

FINANCIAL LIBERALIZATION AND BANK RISK IN PAKISTAN: COMPARATIVE INSIGHTS FOR EMERGING FINANCIAL MARKETS

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ABSTRACT

This study examines how financial liberalization affects bank risk-taking in Pakistan's dual banking system. Using data from 26 banks (2011–2020), it explores the relationship between liberalization and risk behavior, identifying market discipline and regulatory quality as key mechanisms influencing risk-taking across commercial and Islamic banks. The study uses panel data from 26 commercial and Islamic banks in Pakistan (2011–2020). Robust statistical methods are employed to analyze the relationship between liberalization and risk-taking, controlling for bank-specific factors and macroeconomic variables. A comparative assessment of commercial and Islamic banks provides deeper sector-specific insights. The study finds a negative relationship between financial liberalization and bank risk-taking, with varying effects across commercial and Islamic banks. Enhanced market discipline and improved regulatory quality are identified as mechanisms that reduce risk-taking. The results remain consistent across various risk measures, bank-specific factors, and macroeconomic controls. The study is limited by its focus on data from 26 banks in Pakistan, and the findings may not apply to other countries or banking systems. It also does not fully address all macroeconomic factors influencing risk-taking. Future studies could expand to different regions and use broader datasets for generalization. This research provides original bank-level evidence on the impact of financial liberalization on risk-taking in Pakistan's dual banking system. Unlike earlier studies relying on aggregate data, it uses a decade-long panel framework and compares commercial and Islamic banks, offering new insights into governance and regulatory factors influencing risk-taking.

Keywords: Financial liberalization, Bank risk-taking, Bank characteristics and macroeconomics variables.

INTRODUCTION

Financial liberalization refers to the dismantling of government-imposed restrictions on the financial system, including interest rate controls, credit allocation ceilings, capital account restrictions, and barriers to competition and foreign participation. By allowing market forces to

determine the price and allocation of financial resources, liberalization is expected to improve financial intermediation and strengthen the efficiency of credit markets (McKinnon, 1973; Shaw, 1973). Theoretical and empirical studies suggest that deregulation facilitates financial development, improves capital allocation, and supports higher economic growth (King & Levine,

1993; Bekaert, Harvey & Lundblad, 2005). However, liberalization may also alter banks' incentives and affect their risk attitudes, especially when market discipline and supervisory institutions are weak.

The impact of financial liberalization on bank behavior remains ambiguous in the international literature. On one side, the "competition-fragility" hypothesis argues that deregulation intensifies competition, compresses interest margins, and pushes banks toward riskier lending to sustain profits (Keeley, 1990; Berger, Klapper & Turk-Ariss, 2009). Liberalization may also encourage rapid credit expansion, reliance on volatile funding, and exposure to foreign shocks, thereby increasing systemic risk (Kaminsky & Reinhart, 1999; Giannetti & Ongena, 2012). On the other hand, proponents of the "competition-stability" view contend that liberalization can enhance market discipline, improve credit allocation, and reduce excessive risk-taking—particularly when supported by strong regulatory and supervisory frameworks (Boyd & De Nicoló, 2005; Levine, 2003; Barth, Caprio & Levine, 2013). Empirical findings show that the effect of liberalization on bank stability depends critically on institutional quality, regulatory capacity, and macroeconomic stability (Demirgüç-Kunt & Detragiache, 1998; Wihlborg, Willett & Zhang, 2010).

Pakistan provides a particularly relevant setting to examine these issues. The country initiated comprehensive financial reforms in the late 1980s under structural adjustment programs supported by the IMF and World Bank (Husain, 2006; Khan & Khan, 2007). These reforms included interest rate deregulation, privatization of nationalized banks, relaxation of entry barriers for private and foreign banks, and strengthening of prudential regulation under the State Bank of Pakistan (SBP). As a result, private-sector credit, deposits, and clearing-house transactions expanded substantially, indicating deeper financial intermediation (SBP, various reports). However, Pakistan has also faced episodes of macroeconomic instability, political uncertainty, high inflation, and governance challenges, all of which complicate the transmission of financial

reforms to bank stability (Haider, Hashmi & Ahmed, 2021).

Despite extensive reforms, empirical evidence on how financial liberalization affects bank risk-taking in Pakistan remains limited and inconclusive. Earlier studies tend to rely on descriptive analyses (Haque & Nadeem, 1997; Khan & Arshad, 2003), use small samples, or focus on aggregate indicators that do not capture differences across banks. Moreover, very few studies consider Pakistan's dual banking system, where commercial and Islamic banks operate under different business models and governance environments. This gap is notable given evidence that Islamic and conventional banks respond differently to competition, regulation, and macroeconomic shocks (Čihák & Hesse, 2010; Beck, Demirgüç-Kunt & Merrouche, 2013).

This study addresses these gaps by analyzing the impact of financial liberalization on bank risk-taking in a panel of 26 commercial and Islamic banks over 2011–2020. We construct multiple measures of financial liberalization and incorporate bank-specific and macroeconomic controls to estimate fixed- and random-effects models. By estimating separate models for (i) all banks, (ii) commercial banks, and (iii) Islamic banks, we provide a comprehensive assessment of how liberalization affects the two segments of Pakistan's dual banking system.

This study makes several contributions to the literature. First, it offers updated, bank-level evidence from Pakistan using a decade-long panel dataset—addressing limitations of earlier aggregate-level research. Second, it provides the first comparative analysis of how financial liberalization affects commercial and Islamic banks differently, contributing to emerging literature on risk behavior in dual banking systems. Third, by employing multiple liberalization indicators and control variables, the study helps reconcile mixed findings from prior international and regional studies. Finally, the results underscore the importance of strong governance, supervisory capacity, and macroeconomic stability in shaping the risk implications of financial reforms—issues highly relevant for emerging markets undertaking ongoing liberalization.

2 Literature review

Understanding how financial liberalization influences bank risk-taking has become a central question in financial economics. Liberalization alters the structure, incentives, and risk appetite of financial institutions by reducing state intervention, opening capital markets, and intensifying competition (McKinnon, 1973; Shaw, 1973). While liberalization can enhance efficiency, expand credit, and deepen financial markets, it can also introduce vulnerabilities—especially in developing economies with weaker regulatory frameworks (Demirgüç-Kunt & Detragiache, 1998; Kaminsky & Reinhart, 1999). Despite a rich body of literature, empirical evidence remains mixed, non-linear, and highly context dependent. The following subsections synthesize global and regional studies, highlighting how financial liberalization, bank characteristics, and macroeconomic conditions interact to shape bank risk-taking.

2.2 Financial Liberalization and Bank Risk-Taking

Empirical research provides contrasting results on whether liberalization increases or reduces banking-sector risk.

Proponents of the **competition-fragility hypothesis** argue that deregulation erodes market power, compresses margins, and forces banks to take greater risks to sustain profitability (Keeley, 1990; Berger, Klapper & Turk-Ariss, 2009). Liberalized interest rates introduce volatility in funding costs, increasing banks' exposure to credit and liquidity shocks. Unrestricted competition and rapid credit expansion may generate speculative lending, weaken asset quality, and amplify systemic vulnerability (Bhattacharya et al., 2002; Barth, Caprio & Levine, 2013).

