pakistani banking sector from 2006 to 2008, Baele, Farooq and Ongena (2012) find that compared to conventional loans, on average Islamic loans are less likely to default. Using a sample of 553 banks from 24 countries between 1999 and 2009, Abedifar, Tarazi and Molyneux (2010) gauge the risk and stability characteristics of Islamic banking. Their study finds that small Islamic banks that are more leveraged and based in countries with predominantly Muslim population, have lower credit risk than conventional banks, and are more stable than similarly sized conventional banks. On the other hand, they did not find any significant difference between large Islamic and conventional banks. These papers suggest that the structure of banking sector, demographics of its location and the size and organization of Islamic banks may influence the health of Islamic banks. In another study, Hasan and Dridi (2010) evaluates the performance of IBs and CBs during the recent financial crisis by looking at the profitability of 120 Islamic and conventional banks across eight countries during the period 2007-09. Their finding show that during financial crisis profitability of IBs declines more than that of CBs, owing to weak risk management practices.

⁴³ See section 3.4 for capital structure of IBIs.

Figure 1: The figure summarizes selected empirical work on Islamic banking.

Paper	Sample data		# Obs.	At Level		Explains	Analysis
	Countries	Period		Country – Year	Bank		
(Imam and Kpodar (2010))	117	1992-2006	1,520	Country – Year	Presence	Identifies various factors of diffusion	<i>Finds (w.r.t. differences between conventional and Islamic banks / loans)</i>
(Mohamad, Hassan and Bader (2008)), (Bader, Mohamad, Arif and Hassan (2008))	21	1990-2005	80	Bank	Efficiency	No differences	
(Chong and Liu (2009))	Malaysia	1995:04-2004:04	109	Month	Average interest rates	Islamic deposits are not interest-free, but are closely pegged to conventional deposits	
(Çihak and Hesse (2010))	18	1993-2004	2,347	Bank - Year	Z-score Bank strength	Small Islamic > small conventional Large conventional > large Islamic Small Islamic > large Islamic	
(Abdul-Majid, Saal and Battisti (2010))	10	1996-2002		Bank - Year	Technical inefficiency	Islamic banks are more technically inefficient	
(Hasan and Dridi (2010))	8	2007-2009	120	Bank-Year	Profitability	Profitability of Islamic banks declined more than that of conventional banks during 2009	
(Abedifar, Molyneux and Tarazi (2011))	22	2001-2008	1,230	Bank - Year	Bank stability, loan risk	No differences in insolvency risk; for Islamic banks lower loan loss reserves or problem loans but more frequent write-offs and lower recovery	
(Weill (2010))	17	2000-2007	1,301	Bank - Year	Bank market power (Lerner)	Islamic banks have somewhat less market power	
(Beck, Demirgüç-Kunt and Merrouche (2010))	141	1995-2007	25,000	Bank - Year	Various bank measures	Few significant differences in business orientation, efficiency, asset quality, or stability	
(Ongena and Şendeniz-Yüncü (2011))	Turkey	2008	16,056	Bank - Firm	Firm bank choice	Islamic banks deal with young, multiple-bank, industry-focused and transparent firms	
(Pepinsky (2010))	Indonesia	2008:05/06	2,548	Consumers	Views on Islamic Finance	Islamic identity matters, not piety	
(Khan and Khaana (2010))	Pakistan	2008	9,078	Customers at two banks	Opening bank account	Religiosity and wealth matters when opening an Islamic bank account	
(Khan (2010))	Pakistan	2006:06-2009:03	995	Bank - Account	Growth deposit accounts	Islamic deposit accounts grow faster than conventional ones	
(Baele, Farooq and Ongena (2012))	Pakistan	2006:04-2008:12	603,677	Loan - Month	Loan default	Islamic loans less likely to default	
This Study	Pakistan	2002:02-2010:03	1,696	Bank-Quarter	Asset quality Stability	Islamic banking Institutions > Conventional Islamic banks > Conventional	
				Bank-Time Fixed Effects	Asset quality Stability	Islamic branches > Conventional Small Islamic branches < Conventional	

Note: The figure is mainly based on Baele, Farooq and Ongena (2012).

It is a long held idea that profit and loss sharing system will perform better than an interest-based system. Using Bahrain Islamic Bank as a case, Turen (1996) shows that during the period of analysis this bank offered a higher risk adjusted return as compared to commercial banks operating in Bahrain and argues that the profit sharing concept of Islamic banking can achieve a higher profitability and lower risk than conventional commercial banks. Al-Deehani, Karim, and Murinde (1999) argue that because of the profit sharing provisions with the depositors, Islamic bank can increase their market value and return on equity without incurring any additional financial risk. Using a sample of 12 Islamic banks they provide empirical evidence in support of their theoretical argument.

4.3 Conjectures about Risks Shifting Incentives, Financial Stability and Asset Quality of Conventional and Islamic Banking

IBIs are considered more stable as generally they don't have the features of conventional banks which led those banks to recent financial crisis. Main causes of financial crisis 2007-2009 are described as heavy reliance on interest based debt financing, high leverage, lack of adequate market discipline, excessive and imprudent credit growth, investments in toxic assets and speculative short selling (Bank For International Settlements (2008); Bernanke (2008)). Most of the causes are either absent or at lower level in Islamic banks than in conventional banks. Islamic banking, therefore, is less susceptible to financial crises at least in the first round of the financial crisis when it does not hit the real sector of the economy. Chapra (2008) proposes that financial instability can be avoided through *“risk-sharing along with the availability of credit for primarily the purchase of real goods and services and restrictions on the sale of debt, short sales, excessive uncertainty (gharar), and gambling (qimar).”* These are the very features of Islamic banking contracts which put greater market discipline and thus financial stability. For instance, asset-backed financing of Islamic banks ensures the direct link between financial transaction and real sector activities (Mohieldin (2012)). In Islamic banking since S&I depositors share in profit and loss of the Islamic banks, they are exposed to risk of capital loss. Therefore, S&I account holders of Islamic banks may have more incentives to monitor their banks than those of conventional banks (Beck, Demirgüç-Kunt and Merrouche (2013)). Thus liability structure of Islamic banks may impose the required market discipline.⁴⁴

⁴⁴On the other hand, Islamic banks may not exploit the equity-like nature of saving and investment accounts as they face displaced commercial risk.

