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The Role of Financing Models and Credit Risk on Islamic Bank Stability

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Abstract: The prime objective of the current study is to examine the impact of profit sharing and profit margin sharing on the financial stability of the Islamic banks in the seventeen countries listed in the Islamic banking service board. In addition to that the study has employed the credit risk as moderating factor in the relationship between the profit sharing and bank stability, and profit margin sharing and bank stability of Islamic banks. The study has used panel data methodology. The data of 142 banks from 17 countries namely seventeen countries, including Bahrain, Bangladesh, Brunei Darussalam, Egypt, Indonesia, Iran, Jordan, Kazakhstan, Kuwait, Lebanon, Nigeria, Oman, Pakistan, Saudi Arabia, Sudan, and Turkey over the period of eleven years from 2013 to 2023 is gathered from the annual reports and other sources. The GMM and FE are used as estimation techniques in our analysis. The results indicate that the interaction term PSF*CR, and PMF*CR, are in significant positive relationship with the stability of Islamic banks. The result indicates that credit risk under the presence of profit-sharing financing and profit margin financing has significant impact on the stability of sample Islamic banks in our sample countries. The results of the study indicate that evaluation of credit risk is at heart of a sound banking sector under both types of systems i.e., conventional, and Islamic banking systems. The findings of the study will be helpful for policymakers and researchers in understanding the issues related to financing models and credits risks of Islamic banks in Islamic countries.

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Background

Islamic banking, which is founded on principals of Sharia law, a unique alternative to the dominant conventional interest-based banking model, which is a prevalent form of financing in contemporary (Adekoya, 2022). The core principal that form the basis of Islamic finance comprises of ; ethical behavior in financial affairs such as lending and borrowing, the fair allocation of risk, and the fair distribution of rewards. The key feature of Islamic banking which differentiate it from the conventional banking is profit and loss sharing (PLS) model, which is a distinctive feature of Islamic banking that sets it apart from conventional banking and significantly influences its overall stability (Ali et al., 2022). The PLS financing, commonly referred to as profit sharing financing, is a financial arrangement that is primely and entirely based on the fundamental principles of Islamic finance. The main objective behind introduction of PLS is is to eliminate or at least discourage the practice of usury, which indeed promote economic exploitation of messes and characterized by the imposition of exorbitant interest rates, and instead promote economic equality and justice in accordance with the principles of Sharia law (Müller, 2023). The PLS model provides the solution to this problem as it based upon the Islamic financial system is characterized by its adherence to principles that promote cooperation and the acceptance of risk-sharing transactions (Khan et al., 2023). These Islamic financial system based upon the sharia principles are based on the fundamental prohibition of interest, also known as riba.

The aforementioned sharia principles which offer the foundation of Islamic banking and are manifested in profit sharing financing, which is exemplified by contractual arrangements such as Mudarabah and Musharakah (Jiménez-Arroyo, 2023). These contractual agreements promote a sense of collaboration among the parties, discourage the exploitation of any party, and fairly distribute both the potential risks and benefits between the financial institution and its customers. The mudarabah arrangement involves the utilization of the client's intellectual capital, business ideas, investment ideas, or expertise, analyses the risk associated with them, and then assume the financial responsibility through the provision of required funds (Ghayad & Hamdan, 2021; Lorenza & Wargenegara, 2022). According to PLS The capital provider Islamic bank in this case, as stipulated by a prearranged agreement bound to provide funds and engages in the allocation of profits and assumes liability for any resulting losses. On the other hand, Musharakah can be understood as a type of cooperative business arrangement between the bank and Individual or bank and corporations in which both the financial institution and the customer engage in active involvement by contributing financial or non-financial assetsm and are agreed on the equitable and impartial distribution of both financial gains and losses among the parties involved (Mohd Thas Thaker et al., 2021; Sibuea et al., 2020).