Conversely, the **competition-stability view** suggests that liberalization strengthens market discipline, encourages transparency, and lowers incentives for excessive risk-taking when accompanied by effective prudential regulation (Boyd & De Nicoló, 2005; Levine, 2003). Banks operating in liberalized environments may adopt more sophisticated risk-management systems, diversify loan portfolios, and improve screening technologies—ultimately enhancing stability.

Recent empirical studies emphasize that the effect of liberalization on risk-taking is **non-linear**, depending on institutional quality, governance, and regulatory strength (Wihlborg, Willett & Zhang, 2010; González & Elena, 2013). For example, financial opening increases risk when supervision is weak, but reduces risk once adequate oversight is in place.

2.3 Evidence from Developed and Emerging Economies

A considerable number of studies provide evidence from cross-country and single-country contexts:

- **Emerging markets** frequently experience procyclical risk-taking following liberalization, as deregulation allows rapid credit growth that may heighten banking crises (Rancière, Tornell & Westermann, 2006; Eichengreen & Arteta, 2002).
- **Foreign bank entry**, another feature of liberalization, can raise domestic bank risk by intensifying competition or importing foreign shocks (Giannetti & Ongena, 2012; Rui Wang et al., 2017).

- However, when foreign banks bring advanced technology and risk-management practices, their presence may enhance overall stability (Lensink & Hermes, 2004).

Individual country evidence is equally diverse. For instance, Zaim (1995) and Isik & Hassan (2003) find that Turkish banks experienced productivity improvements following deregulation. In contrast, Denizet et al. (2007) document efficiency deterioration in the same context, suggesting heterogeneity across banks and reform periods. Similarly, Choudhry & Jacob (2009) show that the benefits of liberalization materialize only under strong supervisory frameworks.

These mixed results underscore the importance of contextual factors—macroeconomic stability, governance quality, regulatory capacity, ownership structure, and market concentration—in determining how banks respond to liberalization.

2.4 Bank Characteristics, Governance, and Risk-Taking

Bank-specific factors play a crucial role in shaping risk behavior under liberalized financial systems.

- **Ownership structure:** State-owned banks often assume higher risk due to political interference and soft-budget constraints (Hou et al., 2014), whereas privately owned banks respond more strongly to market-based incentives (Abid et al., 2021).
- **Capitalization and size:** Well-capitalized and larger institutions are generally more resilient to shocks and less sensitive to interest rate liberalization (Dinh Su et al., 2021).
- **Income diversification:** Expansion into non-interest activities may either stabilize revenues or introduce new risks, depending on the bank's size and quality of supervision (Amine Tarazi et al., 2007).
- **Islamic vs. conventional banks:** Evidence shows that Islamic banks may exhibit different risk profiles due to asset-backed financing and Shariah governance structures (Čihák & Hesse, 2010; Beck et al., 2013). The interaction of these characteristics with financial liberalization remains underexplored, particularly in dual-banking systems like Pakistan.

2.5 Liberalization, Banking Crises, and Regulatory Environment

Research consistently shows that the relationship between liberalization and crises is conditional on regulatory strength.

- Internal liberalization (interest rate deregulation, removal of credit ceilings) is often associated with banking crises in weak institutional settings (Eichengreen & Arteta, 2002; Noy, 2004).
- Countries with poor governance and low transparency experience heightened crisis probability after liberalization episodes (Mehrez & Kaufmann, 2000).
- Bank activity restrictions, entry barriers, and inadequate capital regulation exacerbate the adverse effects of liberalization (Barth, Caprio & Levine, 2004).

Therefore, regulatory capacity acts as a key moderating factor determining whether liberalization stabilizes or destabilizes the system.

2.6 Financial Liberalization and the Banking System in Pakistan

Pakistan's financial sector reforms—introduced under IMF–World Bank structural programs in the late 1980s—represent one of the most

comprehensive liberalization programs in South Asia (Husain, 2006; Khan & Khan, 2007). The reforms included:

- Interest rate deregulation
- Privatization of nationalized banks
- Entry of private and foreign banks
- Strengthening of the State Bank of Pakistan's supervisory role
- Implementation of Basel capital adequacy frameworks

These reforms significantly increased financial deepening, expanded private-sector credit, and encouraged modernization of financial services (SBP Reports). However, Pakistan has also faced high inflation, governance issues, political instability, and banking-sector vulnerabilities that complicate the effects of liberalization (Haider et al., 2021).

Empirical studies evaluating Pakistan's liberalization outcomes find mixed results. While some report improvements in efficiency and intermediation (Chaudhry, 2007; Farooq et al., 2012), others highlight persistent weaknesses such as high non-performing loans, institutional fragility, and susceptibility to macroeconomic shocks (Burki & Niazi, 2010).

Very few studies, however, examine the bank-level impact of financial liberalization on risk-taking, particularly distinguishing between Islamic and conventional banks. This gap provides strong motivation for the current study.

3. Data and Methodology

The study determines the association of financial liberalization with bank risk taking for Pakistan. For this purpose, the study uses both micro-level variables and macro level variables data for the panel of 26 banks of Pakistan. The existing literature shows that different studies show the impact of financial liberalization and bank risk taking for different countries some studies show bank efficiency with bank characteristics while other study shows economic growth with financial liberalization but we could not find any studies in the case of Pakistan. Therefore, our research plan to investigate the effect of financial liberalization on bank risk taking for the country of Pakistan.

3.1 Data, Sample and Variables Description

The study has selected country of Pakistan for its analysis because it is poor developing country with high population growth rate. In addition, mostly poor countries have higher degradation of financial factor and also in developing countries there is more competition in the banking sector so, it is important to know about the effect of financial liberalization on the bank risk taking for the country of Pakistan. The study sample includes panel of all banks, commercial banks and Islamic banks in account for almost 90% of total banking assets for the dependent variable bank risk taking and all explanatory variables financial liberalization, bank characteristics (size, age, liquidity, capitalization and efficiency) and macroeconomic variables (GDP growth, monetary policy and inflation rate) for the country of Pakistan from the year of 2011 to 2021.

3.2 Description of the variables

The study uses the variables such as financial liberalization, bank characteristics (size, age, liquidity, capitalization and efficiency) and macroeconomic variables (GDP growth, monetary policy and inflation rate) to check their effect on bank risk taking. All the variables are discussed in the following subsection.

The relationship between financial liberalization and bank risk-taking is multidimensional and context-specific, particularly in developing economies such as Pakistan. The findings from existing literature suggest that while liberalization can enhance banking efficiency and competitiveness, it also carries potential systemic risks when implemented in weak institutional settings. This dual effect was confirmed by Berger, Klapper, and Turk-Ariss (2009), who argued that increased competition due to liberalization compresses net interest margins, incentivizing banks to engage in riskier activities to maintain profitability. This view is consistent with the “competition-fragility” hypothesis, where excessive competition undermines stability.