On the asset side, conventional banks mainly see the credibility of the borrower which depends on the net-worth and collateral of the borrower. Generally, conventional banks do not appraise the project for which they lend money, and extend financing even for speculation, especially when the risk of default can be transferred to other persons by selling the debt (Chapra (2008)). Moreover, these banks, especially big ones, may remain less prudent in lending because of the bailout assurance by the central banks and governments according to ‘‘too big to fail’’ axiom (Boyd and Gertler (1993); Mishkin (2000)). Currently, this problem does not exist in Islamic banking because of their small market share. Moral hazard problem cannot be ruled out in Islamic banks, especially if the management of the banks believes that losses can easily be passed on to S&I account holders. This problem may, however, be less potent because of deposit withdrawal risk faced by Islamic banks.

Loans of Islamic banking institutions are presumably less likely to default due to religious motivations of the borrowers, if they are predominately Muslims, and if the decision of preferring an Islamic bank over conventional is religiously motivated. Consequently, asset quality of IBIs may show, if not superior, similar position to that of conventional banks especially in jurisdictions where Muslims are in majority. The basic hypothesis is that delay in repayment of the loans by the rich Muslims, is considered as unjust and, therefore, a major sin.⁴⁵ Thus, devout Muslims who only do business with IBIs are ostensibly less likely to default on their obligations. Even the Muslims who take loans both from IBIs and CBIs, in financial distress would prefer to default on conventional loans, instead of Islamic loans, considering it a lesser evil. Consequently, if business cycles affect both the borrowers of IBIs and CBIs homogeneously, the NPLs of IBIs would likely to be lower than that of CBIs. Even if IBIs operate in Muslim minority country, the ban on short selling, debt sale and excessive speculation accompanied by asset-backed nature of Islamic banks can prevent the Islamic bank from losses.

Islamic deposits have two characteristics that make them different from regular deposits. First, their return is profit dependent, with a limited upswing, so they are also different from equity claims in that respect. Their principal value is senior to equity however. A second difference is less rule based and more grounded in practice: Islamic

⁴⁵It is reported that Allah's Messenger (may peace be upon him) said, ‘‘*Delay (in the payment of debt) on the part of a rich man is injustice.* Sahih Muslim, The Book of Transactions, Hadith 3796, <http://sunnah.com/urn/237960>.

banks in Pakistan have part of their assets in a reserve account that is used as collateral for the deposits only: equity holders have no access to that pool of assets, also not in “going concern” distress situations. Due to the profit and loss sharing nature of Islamic deposits risk shifting incentives in Islamic banks are weaker than in regular banks with similar capital structure. That is the prediction we will test in the following empirical sections.

4.4 Treatment of S&I deposits and Capital of Islamic Banking Institutions

There are some issues about treatment of S&I deposits of Islamic banks for the calculation of equity capital of Islamic banks. Since Islamic banks issue S&I deposits on the PLS basis, these are considered as quasi equity, a category between time deposits and pure equity. These accounts are not deposits in true spirit as the return on these deposits is attached to the Islamic bank’s performance. Even the principal amount is not guaranteed to S&I depositors contractually. On the other hand, S&I deposits may not be given the status of equity as unlike equity these accounts are redeemable in nature i.e. the investment account holders can withdraw them on maturity of these accounts. Even investment accounts can be withdrawn prematurely if an advance notice of one month is given (Čihák and Hesse (2010)) with or without some cost, depending upon the each Islamic bank’s policy. Whereas saving accounts are callable deposits and thus can be withdrawn anytime. Therefore, according to Financial Accounting Standard No.6 of Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) these accounts should be treated “as an independent category between liabilities and owners’ equity.”⁴⁶ The S&I accounts provide an extra line of protection for the Islamic banks besides equity when loss occurs to the Islamic bank.

Therefore, in principle these S&I accounts of IBIs should not be considered as liability of these banking institutions. However, in reality, Islamic banks treat these accounts as liabilities as competitive return are paid thereon regardless of the actual returns of the Islamic banks. This may even happen when the actual return of an Islamic bank is lower than the market return or, in extreme case, when the actual return is negative. This is done through the technique in which Islamic bank institutions forgo part of their share in profit as *mudarabah*, and give the same as a gift (*hibah*) to the S&I account holders.

⁴⁶Accounting and Auditing Organization for Islamic Financial Institutions, 1998. Accounting and Auditing Standards for Islamic Financial Institutions, Bahrain.

Generally, Islamic banking institutions do not include S&I accounts in capital while calculating minimum capital requirement for Basel II and Basel III according to the instructions of the central bank. For our estimation purpose first we treat these accounts as liabilities to make the indicators of stability comparable for IBIs and CBIs.⁴⁷ This approach renders the stability indicators of Islamic banks lower than if we consider S&I deposits as part of equity. However, we also check the results by treating these accounts as equity of the IBIs and compute the capitalization and stability index of IBIs. Obviously, this treatment would make stability indicators of IBIs starkly different from the same indicators of CBIs.

4.5 Data and Descriptive Statistics

We use individual quarterly financial accounts of all commercial banks submitted to the SBP at the end of each quarter. The data contains very detailed information of all the balance sheet and income statement items of all commercial banks (both Islamic and conventional). We construct the indicators for asset quality and stability to evaluate the performance of Islamic and conventional banking institutions. The data covers 32 quarters starting from June 2002 to March 2010. There are 21 conventional banks (CBs), 6 full-fledged Islamic banks (IBs) and 13 mixed banks with both Islamic as well as conventional operations. Following the convention in Pakistan, we name the Islamic branches of mixed banks as Islamic banking branches (IBBs) and their conventional branches as conventional banking branches (CBBs). Both IBBs and full-fledged Islamic banks (IBs) form the Islamic banking institutions (IBIs).