The research on the impact of PLS on the stability of thrift institutions has been a subject of considerable interest for both scholars and professionals, as the understanding the potential consequences of profit-sharing financing on the stability of Islamic banks is of utmost importance, particularly considering the growing significance of Islamic finance in the global landscape (Banna & Alam, 2020). A resilient and ssound banking system ensures the protection of the vested interests of financial institutions and their stakeholders, and also reinforces the integrity of the broader economic structure. Within the domain of interest-based banking, the primary responsibility for assuming risk lies primarily with the borrower, whereas in profit-sharing financing, the collective obligation is distributed among all relevant parties (Nouman & Ullah, 2023). The inherent characteristic of risk diversification and mitigation of systemic shocks in Islamic banks has the potential to enhance their overall stability.

The recent studies have proved that profit-sharing financing is in accordance with the fundamental principles of ethical and sustainable banking practices (Jaafar & Brightman, 2022; Suseno & Bamahriz, 2017; Tiran, 2023). It is argued by Khan et al. (2023) and Al-Roubaie and Sarea (2019). that the Islamic financial institutions that provide profit-sharing financing products play a significant role in enhancing societal and economic development through the promotion of justice and equality in the fair allocation of wealth. The promotion of increased public trust in the banking system can be achieved by ensuring that its practices are in line with prevailing ethical norms, thereby cultivating a stronger sense of confidence among a broader portion of the population. Recognizing the complexities and difficulties inherent in profit sharing financing is of paramount significance. The success of Islamic financial institutions relies on their ability to overcome specific challenges that are inherent in their operational structure, risk assessment procedures, and compliance with regulatory requirements (Alhammadi, Archer, & Asutay, 2020; Saragiha, Wardatib, & Pratamac, 2020; Utamia, Indriantob, & Pratamac, 2019). Islamic banking system has emerged as one of the growing financing systems. It is evident from the Figure 1 that total global assts of Islamic banking has been grown from 1975 USD billions to 3374 USD billions in 2022 and that are projected to reach the figure 4940 by the end of 2025.

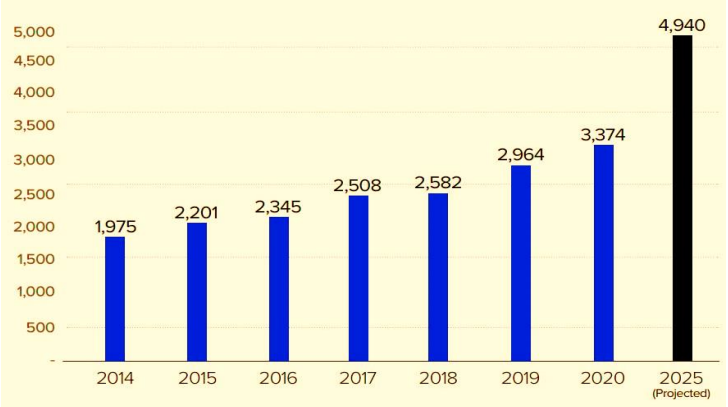

Figure 1: Islamic Finance Asset Growth (US Billions)
Source: ICD Refinitiv Islamic Finance Development Report

Profit margin financing (PMF) which is in contrasts to the conventional lending model that revolves around interest-based transactions. PMF advocates the utilization of interest rates on loans, Islamic financial institutions offering profit margin financing employ a profit-sharing arrangement, which illustrates a mutually beneficial partnership between the financial institution and the customer, in which the institution acquires a tangible asset based on the customer's request and subsequently sells it to the customer at a higher price, resulting in a profit (Askari, 2023). The sale or the purchase transaction is carried out in accordance with agreed terms and through a transparent and mutually agreed-upon conditions. This specific approach of PMF aligns with the core principles of equity, ethical behavior, and shared prosperity that are deeply embedded in the domain of Islamic finance (Ong, 2023).