In Pakistan’s case, the financial liberalization reforms initiated in the late 1980s and early 1990s were aimed at improving banking sector performance, encouraging private ownership, and aligning with global best practices. However, the

liberalization process initially failed to deliver substantial improvements due to persistent macroeconomic instability, high inflation, and poor governance (Husain, 2006). These factors discouraged long-term investments and constrained the banking sector’s growth. Despite the establishment of regulatory bodies such as the SECP and the restructuring of the SBP, it was not until the early 2000s that the reforms began to yield positive outcomes in terms of improved capital adequacy, declining non-performing loans, and stronger bank balance sheets (Burki & Niazi, 2010).

Empirical research offers varying perspectives on the effects of financial liberalization. For instance, Zaim (1995) and Isik and Hassan (2003) found that liberalization in Turkey enhanced banking efficiency, whereas Denizer et al. (2007) reported a decline in performance during the same period. These conflicting findings underscore the importance of contextual factors such as regulatory quality and macroeconomic stability. Similarly, Choudhry and Jakob (2009) concluded that the presence of effective supervision can mitigate the risk of banking crises resulting from liberalization. In Pakistan’s context, the improvements observed post-2000 can largely be attributed to better prudential oversight and regulatory enforcement, rather than liberalization alone.

Additionally, international financial integration plays a significant role in shaping bank risk behavior. Giannetti and Ongena (2012) demonstrated that the entry of foreign banks and exposure to global financial markets can transmit external shocks to domestic banking systems, thereby increasing systemic vulnerabilities. This phenomenon is particularly relevant for Pakistan, where the gradual opening of capital accounts and increasing foreign participation in the banking sector could amplify risk if not properly managed. Overall, while financial liberalization in Pakistan has contributed to structural improvements in the banking sector, its association with bank risk-taking is complex and influenced by institutional, regulatory, and macroeconomic factors. The findings of this study support the notion that liberalization alone does not guarantee stability. Instead, its effectiveness depends on

complementary reforms, particularly in governance, supervision, and monetary policy. Therefore, policy efforts should emphasize balanced liberalization, coupled with strengthened regulatory frameworks, to ensure sustainable growth and financial stability in Pakistan's banking sector.

is taken from world development indicator and micro level variables are taken from annual financial annual statements, state bank website and financial assessment report. For some variable indexes are made. Variables data and description of both micro-level variables macro- level variables are as follow:

3.3 Unit of data collection

The data of micro level and macro level variable is taken from different sources. Macro level variables

Table 3.1 Unit of data collection			
Variables	Description	Source	Year
Micro level variables			
Bank risk taking	$(1 + [ROA + EA] / \sigma (ROA))$, is the natural logarithm. EA used for equities-to-assets ratio, equities- (ROA) shows return on assets standard deviation. Lager score determining a smaller probability of indolent of bank, you can say that a larger degree of bank stability	AFS	2011-2021
Bank characteristics			
Liquidity	The ratio of liquid assets to total assets (%)	AFS	2011-2021
Size	Natural logarithm of bank total assets	AFS	2011-2021
Capitalization	The ratio of equity to total assets (%)	AFS	2011-2021
Efficiency	The overhead cost to total income (%)	AFS	2011-2021
Age	Natural logarithm of the deduction between current year and establish year	SBP	2011-2021
Financial liberalization	We create a seven-dimension annual financial liberalization index. The total financial liberalization index is calculated using a principle component method. Seven dimensions namely regulation and interest rate, credit control, reserve requirement, banking ownership, prudential regulation, pro-competitive measure, and development in the security market. A higher score indicates more financial liberalization.	Financial Assessment reports	2011-2021
Macro level variables			
GDP growth	GDP growth (%)	WDI	2011-2021
Monetary policy	Short-term interest rates (%)	WDI	2011-2021
Inflation rate	The percentage change in the consumer price index (%)	WDI	2011-2021

3.4 Method

The study plan to investigate the association between financial liberalization and bank risk-taking in Pakistan. The general form of our module as given follows:

$$Risk_{i,t} = f(FL_t) \quad (3.1)$$

Where Risk i, t is Bank risk taking while I show number of crosssection, t shows number years, and it is our dependent variable. While FL is financial liberalization is independent variable, and it is our focused variable.

3.5 Model specification

The study will use the following model. The functional form of the model;

$$Risk = f(FL, Bankchar, Macro) \quad (3.2)$$

Here dependent variable Risk-taking and explanatory variables are FL shows financial liberalization, Bank characteristics (Bankchar) shows (size, liquidity, capitalization, efficiency, and age), macro shows macroeconomic variables (monetary policy, GDP growth, inflation rate).

Equation of the model as follows;

$$Risk_{i,t} = \beta_0 + \beta_1.FL_t + \beta_2.LQ_{i,t} + \beta_3.CAP_{i,t} + \beta_4.SZ_{i,t} + \beta_5.AG_{i,t} + \beta_6.EF_{i,t} + \beta_7.GDP_t + \beta_8.IFR_t + \beta_9.SRIR_t + V_{i,t} \quad (3.3)$$

From the equation (3.3) i and t show bank i and year t , respectively. The dependent variable is risk and the independent variables are financial liberalization (FL), liquidity (LQ), capitalization (CAP) bank efficiency (EF), bank size (SZ), age (AG), gross domestic product (GDP), inflation rate (IFR), short run interest rate represent bank attributes as well as macroeconomics variables. The 1-year lag for each bank characteristic variable is applied to reduce the indigeneity problem.

3.6 Econometric technique

The research produces estimates for equation 3.3, which is used to look at how financial liberalization affects bank risk-taking. As one of the better tests that can be used to differentiate between fixed and random effects models, the study employs the pooled OLS, fixed effect, random effect, and Hausman test for cointegration for this purpose. In this study, Random effects (RE) is favored under the alternative hypothesis because it is more effective than Fixed effects (FE), which is preferred under the null hypothesis because it is more efficient. Following are the key practical differences between the two effects:

Fixed effects are not estimated with partial pooling; only random effects are. Partial pooling indicates that when a group has few data points, the group's effect estimate will be relied in part on other groups' more abundant data. The Hausman Test identify endogenous regressors in a regression model.

3.6.1 Unit root test

The study uses Lm-Pesaran shin and Harris-Tzavalis test panel unit root tests are used in this study to look at the stationarity of the variables for Pakistan. At level or at the first difference, all the variables will be stationary. We cannot use fixed effect, random effect, or Hausman effect if any of the variables are stationary at second. Unit root

tests of stationarity should be performed on all dependent and independent variables before to applying fixed effect, random effect, and method. It is the initial defense against the issue of erroneous findings. The data series has to be static at level $I(0)$ or at the first difference $I(1)$.

3.6.2 Fixed Effect and Random Effect model

When it comes to selecting a Panel model employing fixed (FEM), random (REM). By monitoring alterations within groups over time, fixed effects models eliminate bias resulting from omitted variables. To avoid omitted variable bias, we can utilize the fixed-effect model. Multiple elements like location, state throughout multiple time periods are represented in panel data, and it is also known as longitudinal data like yearly or timely random variables occur in time series data which is a basic component of fixed effect regression. The normal distribution premise may be used to draw conclusions from population data using the random-effects model. In the random-effects model, it is assumed that individual-specific effects have no correlation with the independent variables.