Table 1 shows descriptive statistics of main indicators for IBIs and CBIs. We use z-score to compare the riskiness and insolvency of the Islamic and conventional banking institutions. The z-score has been increasingly used to check the bank's soundness. Bank insolvency is defined as a state where $(CAR + ROA) < 0$ or $CAR < -ROA$, with CAR being the bank's capital to asset ratio and ROA its return on assets, or equally when losses exceed the bank capital (Beck, Demirgüç-Kunt and Merrouche (2013); Boyd and Runkle (1993); Čihák and Hesse (2010)). Z-score is constructed as the sum of the mean rate of return on assets (μ) and the mean equity-to-assets ratio (k) divided by the standard deviation of the return on assets (σ), i.e., $z\text{-score} = \frac{\mu+k}{\sigma}$.

⁴⁷Thus the capital of both the banking institutions comprise share capital, reserves, un-appropriated profit and surplus or deficit on revaluation of assets.

Table 1. Descriptive Statistics

The table shows the descriptive statistics of all the indicators used for estimation in all specifications. We also report p-values for the test of difference in means between Islamic banking Institutions and conventional banking institutions. All the bank balance sheet data from State Bank of Pakistan is quarterly and cover the period from 2002-Q2 to 2010-Q1. There are 6 full-fledged Islamic banks (IBs) 21 Conventional banks (CBs) and 13 Conventional Banks which also host Islamic banking through their Islamic Banking Branches (IBBs). We call these banks as *dual banks*. For estimation purpose we treat these IBBs as separate entities. So there are 53 banks with 32 quarters for whole sample (Sample A). Sample B contains only dual banks with comparison of their conventional and Islamic business. Higher number of the z-score suggests greater stability. All ratios are in percentage. All variables are winsorized at the 1% and 99% level to remove outliers.

Sample A All Banks

Variable	Normalized by	Obs.	Mean	Median	Std.Dev.	Max	Min	Islamic Banking Institutions	Conventional Banking Institutions	p-value
Islamic Banking Institutions		1696	0.36		0.48	1	0			
Islamic Banks		1696	0.11		0.32	1	0			
Islamic Banking Branches		1696	0.25		0.43	1	0			
z-score		1423	15.55	12.39	18.94	88.87	-60.26	33.63	14.15	0.00
Return on Assets		1423	0.53	0.64	1.58	4.60	-6.33	0.32	0.32	0.96
Capital-Asset Ratio		1423	9.88	10.56	45.47	83.28	-321.30	19.47	5.85	0.00
Non-Performing Loans	Gross Loans	1367	13.89	4.77	22.24	96.90	0.00	1.61	23.52	0.00
Loan Loss Provisioning	Gross Loans	1369	9.92	3.31	18.34	93.21	0.00	0.78	8.04	0.00
<i>Bank Level Controls</i>										
Size		1423	10.00	10.01	1.91	13.49	4.53	7.99	10.61	0.00
Non-Loan Earning Assets	Total Earning Assets	1423	52.19	48.43	18.99	99.55	9.19	44.16	54.42	0.00
Fixed Assets	Total Assets	1423	2.98	1.70	3.93	22.90	0.00	3.43	2.75	0.00

Table 1. Sample B Dual Banks

Variable	Normalized by	Obs.	Mean	Median	Std.Dev.	Max	Min	Islamic Banking Institutions	Conventional Banking Institutions	p-value
Islamic Banking Branches		832	0.5	0.5	0.5	1	0			
Gross Loans	Total Assets	665	53.69	54.96	17.16	128.37	0.00	52.28	54.63	0.09
ZSCORE		665	13.98	13.08	8.59	72.19	3.67	25.24	15.05	0.00
Return on Assets		665	1.18	0.90	1.01	4.60	-1.23	0.49	0.92	0.00
Capital-Asset Ratio		665	12.09	8.10	13.84	92.08	3.36	18.42	8.30	0.00
Non-Performing Loans	Gross Loans	613	6.39	2.74	8.62	45.94	0.00	1.01	9.26	0.00
Loan Loss Provisioning	Gross Loans	612	4.37	2.14	5.15	27.70	0.00	0.57	3.78	0.00
<i>Bank Level Controls</i>										
Size		665	10.26	10.98	2.42	13.62	4.05	7.56	11.88	0.00
Non-Loan Earning Assets	Total Earning Assets	661	36.36	36.92	19.53	100.00	0.00	43.78	48.31	0.00
Fixed Assets	Total Assets	665	2.69	1.78	3.58	21.95	0.00	3.23	2.40	0.01

It measures the risk of insolvency or distance to default. While combining accounting measures of profitability, leverage and volatility, it exhibits the probability of loss surmounting the equity capital. The sample data shows that average z-score of Islamic banks is significantly higher than that of conventional banks, portraying that IBIs are more stable than their conventional peers. Specifically, the average z-score for IBIs is 33.63, whereas for conventional banks it is 14.15. Similarly, IBIs are better capitalized than CBIs which leads to higher stability of IBIs than conventional banks. Specifically, the CAR of IBIs is 19.47 percent in comparison to CBI's 5.85 percent. We use NPLs to

Table 2 Correlation Matrix Among Selected Variables

In this panel we report Pearson correlation coefficients. The asterisks, i.e., ***, ** and * show that statistically there is a significant correlation between underlying variables at 1%, 5% and 10% level respectively. For example, the correlation between z-score and Islamic Banking Institutions (IBIs), which comprise Islamic banks and Islamic Banking Branches, is 19 percent and statistically significant. This shows that IBI are more stable than conventional banking institutions.