The evaluation of credit risk is at heart of a sound banking sector under both types of systems i.e., conventional and Islamic banking systems. Though these credit risk and its implications are equally important in both types of banking i.e conventional and Islamic, however, the application of profit margin financing and profit-sharing financing highlight its unique dynamics (Rouetbi, Ftiti, & Omri, 2023). Therefore, the current study proposed a model's incorporate credit, which can be attributed to multiple factors such as the evaluation of asset value, the influence of economic fluctuations, and the overall financial health of customers. The profit margin financing inherits a fundamental risk associated with assessing of the accurate value of assets and the chances of a subsequent decrease in their worth, which has significant impact on the stability as well as on the profitability of bank (Adekoya, 2022; Pratamaa, Che-Adamb, & Kamardinc, 2020; Tambunan, Wijaya, Siregar, & Pratama, 2022). As highlighted in above paragraphs. in the context of profit-sharing financing, the distribution of risk is jointly assumed by the financial institution and the client, which has protentional to reduce the bank's exposure to credit risk. It is argued by the inclusion of a risk-sharing component in the structure of Islamic banks contributes to the overall stability of these financial institutions by distributing the responsibility of credit risk and reducing the probability of incurring significant losses arising due to non-performing loans (Mohammad, Asutay, Dixon, & Platonova, 2020).

Based upon the decision above the study argues that the complex interaction between profit margin financing, profit sharing financing, credit risk, and bank stability represents a multifaceted and nuanced phenomenon that encompasses a range of potential benefits and challenges (Hendrawan, Defung, & Wardhani, 2023). It is also discussed that Islamic banks demonstrate a fundamental commitment to ethical finance through their implementation of profit margin financing and profit-sharing financing, which not only fosters a perception of confidence among individuals or groups with an interest in the organization but also acts as a driving force for the advancement of ethical and accountable banking methodologies (Atrizka & Pratama, 2022; Danilwan, Isnaini, Pratama, & Dirhamsyah, 2020; Nugroho, 2021). The shared-risk characteristic of profit-sharing financing has the potential to mitigate the impact of credit risk events on the stability of financial institutions, leading to a more balanced and fair risk profile (Giacomelli, 2022). However, it is crucial to adopt effective risk management strategies to accurately assess credit risk, especially in profit margin financing, where asset valuation plays a significant role. The necessity to develop regulatory frameworks for Islamic banking stems from the requirement to effectively manage the complex intricacies introduced by these unique financing models, while simultaneously safeguarding the stability of the financial system.

Due to the innovation of its methodology in the financial intermediation the Islamic banking sectors has gained the serious and increasing attention of academicians and professionals. It is argued by Alam, Gupta, and Zameni (2019), that profit sharing financing is a key component of the renowned field of Islamic finance, in which charted and approved financial institutions and their valued clients form mutually beneficial partnerships to fairly distribute the benefits of prosperity and share the financial risks of challenges. This innovative financial intermediation methodology under consideration is based on the core principles of fairness, cooperation, and the removal of transactional incentives (Crouhy, Galai, & Wiener, 2021). These principles form the foundational basis for a unique operational framework that has the capacity to impact the stability of a bank's Z-score.

Literature review have yielded significant insights regarding the sustainability of financial institutions through the examination of profit-sharing financing, and a growing body of empirical evidence, Iryanto, Inat, and Fadly (2020) suggests a significant and favorable association between profit sharing financing (PSF) and Z-Score metrics, which serve as indicators of the financial stability of banks. Islamic banks that utilize profit sharing financing mechanisms tend to have higher Z-Score values compared to banks that primarily engage in interest-based transactions, which indicates a greater level of financial stability in the banking sector. This significant impact of PSF on the bank stability can be ascribed to the inherent risk-sharing mechanism present in profit-sharing financing. It is argued by Rabbani et al. (2021) that Islamic financial institutions demonstrate an enhanced ability to proficiently mitigate risks due to their unique approach of mutually distributing both profits and losses with their customers. It is further argued that the bank's ability to withstand economic downturns and adverse shocks may be strengthened if it has implemented prudent risk diversification measures.