3.6.2 Hausman test

The Hausman Test, also known as the Hausman specification test, finds endogenous regressors in a regression model (predictor variables). The other variables in the system reflect the values of

endogenous variables. Before choosing a model, Hausman's tests are performed to compare the estimators of the tested models. The Hausman test can be applied if the null hypothesis predicts that one of the compared models will produce consistent and efficient results while the other will produce consistent but inefficient results, and the alternative hypothesis predicts that the first model will produce inconsistent results while the second model will produce consistent results.

In panel analysis, the Hausman test may be used to distinguish between models with fixed and random effects. The study favours Random effects (RE) because it is more effective under the null hypothesis, even though Fixed effects (FE) are at

least as consistent as Random effects (RE) and are thus preferable under the alternative hypothesis. The difference between the fixed effect as well random effect on the basis of their significance is that for the estimation of random effect model partial pooling approach is used rather while no such approach is used for fixed effect model. Partial pooling is the estimate effect on group which is based in part having more abundant data from other groups and it is in the case when group have some data point. For the regression model of Hausman tests endogenous regressors (predictor variables) can be detected. Endogenous variables values can be determined within the model.

$$H = \frac{\beta_{FE} - \beta_{RE}}{Var(\beta_{FE}) - Var(\beta_{RE})} \quad (3.4)$$

4. Result and Discussion

This chapter presents and interprets the empirical findings of the study, which examines the relationship between bank risk-taking and financial liberalization for a sample of banks in Pakistan. The analysis is divided into subsections, each addressing the results for different panels of banks.

Initially, descriptive statistics were employed to assess the normality of the data. The descriptive analysis confirmed that the data is normally distributed and highlighted both positive and negative relationships among variables based on their lagged values.

The core empirical results were obtained through regression analysis. These results reveal that financial liberalization has a significant influence on bank risk-taking behavior. The nature and extent of this impact, however, vary across

different types of banks (e.g., public, private, and foreign banks), suggesting that institutional and ownership structures play a crucial role in mediating the effects of liberalization.

The findings also indicate that bank-specific characteristics, such as size, capitalization, and profitability, significantly influence risk-taking behavior. Additionally, macroeconomic variables such as GDP growth and inflation were found to have varying degrees of influence on bank risk.

In summary, the empirical evidence supports the hypothesis that financial liberalization affects bank risk-taking in Pakistan. However, the direction and intensity of this relationship are contingent upon both internal (bank-specific) and external (macroeconomic) factors. The results underscore the need for cautious and well-regulated liberalization policies to manage risk in the banking sector.

Table:4.1 shows the estimated results by using principal components analysis.

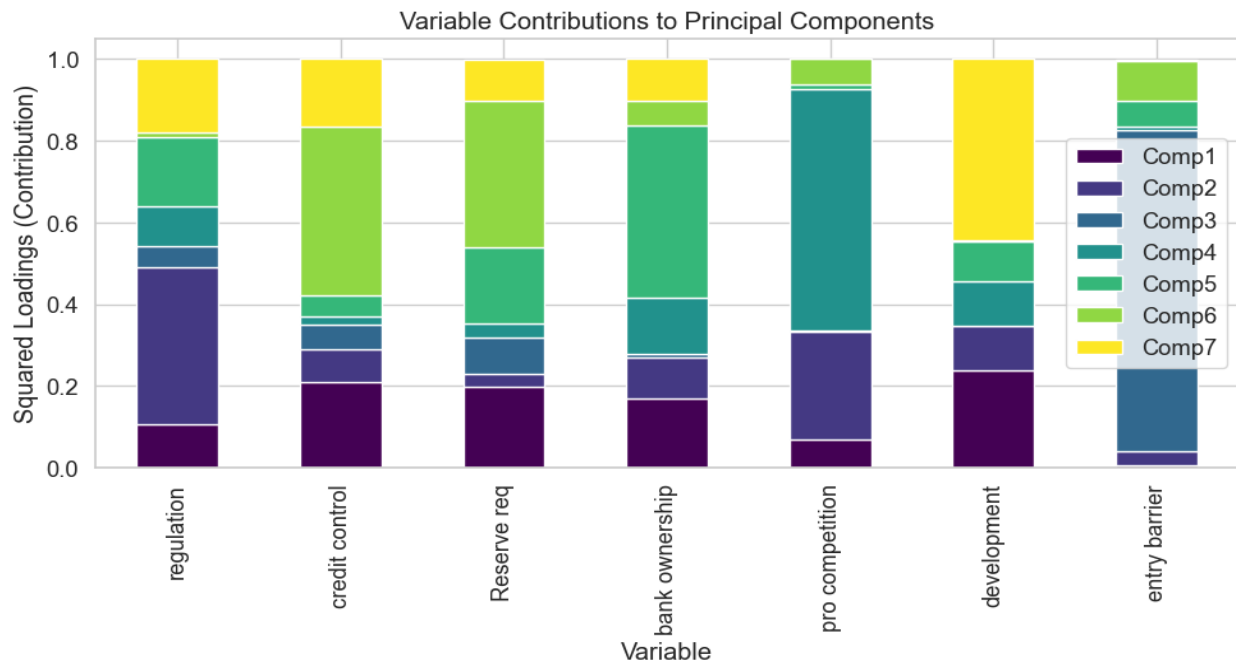
Table:4.1 PCA results

Principal components/correlation		Number of obs	=	11
		Number of comp	=	7
		Trace	=	7
Rotation: (unrotated = principal)	Rho		=	1.0000
Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	2.874	1.733	0.411	0.411

Comp2	1.142	0.051	0.163	0.574
Comp3	1.090	0.309	0.156	0.730
Comp4	0.781	0.204	0.112	0.841
Comp5	0.577	0.149	0.082	0.923
Comp6	0.428	0.320	0.061	0.985
Comp7	0.108	.	0.015	1.000

Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6	Comp7	Unexplained
regulation	0.327	0.619	0.231	-0.312	0.410	-0.110	0.424	0
credit control	0.458	0.282	0.247	0.142	-0.229	0.641	-0.407	0
Reserve req	-0.444	-0.181	0.298	0.186	0.431	0.598	0.320	0
bank ownership	0.413	-0.316	0.087	0.373	0.648	-0.244	-0.321	0
pro competition	-0.265	0.514	0.054	0.768	-0.108	-0.246	0.032	0
development	0.489	-0.328	-0.015	0.330	-0.315	0.038	0.666	0
entry barrier	-0.080	-0.185	0.886	-0.099	-0.250	-0.312	-0.063	0



4.3 Descriptive statistics

The dataset includes 286 observations after removing outliers. Bank risk (Z-score) has a mean

of 3.21, showing wide variation across banks. Financial liberalization averages 3.38, also with notable variability. Among bank characteristics,

liquidity is stable, while capitalization and efficiency show high variation. Macroeconomic variables like GDP, inflation, and interest rates

also display moderate fluctuations. Overall, the data reflects strong diversity across banks and time.