Z-score	1																		
Return on Assets	0.19***	1																	
Capital to asset Ratio	0.75***	0.24***	1																
Non-Performing Loans	-0.46***	-0.29***	-0.5***	1															
Loan Loss Provisioning	-0.45***	-0.26***	-0.51***	0.94***	1														
Non-Loan Earning Assets	0.04	-0.09***	-0.11***	0.37***	0.41***	1													
Fixed Assets Size	0.04	-0.27***	0.1***	0.08***	0.01	-0.06**	1												
Islamic Banking Institutions	-0.19***	0.17***	-0.03	-0.15***	-0.16***	-0.24***	-0.01	1											
Islamic Banks	0.19***	-0.01	0.09***	-0.29***	-0.26***	-0.25***	0.07**	-0.45***	1										
Islamic Banking Branches	0.21***	-0.05*	0.1***	-0.16***	-0.14***	-0.05*	0.11***	-0.08***	0.59***	1									
	0.06**	0.02	0.03	-0.22***	-0.19***	-0.26***	-0.01***	-0.48***	0.73***	-0.12***	1								

gross loans and provisioning to gross loans to compare the *asset quality* of both banking systems. Lower NPLs and provisioning indicates better quality of assets of a bank. NPLs and provisioning of IBIs are significantly lower than those of CBIs, representing superior asset quality of IBIs. Precisely, average NPLs and provisioning, both normalized by gross loans, for IBIs are 1.61 and 0.78 percent respectively. Whereas the same ratios for CBIs are 23.52 percent and 8.04 percent.

The industry average of these two indicators is 13.89 percent and 9.92 percent respectively. In sample B, we present the descriptive statistics of mixed banks used in our fixed effects specifications. While comparing the IBBs with CBBs the results is mostly similar to those of sample A. IBBs are less profitable than CBBs. The potential reason could be at initial stage for their operations, IBBs need to generate their own business and profits as all their activities have to be shariah compliant and for which IBBs have to market their products, which are distinct from those of their head offices.

Table 2 presents the correlation between all indicators. Simple correlations support most of the previous results of Table 1. IBIs have better asset quality i.e. lower hazard rates than the same indicator of conventional banks.

4.6 Econometric Specification

To evaluate difference in various banking indicators of riskiness and asset quality across both bank types in our data, we estimate the following regressions:

$$M_{ijt} = \alpha_t + \beta ISL_j + \gamma_1 B_{ijt} + \varepsilon_{ijt} \quad (1)$$

where M_{ijt} is one of the measures corresponding to asset quality and stability of bank i , branches/operations type j , in quarter t . α_t is coefficient for time fixed effects. ISL_j is the dummy for Islamic banking institutions, which includes both IBBs and IBs. The dummy is one when the IBI is Islamic and zero otherwise. B_{ijt} are the time-variant banking characteristics as control variables. Specifically, we include log of assets, non-lending operations and fixed assets of the banks to control for size and asset structure of banks. We first estimate (1) with an intercept and a dummy for IBIs only (in order to compare CBIs and IBIs) without any covariates. Then we control the results for an array of bank/segment-level time-changing features which might affect the differences across bank types.

We thus include log of assets as a proxy for size. There is, however, no definite relationship between bank size and stability (Beck, Demirgüç-Kunt and Merrouche (2013)). Most of the Islamic banks in Pakistan are in small to medium size bank categories, whereas to tap into the market a few big conventional banks also introduced Islamic banking operations through IBBs. We also include fixed assets to total assets ratio and non-loan earning assets to total assets ratio to control for the opportunity cost of having unproductive assets and non-lending business respectively.⁴⁸ Both the variables influence the stability of the banks as shown by some previous studies (Aggarwal and Yousef (2000); Beck, Demirgüç-Kunt and Merrouche (2013); Demirgüç-Kunt, Laeven and Levine (2004); Demirgüç-Kunt and Huizinga (2010)). To remove the outliers, the data is winsorized for all variables at the 1st and 99th percentiles. That is, we set all the observations greater/lower than 99th percentile/1st percentile value of a given series to 99th percentile/1st percentile value.

⁴⁸ Fixed assets include operating fixed assets of the bank and non-loan earning assets comprise balances with other banks, lending to financial institutions and investment in securities and bonds.

Further, to see the corresponding difference from CBIs, we also split the dummy for IBIs into dummy for Islamic banks (IBs) and Islamic banking branches (IBBs). We, therefore, estimate equation (2)

$$M_{ijt} = \alpha_t + \beta_1 ISLb_j + \beta_2 ISLbb_j + \gamma_1 B_{ijt} + \varepsilon_{ijt} \quad (2)$$

where $ISLb_j$ and $ISLbb_j$ are dummies for full-fledged Islamic banks and Islamic banking branches of mixed banks respectively.

Our main contribution to the emerging research on the topic is that we apply bank-quarter fixed effects to specification (1). That is, we measure how conventional banking branches of a mixed bank are different from Islamic banking branches of the same bank across different financial indicators of riskiness and asset quality. Thus we estimate following model

$$M_{ijt} = \alpha_{it} + \beta ISL_i + \varepsilon_{ijt} \quad (3)$$

where M_{ijt} is one of the measures conforming to asset quality and financial stability of bank i , branches/operations type (Islamic or conventional) j , in quarter t . Crucially for our purposes we introduce α_{it} for bank-quarter fixed effects, to account for all observed and unobserved time variant bank heterogeneity. So in effect we compare Islamic and conventional operations within the *same* bank and in a specific quarter. Therefore, bank-quarter fixed effects specification disentangle the Islamic banking from conventional banking and the difference between the two systems is then due to Islamic banking *per se*. We also introduce a dummy for Islamic banking branches of large mixed banks to decipher how these entities differ from CBBs and small IBBs. Bank-quarter fixed effects take out all the banks which have either only Islamic operation or only conventional operations. So we are left only with mixed banks having both types of banking, Islamic and conventional.⁴⁹

4.7 Results:

We first present the results by comparing IBIs and CBIs according to specification (1). Then we estimate specification (2) in which coefficients for IBs and IBBs are estimated separately. Finally, we use bank-time fixed effects through estimating (3). Across all the specifications, standard errors are clustered at bank segment level to allow

⁴⁹It is apparent that for IBBs (i.e. Islamic segment of mixed banks) the size and asset structure of the parent company would matter. Thus, for example, IBBs of a big (mixed) bank probably have more access to capital market than IBBs of a small (mixed) bank. Therefore, we do not use any controls as the comparison is within bank and at each year quarter.

for correlation within clusters (branches type of each banking entity) across quarters. $Z\text{-score}_A$ is computed by treating PLS saving and investment accounts as liabilities of IBIs according to general practice of IBIs. Whereas, in $Z\text{-score}_B$ we consider PLS accounts as equity of the IBIs in accordance with AAOIFI standards. Likewise, CAR_A and CAR_B are computed by treating PLS accounts as equity and liabilities respectively. Models 1,4, 7 and 10 in each Panel A and Panel B of table 4 and 5 reports the estimates of various specifications *without* using any control variables. In models 2, 5, 8 and 11 we control for size, and fixed assets and non-loan earning assets both normalized by total assets and total earning assets respectively. Lastly, in models 3, 6, 9 and 12 in both panels of tables 4 and 5, we interact size with dummy for IBIs to disentangle the stability and asset quality of small and large IBIs. In Table 5, model 1, 3, 5 and 7 report the results of specification (3) that uses bank-quarter fixed effects. In model 2, 4, 6 and 8 we use dummies for Islamic windows of large and small mixed banks separately.