According to Rulindo and Rifqi (2022) thrift institutions that participate in profit-sharing modes of financing possesses a tendency to holds assets of higher quality. He continued and argued that this asset accumulation is a result of a conscious focus on ethical investments and strict adherence to Sharia principles, thus aligning with a cautious approach to risk management. In a study caried out by Zeka and Alhassan (2023) And Saragih et al. (2020b) it is broached that the Z-Score of a bank is directly influenced by the augmentation of its asset base, as there exists an inherent relationship between the bank's asset base and its capacity to endure financial adversities. Authors with different theocratical lenses and focusing on the regulatory and governance structure sheds light on the positive effects of profit-sharing financing on the strength and stability of banking institutions across the globe (Liu, Xiong, & Du, 2023; Tambunan, Siregar, Wijaya, & Pratama, 2022). However, do profit sharing financing has any potential to enhance stability of banking sector by flourishing within a regulatory framework that fosters the adoption of risk-sharing mechanisms and aligns with the fundamental principles of Islamic finance is still seems a puzzle whose parts do not seems to be fixed (Karim, 2023).

In conclusion, a comprehensive review of scholarly literature demonstrates that profit sharing financing significantly influences the Z-Score of Islamic banks. Islamic banks that adopt this innovative financial model demonstrate increased security due to the inherent

feature of risk-sharing in profit-sharing financing, as well as a collection of high-quality assets and regulatory frameworks that are more accommodating in nature (Cortelezzi & Ferrari, 2022).

The Islamic banking system based on principles of ethical conduct and fair financial practices, and there is a growing body of literature which indicate that the profit margin financing is a crucial component within the domain of Islamic finance, as it enables the formation of mutually beneficial partnerships between Islamic banks and their customers (Augusta, Olaleke, Ogbari, & Maxwell, 2022; Danilwan, Isnaini, & Pratama, 2020; Mallick, 2019). It is argued that these contractual collaborations between banks and clients not only align with the core principles of risk allocation but also function as a mechanism for fair distribution of financial gains.

Researchers have tried to examine the relationship between profit margin financing and the stability of financial institutions with various dimensions and the existing body of evidence suggests a strong and positive correlation between profit margin financing and the stability of banks, as measured by the Z-Score. Few of authors have also compared Islamic and conventional banks and argued that When comparing Islamic banks that primarily engage in conventional interest-based transactions with those that prioritize profit margin financing, it becomes evident that the latter demonstrate higher Z-Score values, indicating a greater degree of financial stability (Pratami, Feriyanto, Sriyana, & Pratama, 2022). According to Pratami, Feriyanto, Sriyana, and Pratama (2022) the stability of banks is subject to various influential factors in relation to profit margin financing and one of the crucial factors broached in their study is the intrinsic risk-sharing mechanism that is fundamental to profit-margin financing (Bhimavarapu, Rastogi, & Kanoujiya, 2023; Tambunan, Siregar, Wijaya, & Pratama, 2023). They continued and argued that the Islamic financial institutions demonstrate enhanced risk management capabilities because of their active engagement in collaborative ventures that involve the equitable distribution of both profits and losses. It was further argued that the potential adoption of this risk-sharing framework has the capacity to potentially bolster banks' ability to endure and adjust to the consequences of economic volatility.

According to Ahmed and Aassouli (2022). profit margin financing is characterized by its inherent ethical and Sharia-compliant attributes, which often result in a more cautious and prudent approach to risk management. Moreover, many prior studies have argued that the Islamic banks that adhere to these principles are more likely to participate in ethical investments and avoid speculative activities, resulting in a stronger and more diverse asset portfolio and the Z-Score is significantly impacted by improved asset quality, as it contributes to increased stability and resilience within a financial institution (Mallick, 2019; Nosheen & Rashid, 2021; Saragih et al., 2020a; Silviani, Nisa, & Pratama, 2022). The findings indicate that the stability of banks is influenced by profit margin financing, with the regulatory and governance framework playing a crucial role as a moderator. According to the study of Ben Bouheni, Obeid, and Margarint (2022) argued that to enhance the profitability of profit margin financing, it is crucial to establish regulatory frameworks that promote the adoption of risk-sharing practices and demonstrate a favorable inclination towards the principles of Islamic banking. It is further argued that the Islamic banks exhibit an elevated degree of security due to the existence of strong governance mechanisms that efficiently supervise the administration of partnerships and the accompanying risks they involve. Through a thorough examination of existing scholarly literature, it becomes apparent that a contemporary literature highlights a growing agreement regarding the significant impact of profit margin financing on the stability of banks in general and Islamic banks in particular, as measured by the Z-Score metric. It is also further argued that the Islamic financial institutions that prioritize this unique fiscal methodology benefit from increased stability because of the risk-sharing nature of profit margin financing, as well as improved asset quality and favorable regulatory frameworks (Hendrawan, Defung, & Wardhani, 2023).