Table 4.2 Descriptive statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Financial Liberalization	286	3.383	0.749	5.697	7.975
FL					
Bank Risk Taking	286	3.216	0.989	-1.461	7.958
Z-score					
Bank Characteristics					
Liquidity	286	0.066	0.023	0	0.162
Capitalization	286	0.153	0.722	-0.129	12.13
Efficiency	286	1.172	4.731	-0.947	79.572
Size	286	19.623	1.214	16.48	22.186
Age	286	3.547	0.672	2.398	5.063
Macroeconomics Variables					
GDP	286	3.406	2.234	-0.935	5.846
Inflation	286	7.413	3.003	2.529	11.916
Short term interest rate	286	8.838	2.138	5.82	12.472

4.4 Correlation Matrix

Table 4.3 presents the correlation among variables for 26 Pakistani banks from 2011 to 2020. The results show both positive and negative relationships, indicating that changes in one variable may lead to similar or opposite changes in

another. Financial liberalization is positively linked to bank stability. Overall, the correlations among bank-specific and macroeconomic variables are low, suggesting no serious multicollinearity issues in the analysis.

Table 4.3; Correlation Matrix

	Risk	FL	Capt	Ef	Liq	Size	Age	GDP	INF	SRIR
Risk	1.000									
FL	-0.277	1.000								
Capt	0.324	-0.017	1.000							
Ef	-0.166	0.081	-	1.000						
			0.027							
Liq	0.018	0.116	-	0.124	1.000					
			0.065							
Size	-0.024	0.241	-	-0.073	0.429	1.000				
			0.064							
Age	0.207	0.000	0.200	-0.107	0.114	0.282	1.000			
GDP	0.088	-0.440	0.067	-0.130	-	-	-	1.000		
					0.089	0.127	0.009			
INF	0.084	0.232	-	0.055	0.099	-	0.008	-0.732	1.000	
			0.065			0.051				
SRIR	0.133	0.075	-	0.002	0.090	-	0.009	-0.600	0.924	1.000
			0.078			0.089				

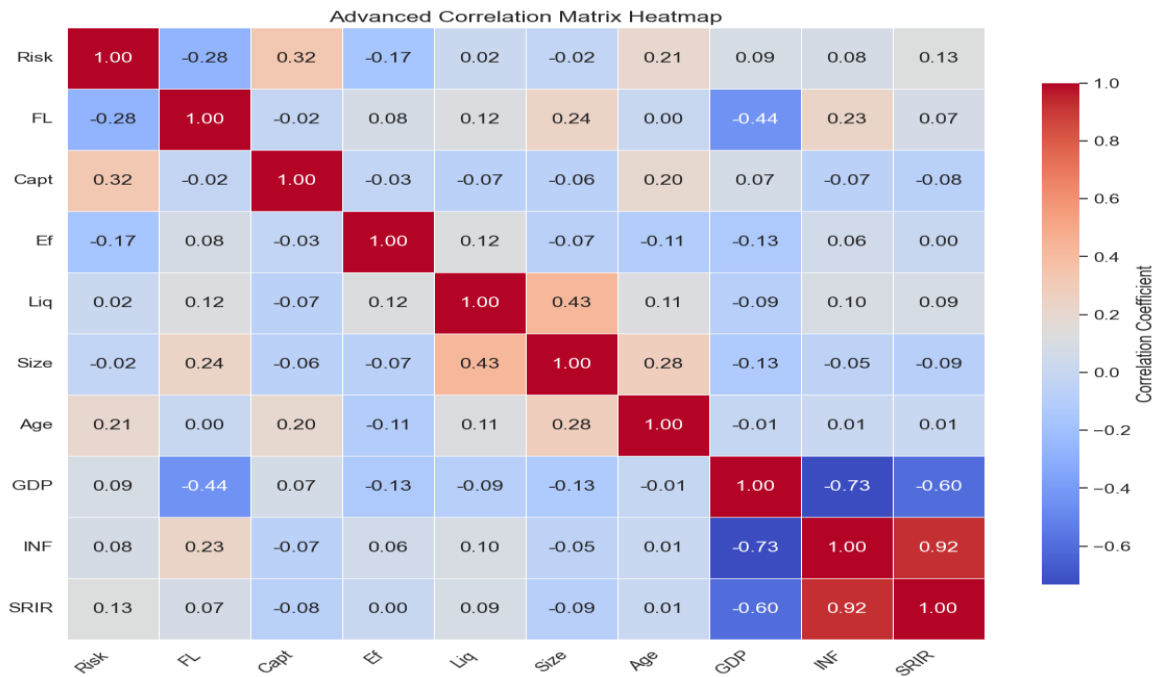


Table 4.3 shows the correlation between dependent and independent variables. Bank risk has a negative relationship with size, inflation, and short-term interest rate, but a positive link with financial liberalization, capitalization, efficiency, age, and GDP. Liquidity shows no significant correlation with risk, and has a weak negative correlation with financial liberalization. Based on Gujarati (2003), multicollinearity is a concern if correlation exceeds 0.10; however, only one pair shows a high correlation (0.92), indicating a low risk of multicollinearity overall.

root tests. The findings show that financial liberalization, risk, size, and GDP are stationary at first difference (I(1)), while liquidity, efficiency, capitalization, inflation, and short-term interest rate are stationary at level (I(0)). No variable is integrated at the second difference (I(2)), confirming the data is suitable for panel regression models. Conducting unit root tests is essential before applying fixed or random effects models to avoid spurious results.

4.5 Unit root test

Table 4.4 presents the results of the Harris-Tzavalis and Levin-Lin-Chu (LM-Pesaran-Shin) panel unit

Table 4.4: Result of unit root test for the panel of all banks

Variables	Harris-Tzavalis		Lm-Pesaran shin	
	I (0)	I (1)	I (0)	I (1)
FL	0.729	-0.189***	4.195	-6.431***
Risk	-0.093	-0.498***	-3.625	-5.874***
Bank Characteristics				
Liquidity	0.325***	-	-2.741***	-
Size	0.887	-0.193***	5.433	-5.874***
Age	0.000****	-	-0.819	-5.902***
Efficiency	-0.177***	-	-3.707***	-
Capitalization	-0.110***	-	-0.819***	-

Macroeconomics Variable

GDP	0.796	0.218***	3.810	-3.385***
Inflation rate	0.568**	-	-1.981**	-
Short-term interest rate	0.392***	-	-3.913***	-

Note: ***, ** and * indicate significance levels of 1%, 5%, and 10% respectively.

The unit root test results in Table 4.4 show that bank risk, financial liberalization, bank size, and GDP growth are stationary at first difference (I(1)), while variables like liquidity, age, efficiency, capitalization, inflation, and short-term interest rate are stationary at level (I(0)). No variable is integrated at the second order (I(2)), confirming that all variables are suitable for panel data analysis. Therefore, the Fixed Effects Model, Random Effects Model, and Hausman Test were applied to examine the relationship between bank risk and the explanatory variables. This means that all data sets for the selected variable are linked in series I (0) or I (1), Therefore, fixed effect and

random effect and Hausman test is used in this study which as follows.