4.7.1 *Conventional vs. Islamic Banking Institutions*

Table 3, Panel A and B, shows the main results of specification (1) for various indicators of financial stability and asset quality of Islamic and conventional banking with and without control variables. In Table 3, '*Islamic*' is a dummy for IBIs which includes both full-fledged IBs and IBBs of mixed banks. The estimation without covariates indicates that IBIs fare better than CBIs in financial stability as their z-score is higher than that of CBIs. In Panel A, both the z-scores, i.e. $z\text{-score}_A$ and $z\text{-score}_B$, of the IBIs are significantly higher than that of CBIs. Also, the magnitude of the coefficients is economically meaningful keeping in view the industry average. Specifically, $Z\text{-score}_A$ is 19 points higher than the same index of CBIs whereas $Z\text{-score}_B$ of IBIs is understandably much higher than that of CBIs (69 points). However, CAR_A of IBIs is not significantly different from that of CBI. Whereas, CAR_B 50 points higher than that of CBIs, which is expected because for this measure we treat PLS savings and investment of deposits of IBIs as equity of these institutions.

Once we control for the bank/segment level characteristics of size, fixed assets and non-loan earning assets (models 2, 5, 8 and 11), $z\text{-score}_B$ of IBIs still remain higher than the same indicator of CBIs showing sound financial stability. Also, IBIs are more capitalized than CBIs in terms of higher CAR_B . However, $z\text{-score}_A$ and CAR_A of IBIs are though positive but statistically insignificant.

Table 3:
Panel B
Asset Quality

Coefficients	Asset Quality											
	ROA	3	4	5	SD(ROA)	6	7	8	9	10	11	12
Islamic	0.098 (0.237)	0.691*** (0.296)	2.107* (1.125)	0.001 (0.003)	-0.00675** (0.003)	-0.00063 (0.01692)	-11.026*** (3.211)	-13.169*** (4.312)	-37.724** (16.814)	-14.069*** (3.629)	-18.162*** (5.355)	-56.675** (22.054)
(2) size	0.226*** (0.065)	0.275*** (0.089)	0.275*** (0.089)	-0.00297*** (0.001)	-0.00276*** (0.0008)	-0.00297*** (0.0008)	-2.356** (1.198)	-3.075** (1.568)	-3.115** (1.517)	-3.075** (1.568)	-3.115** (1.517)	-4.243** (2.014)
Fixed assets	-0.084*** (0.021)	-0.084*** (0.021)	-0.084*** (0.021)	0.00022 (0.000)	0.00021 (0.0002)	0.00021 (0.0002)	0.187 (0.286)	0.185 (0.283)	0.185 (0.283)	0.185 (0.283)	0.185 (0.283)	0.732* (0.410)
Non-loan earning assets	0 (0.005)	0.002 (0.005)	0.002 (0.005)	0.00002 (0.000)	0.00002 (0.00005)	0.00002 (0.00005)	0.296** (0.134)	0.261** (0.123)	0.261** (0.123)	0.261** (0.123)	0.270* (0.143)	0.215 (0.132)
(5) Islamic*size	-0.155 (0.104)	-0.155 (0.104)	-0.155 (0.104)	-0.00067 (0.00172)	-0.00067 (0.00172)	-0.00067 (0.00172)	2.638* (1.41)	2.638* (1.41)	2.638* (1.41)	2.638* (1.41)	2.638* (1.41)	4.136** (1.877)
Constant	0.292* (0.166)	-1.881** (0.809)	-2.479** (1.057)	0.013*** (0.002)	0.04282*** (0.010)	0.04024*** (0.00951)	12.489*** (3.177)	21.038** (10.698)	30.594* (15.798)	17.164*** (3.737)	33.615** (14.887)	48.611** (21.715)
c(2)+c(5)=0		0.12**	0.12**	-0.00343**	-0.00343**	-0.00343**	-0.437	-0.437	-0.437	-0.437	-0.437	-0.107
R-squared	0.056	0.149	0.153	0.23919	0.24137	0.24137	0.232	0.232	0.24	0.105	0.244	0.257
Observations	1423	1423	1423	1423	1423	1423	1367	1367	1367	1363	1363	1363

Panel B of Table 3 show that there is a significant difference between asset quality of the IBIs and CBIs (Models 1, 4, 7, 10). IBIs have better asset quality than that of CBIs, i.e., NPLs and loan loss provisioning to gross loans of IBIs are lower in comparison to same indicators of CBIs. Findings about asset quality of the banks are consistent with the results of Baele, Farooq and Ongena (2012) who use individual loan level data of banking sector in Pakistan from 2006 to 2008. They find that, when compared to conventional loans, on average Islamic loans are less likely to default. Loan loss provisioning normalized by gross loans is significantly lower for IBIs owing to the lower level of NPLs. Although, profitability, i.e., return on assets (ROA) of the IBIs show higher values, but are statistically insignificant.

After controlling for size and asset structure of the banking institutions, the outcome shows that IBIs are more profitable and have less volatility in ROAs in comparison to CBIs. This fact reveals that assets of IBIs are not only more profitable but also are less risky. In particular, ROA of IBIs is 69 basis points higher than the same indicator of CBIs. The coefficients are economically meaningful given the industry average of 0.53 percent. Similarly, the superior asset quality of IBI is also clear from the lower level of NPLs, and thus the loan loss provisioning, of IBIs in relation to CBIs. After addition of control variables the results show that NPLs and loan loss provisioning of IBIs are 18 and 13 percentage points lower than the same indicator of CBIs. Both these differences are large considering the industry means of both the indicators i.e. 14 percent and 10 percent respectively.