During recent decades, the complex and interconnected nature of credit risk and bank stability has attracted considerable attention from scholars, given its profound importance in financial systems, regulatory frameworks, and the concerns of different stakeholders (Cumming, Johan, & Reardon, 2023). The fiscal soundness and stability of a financial institution in general and Islamic banking in particular are closely interconnected with credit risk, which emerges from the potential for borrowers to fail in meeting their obligations. There is growing body of literature that recommend to researchers to focuses on the thorough examination of the significant influence that credit risk has on the stability and used Z-score as a proxy of bank stability (Rahman, Chowdhury, & Tania, 2021; Ruslan et al., 2023). It is also argued that the significance of non-performing loans (NPLs) is fundamental to the discussion surrounding the complexities of credit risk and the general soundness and stability of financial institutions and in particular Islamic banks. According to the study of Khairi, Bahri, and Artha (2021) and Nu'man et al. (2020) non-performing loans (NPLs) are a widely used measure of credit risk, as they symbolize the loans that borrowers are unable to repay as per the agreed terms, and there exists a strong correlation between the Z-score of a financial institution and the number of NPL held in its portfolio. Many studies have reported a negative and significant relationship between the NPL, and bank stability and the results emphasize the critical significance of implementing strong credit risk management practices to protect the long-term viability of a financial institution.

According to the study of Chen, Kumara, and Sivakumar (2021); Marbun, Effendi, Lubis, and Pratama (2020) argued that the successful implementation of effective credit risk management methodologies plays a crucial role in reducing the credit risk and consequently enhance the stability of financial institutions. Additionally, it is crucial to recognize the importance of incorporating prudent lending strategies that prioritize the diversification of risks and strict adherence to regulatory guidelines. These strategies play a crucial role in reducing the adverse effects of credit risk on the overall financial position of a bank. Moreover, another study of Rehman, Muhammad, Sarwar, and Raz (2019) capital adequacy plays a crucial role in safeguarding financial institutions by mitigating the negative impacts of credit risk and enhancing their overall stability. It was further argued that the capital reserves of significant magnitude function as a protective measure against potential losses arising from credit risk. Financial institutions with higher levels of capital are better equipped to withstand and navigate challenging circumstances in the domain of credit losses (Dalio, 2022; Susilawati et al., 2023; Tanjung, Ruslan, Lubis, & Pratama, 2022). Banks that possess weak capital buffers undergo a decrease in their Z-Scores and overall stability because of the emergence of credit risk.

The relationship between credit risk and banks' lending capacity is closely interconnected with the prevailing macroeconomic conditions. The deterioration of a financial institution's asset quality becomes evident when there is an increase in credit risk because of a simultaneous economic downturn. Financial institutions experience a negative effect on their Z-Scores and overall stability during economic downturns, which increases their susceptibility to credit-related stress. Therefore, it is crucial to understand the inherent cyclical nature of credit risk and its complex interaction with the current economic conditions when evaluating and supervising the stability of financial institutions. Therefore, it is revealed by prior studies that the stability of banks is greatly affected by the influence of regulation and supervision in relation to credit risk (Hsieh & Lee, 2020). The relationship between credit risk and stability can be greatly impacted by regulatory frameworks that promote responsible lending practices, risk diversification, and adequate provisions for credit losses. By exercising diligent supervision, regulators can effectively enforce adherence to regulatory guidelines and the implementation of prudent credit risk management methodologies within banks. The presence of strong regulatory oversight and comprehensive supervisory mechanisms directly contributes to the stability and resilience of the banking sector, enabling it to effectively navigate challenges related to credit risk (Abdulla & Elshandidy, 2023; Susilawati et al., 2022).