4.6 Fixed effect and Random effect model

Fixed Effects Models (FEM) help control for unobserved factors that vary across groups but remain constant over time, reducing omitted variable bias using dummy variables. Random Effects Models (REM) assumes that individual-specific effects are uncorrelated with the independent variables and are suitable for generalizing to the population. The Hausman Test is used to choose between FEM and REM by checking if individual effects are correlated with regressors if they are, FEM is preferred; otherwise, REM is appropriate.

$$chi^2 \text{ statistics}(9) = 70.25$$

$$Prob > chi^2 = 0.000$$

The Hausman test result (p-value = 0.000) indicates that the fixed effects model is more appropriate than the random effects model. Since the p-value is below 0.05, the null hypothesis favoring the random effects model is rejected, confirming that the fixed effects model provides consistent and reliable estimates.

Table 4.5 Fixed Effect model for panel of all banks, dependent variable is risk

	Include all the variables		Include only bank characteristics	
	Coef.	St. Err.	Coef.	St. Err.
FL	-0.080**	0.028	-0.059**	0.025
Liquidity	-1.825	2.2	-1.522	2.216
Capitalization	0.391***	0.044	0.38***	0.044
Efficiency	0.009	0.007	0.007	0.007
Size	-0.457***	0.104	-0.593***	0.083
Age	-44.123	53.777	-56.57	54.175
GDP	0.021	0.026		
inflation rate	0.013	0.035		
Short term interest	0.042	0.04		
Constant	168.222	191.038	215.54	192.38
Mean dependent var		3.213		3.213
R-squared		0.475		0.457
F-test		25.245		35.567
Prob > F		0.000		0.000
Number of obs		286		286

Note: *, ** and *** indicate significance levels of 10%, 5%, and 1% respectively.

Estimated results by using fixed effect model shows in table 4.5. Obtained outcomes shows that financial liberalization has negative and significant impact on the banking risk at 1% level of significance with -0.08 coefficient value. These results show similarity with, Danier et al., (2007), stated that financial liberalization have positive impact on banking risk when they achieve threshold level of efficiency. In case of Pakistan banking system is not at efficient level that's why financial liberalization has negative impact on the bank taking risk. While all the variables have insignificant impact on the banking risk, only capitalization and size have significant impact. Because size of the banks cause to decline the banking risk, keely (1999).

The other independent variables bank characteristics liquidity, size and age shows negative relationship with bank risk taking behavior. The result shows statistically significant at 1% significant level while efficiency, capitalization, GDP, inflation rate and short run interested have positive link with bank risk. The result shows that capitalization is statistical significant and the efficiency, liquidity are statistically insignificant at 1% and 5% Significant level.

Efficiency have and bank capitalization with bank risk and it is shown from the study of Hughes and Moon (1995) which emphasized the relevance of efficiency when examining the link between bank capital and risk. The theoretical reasons were followed by investigations that discovered bank risk-taking and moral hazard incentives are affected by both efficiency and bank capital. Furthermore, in the event of a banking system with diverse ownership arrangements, it is essential to determine if this connection (capital-risk-efficiency) is impacted by this element (ownership structure). Efficiency can increase bank risk according to Eatwell (1997) widely praised financial liberalization's administration of

savings to the most effective investments, competition that increases the efficiency of the financial system, effective management of bank risks, higher investments and economic growth, and better government policies due to healthy financial discipline for the panel of total banks.

According to Altunbas, Carbo, Gardener, and Molyneux (2007) study, banks with greater capital are less efficient and more likely to take on high risks, while inefficient European banks have no incentive to take on additional risk. The findings indicate a positive association between risk and capital level, as well as the favorable effect that corporate financial health has on decreasing capital levels and bank risk-taking. Vasicek (2002), shows that the default of an individual loan is driven by the realization of two risk factors: a systematic risk factor that is common to all loans, and an idiosyncratic risk factor.

Liquidity have negative association with bank risk which is link with Calomiris et al. (2015) establish a theory on banking liquidity requirements, arguing that banks should be regulated on the basis of assets rather than capital. Banks should retain more liquid assets in order to deal with liquidity risk and better manage and monitor the risks to which they are exposed.

Macroeconomics variable (GDP, interest rate and inflation rate) have positive effect on bank risk. Pakistan is developing countries. By increase in GDP investment will increase and it will tends to increase bank risk as people taking loan from banking sector and will not repay back which turn the bank go to risk. Interest rate can increase bank risk when private investor taking loan from banks non performing loan will tends to bank risk. When there is increase in production it will increase prices and inflation will increase which turn to increase more loan for survival and debt burden will increase and the bank will goes to risk.

4.7 panel of commercial banks for Pakistan

Hausman test

χ^2 statistics = 0.234

$Prob > \chi^2 = 0.890$

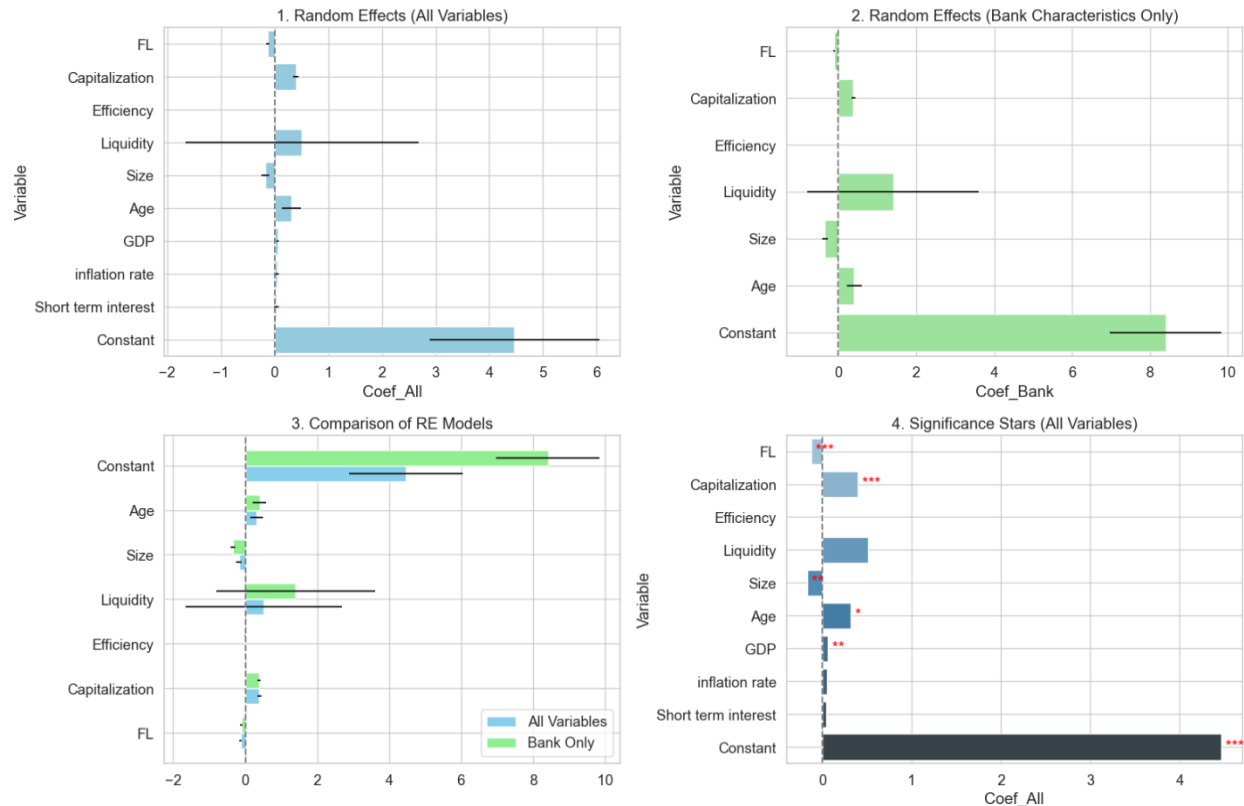
Result shows that chi-square statistics probability is 0.890 which is greater than 0.05 at 5% significant level so, we are unable to reject the null hypothesis and conclude that the random effect model is appropriate. The result of random effect model is reported in table 4.6.