Some of the bank level control variables, which are also statistically significant, show stylized facts. Specifically, larger banks carry less NPLs to gross loans and thus required to make less provisioning as well. Thus, the asset quality of the banks improves as they become larger. In emerging economies where firms are mostly dependent on bank loans and loan demand is high the bigger banks are better placed to pick better quality firms to finance. However, as expected, large banks have higher profitability (ROA) due to the economies of scale. Though statistically insignificant, larger banks have lower z-score mainly due to lower capitalization. Regarding correlation of size and stability, theoretical and empirical literature is inconclusive (Beck, Demirgüç-Kunt and Merrouche (2013)).

Since size of an Islamic bank may affect the stability (Čihák and Hesse (2010)) and asset quality (Beck, Demirgüç-Kunt and Merrouche (2013)) of IBIs, we also interact dummy for IBIs with size (see models 3, 6, 9 and 12 of Panel A and Panel B). The results indicate that relative to the CBIs, small IBIs show lower level of NPLs and, therefore,

loan loss provisioning, and are more profitable. As size of IBIs increases, the difference between IBIs and CBIs decreases for asset quality as NPLs of CBIs decrease with the size which is not the case for IBIs. Size affects profitability of both conventional and Islamic banks positively. Volatility of the returns of both IBIs and CBIs also decreases as their size increases. This shows that large IBIs and CBIs have stable returns on their assets in comparison with small IBIs and CBIs respectively. On the other hand, $z\text{-score}_B$ of IBIs increases with their size, whereas size does not affect the same indicator of CBIs. Large IBIs, therefore, are significantly more stable than large CBIs.

4.7.2 Conventional Banking Institutions vs. full-fledged Islamic Banks and Islamic Banking Branches of Mixed Banks

As mentioned before, Islamic banking operations in Pakistan are carried out by two different kinds of entities, full-fledged Islamic banks and Islamic banking branches of mixed banks. So next we split the sample of IBIs into IBs and IBBs of mixed banks by using a dummy for each category separately to see whether they differ from CBIs. We thus estimate specification (2).

Panel A of Table 4 reports the results of specification (2) for financial stability of all the banking institutions. We first present the results of specification without any covariates shown in models 1, 4, 7 and 10. $Z\text{-score}_A$, a stability and solvency indicator, of full-fledged IBs is 16 points higher than that of CBIs showing that these institutions are more stable than conventional ones. Not surprisingly given the definition, $Z\text{-score}_B$ and CAR_B also demonstrate better stability position of both IBs and IBBs. After controlling for size, fixed assets and non-loan earning assets, the results, in general, show improvements in terms of their statistical significance and economic relevance. The outcome suggests that the difference in stability indicator of IBIs and CBIs is not due to the size, fixed assets and non-loan earning assets. Specifically, $Z\text{-score}_A$ shows that for IBs this index is significantly higher than the same indicator of CBIs. Similarly, $Z\text{-score}_B$ and CAR_B of IBs and CBIs are greater than the counterpart indicators of CBIs.

Table 4, Panel B (without covariates) shows that volatility of ROA given by standard deviation of ROA is significantly lower for Islamic banks than for CBIs. However, we do not find any significant difference in volatility of ROAs of CBIs and IBBs which is a surprise. The results also suggest that IBs have better asset quality because they have lower NPLs and loan loss provisioning on their balances sheets.

Coefficients	Asset Quality											
	1	2	3	4	5	6	7	8	9	10	11	12
Islamic Banks	-0.142 (0.357)	0.266 (0.262)	1.527 (1.892)	-0.004** (0.002)	-0.00738*** (0.002)	-0.03285*** (0.01136)	-10.567*** (3.145)	-12.021*** (3.812)	-57.227*** (23.066)	-13.656*** (3.624)	-16.645*** (4.663)	-92.084*** (25.972)
Islamic Banking Branches	0.218 (0.254)	1.164*** (0.387)	1.117 (1.187)	0.003 (0.004)	-0.00605 (0.004)	0.00296 (0.01949)	-11.316*** (3.257)	-14.65*** (5.310)	-36.469*** (16.85)	-14.33*** (3.651)	-20.123*** (6.703)	-55.093*** (22.099)
(4) Size		0.286*** (0.074)	0.287*** (0.089)		-0.00288*** (0.001)	-0.00272*** (0.0008)		-2.517* (1.310)	-3.028* (1.566)		-3.328** (1.666)	-4.153** (2.01)
Fixed Assets		-0.079*** (0.019)	-0.08*** (0.019)		0.00022 (0.000)	0.00025 (0.0002)		0.165 (0.298)	0.216 (0.29)		0.707* (0.422)	0.79*** (0.385)
Non-Loan Earning Assets		0.003 (0.005)	0.003 (0.004)		0.00002 (0.000)	0.00003 (0.00005)		0.286** (0.130)	0.266** (0.124)		0.257* (0.139)	0.225* (0.133)
(7) Islamic Banks*Size		-0.13 (0.18)			0.00264** (0.00103)			4.59** (2.081)				7.663*** (2.313)
(8) Islamic Banking Branches*Size		0.006 (0.124)			-0.00111 (0.00215)			2.558* (1.423)				4.098** (1.895)
Constant	0.292* (0.166)	-2.694*** (0.899)	-2.7*** (1.043)	0.013*** (0.002)	0.04161*** (0.010)	0.03957*** (0.00957)	12.491*** (3.178)	23.351* (12.404)	29.711* (15.84)	17.165*** (3.737)	36.671*** (17.14)	46.929*** (21.765)
(4) + (7)=0			0.157		0.000			1.562***				3.51**
(4) + (8)=0			0.293***		-0.00383			-0.47***				-0.055***
R-squared	0.059	0.164	0.165	0.033	0.240	0.249	0.072	0.233	0.241	0.105	0.245	0.259
Observations	1423	1423	1423	1423	1423	1423	1367	1367	1367	1363	1363	1363

To check whether or not the difference between IBs and CBIs is derived from some other banking characteristics, we control for the size and asset structure of the banking institutions (model 2, 5, 8 and 11). The specification improves the results and the difference in terms of asset quality between IBs and IBBs from CBIs goes up. Specifically, loan loss provisioning and NPLs, of full-fledged IBs are 12 percentage points and 17 percentage points lower than those of CBIs.