Table 4.6; Random Effect model for commercial banks, dependent variable risk

	Include all the variables		Include only bank characteristics	
	Coef.	St. Err.	Coef.	St. Err.
FL	-0.13***	0.026	-0.109***	0.024
Capitalization	0.394***	0.047	0.38***	0.047
Efficiency	0.008	0.008	0.005	0.007
Liquidity	0.51	2.177	1.403	2.2
Size	-0.17**	0.076	-0.345***	0.07
Age	0.313*	0.171	0.4**	0.192
GDP	0.055**	0.025		
inflation rate	0.046	0.036		
Short term interest	0.037	0.043		
Constant	4.469***	1.584	8.412***	1.431
Mean dependent var	3.213		3.213	
Overall r-squared	0.184		0.111	
Chi-square	190.791		171.242	
Prob > chi2	0.000		0.000	
R-squared within	0.457		0.437	
Number of obs	286		286	

Note: *, ** and *** indicate significance levels of 10%, 5%, and 1% respectively.

Random Effects Model Summary



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Estimated results by using random effect model shows in table 4.6. Obtained results shows that financial liberalization has negative and significant impact on the banking risk at 1% level of significance with -0.13 coefficient value. if there is 1% increase occurs in the independent variable financial liberalization (FL) it will bring 0.13% decrease occurs in the dependent variable. These results show similarity with Cubillas (2012), stated that financial liberalization have positive impact on banking risk when they achieve threshold level of efficiency.

In case of Pakistan banking system is not at efficient level that's why financial liberalization has negative impact on the bank taking risk. While all the variables have insignificant impact on the banking risk, only capitalization, age, size and GDP has significant impact on the banking risk, whereas size of the banks has statistically negative and significant impact on the banking risk, the reason is that size of the banks cause to decline the

risk. Also, it can be shown from the table that the independent variable bank characteristics Capitalization, liquidity, banks efficiency, GDP, short run interest rate and inflation rate have positive association with dependent variables risk taking. Bank size show negative relationship with dependent variable bank risk taking. And the result shows that it is highly statistically significant at 1% significant level. If there is increase in the size of the bank it will decrease bank risk taking. The independent variable capitalization, size and GDP shows statistically significant at 5% significant level. On the other hand, liquidity, efficiency, inflation rate and short run interest rate are statistical insignificant at 5% significant level. According to Gorton and Rosen (1995), managers will take on more risks during periods of poor performance in the banking industry. Moral hazard incentives are reduced in better capitalized banks. The role of regulators and supervisors has an impact on the positive relationship between

capital and risk. According to their requirements, any increase in a bank's risk-taking level must be accompanied by an increase in capital held to cover these risks. In the case of banks with higher levels of risk, the required additional capital buffer allows them to avoid the costs of issuing equity on short notice. The level of bank efficiency may have an impact on future bank risk. Furthermore, a decrease in efficiency will increase the bank's risk. Efficiency is positively and insignificantly link with bank risk. The efficient market hypothesis assures market information is utilised effectively, whereas the Pareto optimality theorem says competition leads to Pareto optimal equilibrium. These postulates ensure financial sector efficiency and competitiveness (Eatwell, 1997; Chowdhury, 2001). McKinnon (1973) and Shaw (1973) critiqued developing's nations' financial restrictions. Financial restriction affects economic progress.

Liquidity have positive link with bank risk which is shown from the study of Diamond and Rajan

(2005), there is a positive association between liquidity and bank risks. They stress that if too many economic ventures are supported with loans, the economy would suffer. The bank is unable to fulfill depositor demand. As a result, if the value of these assets declines, these depositors will be able to reclaim their funds. This suggests that both liquidity and bank risks are increasing at the same time.

Macroeconomics variable (GDP, interest rate and inflation rate) have positive effect on bank risk. Pakistan is developing countries. By increase in GDP investment will increase and it will tends to increase bank risk as people taking loan from banking sector and will not repay back which turn the bank go to risk. Interest rate can increase bank risk when private investor taking loan from banks non performing loan will tends to bank risk. When there is increase in production it will increase prices and inflation will increase which turn to increase more loan for survival and debt burden will increase and the bank will goes to risk.

4.7 Panel of Islamic banks for Pakistan.

I Hausman test statistic for Islamic banks

Chi square statistics = 20.470



prob (chi-square = 0.021)

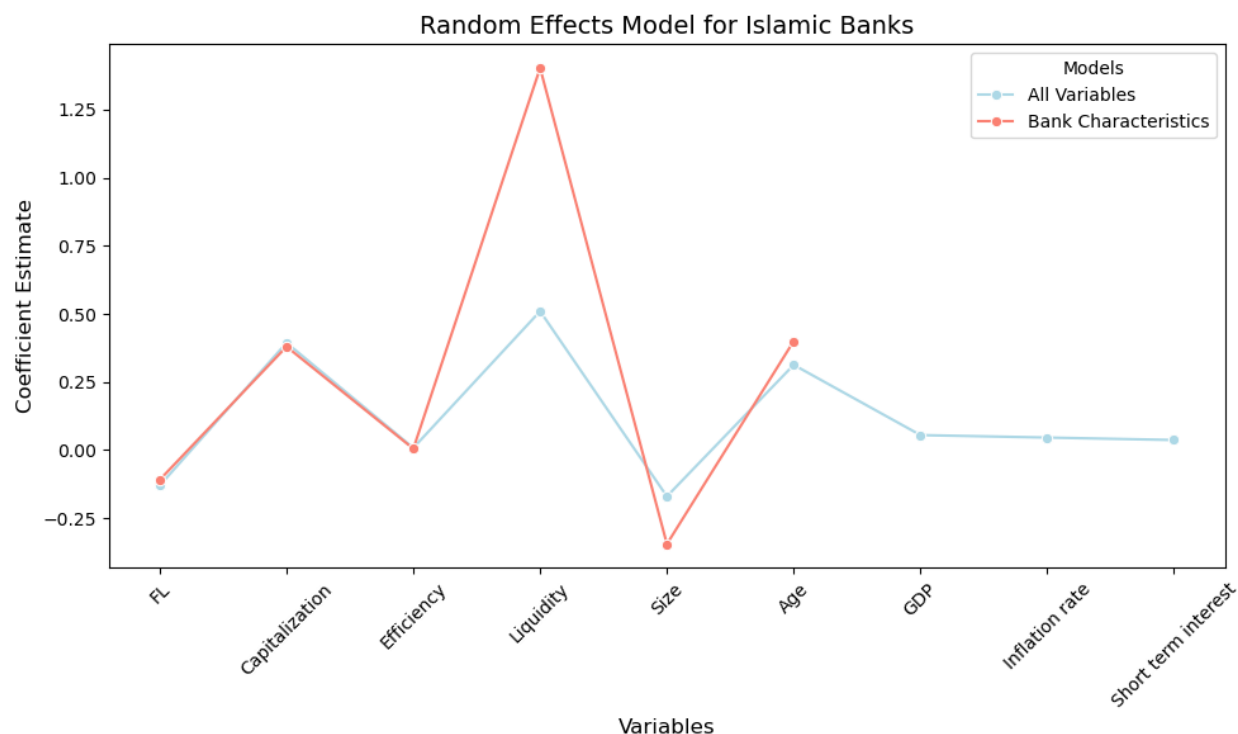
From the result of Hausman test it can be shown that the value of probability of chi square is greater than 0.05 at 5% significant value which shows that we are unable to reject null hypothesis and conclude that random effect model is appropriate.

Table 4.7 Random Effect model for panel of Islamic banks; dependent variable risk

	Include all the variables		Include only bank characteristics	
	Coef.	St. Err.	Coef.	St. Err.
FL	-0.079***	0.028	-0.082***	0.026
CAP	20.21***	2.352	20.649***	2.356
EF	-0.992***	0.3	-1.082***	0.304
LIQ	0.748	1.397	0.853	1.414
SIZE	0.262***	0.082	0.207***	0.08
AGE	-0.516***	0.11	-0.516***	0.112
GDP	0.052*	0.027		
INFR	0.025	0.039		
SRIR	0.022	0.046		
CONSTANT	-1.381	1.934	0.264	1.825
Mean dependent var	3.313			3.313
Overall r-squared	0.836			0.817

Chi-square	229.670	215.000
Prob > chi2	0.000	0.000
Number of obs	55	55

Note: *, ** and *** indicate significance levels of 10%, 5%, and 1% respectively.



The estimated results using the random effects model for Islamic banks, as shown in Table 4.7, indicate that financial liberalization has a negative and significant impact on bank risk at the 1% significance level, with a coefficient of -0.07. This suggests that in Pakistan's less efficient banking system, financial liberalization increases risk rather than reducing it, aligning with the view of Helmann et al. (2000) that liberalization can raise risk if efficiency thresholds are not met. Among bank-specific factors, efficiency and age are negatively and significantly associated with bank risk, while capitalization, bank size, and GDP show a positive and statistically significant relationship. Inflation, short-term interest rate, and liquidity also exhibit a positive association with bank risk, but their impact is statistically insignificant. The findings are supported by previous literature, which suggests that higher capitalization can lead to greater risk-taking (Molyneux et al., 2007), increased liquidity can

heighten risk due to depositor demand (Acharya & Viswanathan, 2011), and greater efficiency helps reduce risk (Fiordelisi et al., 2010). Furthermore, macroeconomic factors such as rising GDP, interest rates, and inflation contribute to increasing bank risk in developing economies like Pakistan due to greater loan demand, default risks, and debt burdens.

4.8 Qualitative Analysis

As part of the qualitative analysis in Chapter 4, an in-depth interview was conducted with a senior official from the State Bank of Pakistan to explore the relationship between financial liberalization and bank risk-taking. The official clarified that in Pakistan, the banking sector is monitored solely by the central bank, not the federal government, although federal policies such as import and export regulations may indirectly impact the banking system. The interview revealed that removing government intervention—interpreted as

central oversight—can increase banking risks, including liquidity and credit risk, particularly in the absence of strong regulatory frameworks. For instance, the unregulated use of cryptocurrency in regions like Khyber Pakhtunkhwa has already introduced financial vulnerabilities. The official noted that financial liberalization may increase liquidity due to unrestricted money flows, which in turn raises the risk level in the system. When asked about efficiency, the official suggested it could improve under liberalization if economic fluctuations are minimized. Regarding bank size, it was explained that while increasing the number of branches does not directly increase bank risk, it significantly raises operational costs—including rent, salaries, and compliance with reserve requirements—and is only advisable during periods of economic boom. The interview also covered the indirect impact of banking on GDP, where sectors such as IT and call centers contribute to service exports and foreign currency inflows, even though banks do not directly influence GDP. Lastly, the official commented on the effect of rising interest rates, stating that although interest rates may not directly affect bank risk, they can contribute to inflation, especially when used by governments during financial constraints. Overall, the interview underscores that while financial liberalization can offer benefits, it also poses increased risk in the absence of strong centralized oversight and consistent policy enforcement.

5 Conclusion and Policy Recommendation

This section presents insights from an interview with a senior official from the State Bank of Pakistan, focusing on the relationship between financial liberalization and bank risk. The official explained that in Pakistan, the central bank is the main regulatory authority for the banking sector, and removing its oversight could increase financial risks, including liquidity and credit risk. Without proper regulation, financial liberalization may lead to uncontrolled money flows and higher exposure to risk, as seen in unregulated cryptocurrency activities. The official noted that efficiency in the banking sector could improve under liberalization, but only if economic fluctuations are controlled. Increasing the size of banks through branch

expansion does not directly raise risk, but it significantly increases operational costs and is more suitable during periods of economic growth. Although the banking sector does not directly influence GDP, it supports economic activity through service exports, especially in IT and call centers. Regarding interest rates, the official stated that while they may not directly affect bank risk, higher rates can lead to inflation and are often used by governments in times of financial need. Overall, the discussion emphasized the importance of strong regulatory oversight to ensure that financial liberalization does not lead to increased instability in the banking sector.

5.2 Policy Recommendation

- i. The study highlights the need for a well-defined policy framework derived from empirical findings to manage and reduce bank risk across the 26 banks in Pakistan. Such a policy should be implemented to ensure better oversight and control over financial activities in the sector.
- ii. Financial liberalization, while offering potential benefits, also introduces significant risks in Pakistan's banking system due to institutional weaknesses. Without strong regulatory institutions, the costs of liberalization may outweigh its benefits, especially in emerging economies like Pakistan.
- iii. To stabilize the financial system, the study recommends strengthening political stability and improving governance. It is essential to enhance the supervisory capabilities and prudential regulatory functions of the State Bank of Pakistan.
- iv. The study also emphasizes the importance of expanding and deepening the local capital market to improve financial intermediation. For future research, it suggests incorporating additional variables and applying alternative econometric techniques to gain deeper insights into the effects of financial liberalization and macroeconomic factors on bank risk.

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