IBs also have lower volatility in returns than CBIs. On the other hand, ROA of IBBs is 1.2 percentage points higher than that of CBIs. Islamic operations of mixed banks are slightly more profitable than conventional business of CBIs. Also IBBs depict better asset quality as their provisioning and NPLs are 15 percentage points and 20 percentage points respectively lower than the same measures of CBIs.

We interact dummies for IBs and IBBs with size separately to check how size affects the coefficients of these institutions for different variables. The results, shown in Table 4 Panel A and B (models 3, 6, 9 and 12), signify that in comparison to conventional peers, small IBs are more stable as they have higher z-scores and better capitalization. IBs also have superior asset quality because of the lower NPLs. Specifically, the coefficient of z-score and capital asset ratio of small full-fledged IBs is 2.6 times and 1.6 times greater than that of CBIs respectively. This suggests that IBs are less risky than CBIs. The results also indicate that standard deviation of ROA of IBs is significantly lower than that of CBIs, though for larger IBs this difference declines. Similarly, NPLs and loan loss provisioning is 92 percentage points and 57 percentage points lower than the same measures of CBIs respectively. However as the size of Islamic banks becomes larger the asset quality of the IBIs becomes relatively weaker.

This is obvious from the fact that if we calculate coefficient of size of IBs for loan loss provisioning and NPLs by separately adding coefficient (4) and (7) for the relevant indicators, these turns out to be 1.6 and 3.5 respectively. The fact that size impacts Islamic banks' asset quality negatively is also revealed by Čihák and Hesse (2010). However, this is not the case for IBBs of the mixed banks as their NPLs and provisioning go down with increase in their size. Volatility of returns of small and large IBs is less than that of CBIs, showing that their assets are less risky as size of IBIs does not impact the riskiness of their

returns. Due to increase in size, the differences between IBBs and CBIs decrease for the asset quality.

4.7.3 Bank-quarter Fixed Effects: Conventional vs. Islamic Windows of Mixed

Banks

The data also provide us with the opportunity to use bank-quarter fixed effects, since we have some banks that host both Islamic and conventional banking separately through Islamic and conventional banking branches. Bank-quarter fixed effects permit us to control for any time variant observed and unobserved heterogeneity. This specification thus shows how Islamic banking operations of mixed banks are different from their conventional operations within the same bank and quarter in terms of financial stability and asset quality. Since specification with fixed effects takes into account only those banks which have both types of banking windows, the sample observations decrease by about half.

Table 5, Panel A and B reports the estimation results of the specification (3). The estimation outcome indicates that IBBs have 10 percentage points higher capitalization than CBBs while we consider CAR_A . However, there is no difference between $z\text{-score}_A$ of IBBs and CBBs. On the other hand, if we consider $Z\text{-score}_B$ and CAR_B for comparison, IBBs are more stable and better capitalized than CBBs. Models 1, 3, 5 and 7 in Panel B indicate that IBBs have higher ROA than that of CBBs. Specifically, IBBs ROA is 0.7 percentage point higher than return on assets of CBBs. This suggests that offering Islamic banking by a conventional bank yields higher returns to the conventional bank. However, there is higher level of volatility in the returns on their assets than those of CBBs. In contrast, NPLs of IBBs are 7 percentage points lower than the same ratio of CBBs. Loan loss provisioning of IBBs, therefore, is also lower than that of CBBs. This shows a better asset quality of IBBs as the coefficients are highly significant and economically meaningful. In model 2, 4, 6 and 8 of both panels, we use separate dummy variables for IBBs of small and large mixed banks to see if they behave differently from CBBs. The results show that IBBs of small mixed banks are less stable than CBBs as these have lower $z\text{-score}_A$. The main reason for this outcome is that Islamic window of small mixed banks have greater volatility in returns of their assets than that of CBBs. However, $z\text{-score}_B$ of IBBs of both small and large mixed banks is greater

Table 5 In this table we report the results of specification (3) for Sample B (only dual banks) using *bank-time fixed effects*. The table reports the estimated coefficients for specifications with the various stability (Panel A) and asset quality (Panel B) measures as dependent variable of bank *i* in year: quarter *t*. The independent variables *Islamic* is a dummy variable which takes the value of 1 if the branches of a mixed bank are Islamic and zero otherwise. Similarly, *large Islamic* is a dummy variable for the mixed banks with assets more the around USD2 billion. Size is natural log of the assets. Fixed assets are normalized by the total assets and non-loan earning assets are normalized by the total earning assets of the each banking intuition. $Z\text{-score}_A$ and CAR_A is computed by treating profit and loss saving and investment (PLS) accounts of IBIs as liabilities, whereas $Z\text{-score}_B$ and $Capital\text{-Asset Ratio}_B$ is calculated by treating these PLS accounts as equity of the IBIs. Each model use various banking institution– year: quarter observations. Standard errors (in parentheses) are clustered at the bank-segment level. *** Significant at 1%, ** significant at 5%, * significant at 10%.

Panel A		Stability							
		Z-score A		Z-score B		Capital-Asset Ratio A		Capital-Asset Ratio B	
Coefficients	1	2	3	4	5	6	7	8	
<i>Islamic</i> [@]	-0.796 (1.265)	-2.555** (1.22)	64.994*** (10.227)	68.501*** (12.8)	9.536*** (2.712)	5.201*** (1.453)	39.967*** (2.549)	43.036*** (2.138)	
<i>Large Islamic</i>		1.801 (2.116)		59.821*** (16.883)		15.93*** (5.844)		35.439*** (5.115)	
C	13.588*** (4.969)	12.29** (5.942)	-7.456 (20.719)	-4.869 (20.107)	8.386*** (1.934)	5.189 (4.668)	5.48 (3.663)	7.744*** (3.146)	
p value (1)=2)		0.076		0.682		0.076		0.172	
R-squared	0.542	0.55	0.730	0.732	0.575	0.60	0.849	0.854	
Observations	665	665	665	665	665	665	665	665	

Panel B		Asset Quality							
		ROA		SD(ROA)		Loan Loss Provisioning		Non-Performing Loans	
Coefficients	1	2	3	4	5	6	7	8	
<i>Islamic</i> [@]	0.725*** (0.251)	0.699*** (0.201)	0.01*** (0.002)	0.008*** (0.001)	-5.291*** (1.046)	-5.818*** (1.509)	-7.231*** (2.033)	-8.111*** (3.029)	
<i>Large Islamic</i>		0.763 (0.547)		0.013** (0.006)		-4.333*** (0.767)		-5.647*** (1.014)	
C	1.512** (0.77)	1.493* (0.795)	0.014** (0.007)	0.013** (0.006)	8.421*** (0.000003)	8.421*** (0.000)	11.497*** (0.000006)	11.497*** (0.000)	
p value (1)-(2)=0		0.912		0.387		0.381		0.441	
R-squared	0.622	0.622	0.657	0.672	0.835	0.838	0.822	0.825	
Observations	665	665	666	666	611	611	612	612	

@ For column 2, 4, 6, 8 and 10, 'Islamic' is a dummy for small IBBs, which otherwise represent all Islamic windows of mixed banks

than the same indicator of CBBs, which shows that treatment of risk sharing S&I deposits of IBBs depicts that there is less risk shifting in these institutes. On the other hand, though Islamic windows of large banks also have higher volatility in returns they have also much better capitalization. Therefore, their $z\text{-score}_A$ is 2 points greater than that of CBBs, albeit insignificant statistically. We also check if IBBs large mixed banks behave differently from those of small IBBs. For that we test if the coefficients of Islamic windows of large banks are equal to the coefficients of Islamic windows of small ones. The results show that IBBs of large mixed banks are significantly more stable than that of small mixed banks. However if we consider $z\text{-score}_B$ and CAR_B , we note that IBBs of small mixed banks are more stable and better capitalized than those of large mixed banks.

Panel B of Table 5 (model 2, 4, 6 and 8) show that IBBs of small mixed banks are more profitable but have more volatility in returns on their assets than CBBs. ROA of these entities is 0.7 percentage points higher than ROA of CBIs. Moreover, these Islamic windows have better asset quality as NPLs, and thus loan loss provisioning is 8 percentage points and 6 percentage points lower than that of CBBs. By the same token, IBBs of large mixed banks have NPLs and provisioning 4 percentage points and 5 percentage points lower than same indicators of CBBs respectively. In this respect, there is no difference between IBBs of small and large mixed banks.

Robustness

We check the robustness of our estimations by using the original un-winsorized data. The unreported results are not different from the baseline results which indicate insignificance of outliers in the estimation process. Next, using contemporaneous control variables of size and asset structure, i.e. fixed assets and non-lending, of the banks may create endogeneity problem in the estimation due to reverse causality. We, therefore, replace contemporaneous control variables with lag values of the control variables in a robust estimation. The robust specification results support our findings of baseline estimation. Similarly, following Beck, Demirgüç- Kunt and Merrouche (2013) we also estimate the specifications using an alternative method of median least squares which minimizes the median squares of residual and is, therefore, robust to outliers (Clarke and Fuchs (2007)). However, we cannot cluster standard errors at bank level in this method. The findings do not change using to this method either.

Age and experience of a bank may influence the differences between Islamic and conventional banking across all indicators of stability and asset quality. Thus it may be the case that asset quality of the IBIs turns out to be better than that of CBIs because age differences between IBIs and CBIs. Therefore, the difference in behavior of IBIs from CBIs may not be because of Islamic characteristics *per se*. To disentangle this effect, we re-estimate the specifications with an additional control for age and experience of a bank that we proxy by the number of years a bank has been in the business. The results confirm that the differences between Islamic and conventional banking for baseline specifications are not due to age and experience. Thus, our baseline results still stay valid. Finally, we also use number of bank branches (outlets) as a proxy for a bank's experience as it is generally expected that older banks will have larger numbers of branches. Our results are also robust to this alternative specification.

4.8 Conclusion

In this paper, using Pakistan as a case in point, we investigate how Islamic banking institutions are different from conventional banking institutions in terms of asset quality and stability this developing economy which has been hosting both the banking systems since 2002. Islamic banking institutions (IBIs) performed better than conventional banks in profitability and asset quality during last decade. Specifically, NPLs and provisioning to gross loans ratios of IBIs are lower than the same indicators of conventional banks. Thorough analysis shows that IBs have not only better asset quality but also are more stable than CBIs whereas IBBs though have higher z-score, do not differ significantly from conventional banking institutions. However, IBBs are more profitable, have less volatility in ROAs and have lower NPLs and resulting loan loss provisioning than CBIs. If we treat S&I accounts of IBIs, issued on the basis of PLS risk sharing basis, IBIs are more stable, and have better asset quality than CBIs.

Results for applying bank-quarter fixed effects suggest on the contrary that Islamic operations of small mixed banks have higher capital to asset ratio and are more profitable, but have higher volatility of returns on their assets. As a consequence, stability index of these IBBs is lower than that of conventional part of mixed banks. This is if we treat risk sharing S&I deposits of IBBs as their liabilities. IBBs, of both small and large mixed banks, also

exhibit superior asset quality due to lower NPLs and thus provisioning than CBBs. Also IBBs of small mixed banks are more profitable than CBBs and, IBBs of large mixed banks are not significantly different from that of small ones in this regard.

The results have important implications for the co-existence of conventional and Islamic banking systems. These results imply that there is an inherent difference in the stability (z-score) and asset quality of IBIs and CBIs. Therefore, introducing principles of Islamic banking and finance in conventional banking may result in greater financial stability and better asset quality.

Due to profit and loss sharing deposits, Islamic banking institutions have less incentive for risk shifting in distress. These institutions have better asset quality and are more stable than their conventional counterparts.