Thus, the existing body of literature provides clear and indisputable evidence supporting the claim that credit risk significantly impacts the overall stability of financial institutions. This assertion is supported by various metrics, including the widely recognized Z-score. The factors mentioned above include nonperforming loans, capital adequacy, effective credit risk management practices, current economic conditions, and regulatory frameworks. The effective management of credit risks is of utmost significance in safeguarding the long-term stability and viability of a financial institution, such as a bank. The understanding, assessment, and improvement of credit risk remain crucial efforts in ensuring the stability of financial institutions, despite the constantly changing landscape of the banking industry. The limited formulation of effective risk management approaches for the banking industry is hindered by a lack of comprehensive understanding regarding the intricate dynamics between credit risk and the stability of financial institutions (Naili & Lahrichi, 2022; Susilawati et al., 2022).

Data

This study utilized secondary data sources. The data on bank-specific factors were derived from the annual reports of the banks, whereas data on regulatory and economic factors were obtained from the World Bank database. The study covers the years 2013 to 2023. In this study, the population of interest consists of all Islamic banks registered by the central banks of countries that are members of the Islamic banking service board (IFSB). The sample consists of 142 banks from seventeen countries, including Bahrain, Bangladesh, Brunei Darussalam, Egypt, Indonesia, Iran, Jordan, Kazakhstan, Kuwait, Lebanon, Nigeria, Oman, Pakistan, Saudi Arabia, Sudan, and Turkey. Purposive sampling was used for sampling because it enables a focus on certain significant characteristics of the population that can be utilized most effectively to answer the research questions. The reason we chose this time frame is because the BASEL III financial restructuring in these countries occurred after 2013.

The average capital ratio for Islamic banks is 7.3%, while 4.0% of their assets are pledged in non-performing loans. The rate of return on assets is 1.8%. Fee-based revenue accounts for 9.11 percent of total revenue. The average level of adequate capitalization is 14.36 percent.

Table 1: Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Z	1562	3.691000	0.257062	-4.102010	9.2010100
PSF	1562	.0738539	.0430503	0.0023131	0.6195135
PMF	1562	20.53497	2.433262	16.504353	27.8464
PROF	1562	0.0185505	0.0186968	-0.0413331	0.1121318
MP	1562	0.6753433	2.5866600	0.0005322	24.369740
CR	1562	0.0403301	0.0630648	0.0145894	0.7429054
LR	1562	0.6420857	0.1642445	0.0206659	0.9492560
CAP	1562	0.0911335	0.1045013	0.0456170	0.9310000
RR	1562	0.0291833	0.0266189	0.0016638	0.1465053
CAR	1562	14.373201	6.242420	1.600000	42.860000
RGDP	1562	5.512319	1.368280	3.396000	8.1540000
INF	1562	4.983173	2.140380	0.350000	8.7500000
ER	1562	0.0393395	0.0443643	-.0459304	0.1352254
LEX	1562	0.4072516	0.0942727	0.250000	0.6600000
ISPREAD	1562	3.155222	1.064166	0.590000	4.810000

Method

Model 1 represents the aggregate from and includes the entire list of independent variables, while model 2 includes the intervening impact of credit risk. All these panel models contain a single dependent variable, the Z-score, which is a linear function of the independent variables. The subscripts i represent the bank identification number in the 17 countries (142 banks), t represents time (2013-2017), ε_i are observation-specific errors, λ_t are time-specific effects, and μ_i are unobserved individual-specific effects. The model 1 and 2 are given below;

$$Z_{i,t} = \alpha_0 + \alpha_1 PSF_{it} + \alpha_2 PMF_{it} + \alpha_3 CR_{it} + \alpha_4 PROF_{it} + \alpha_5 FEE_{it} + \alpha_6 MP_{it} + \alpha_7 CAP_{it} + \alpha_8 LRISK_{it} + \alpha_9 RR_{it} + \alpha_{10} CAR_{it} + \alpha_{11} RGDP_{it} + \alpha_{12} ISPREAD_{it} + \alpha_{13} INF_{it} + \alpha_{14} ER_{it} + \alpha_{15} LEX_{it} + \mu_i + \lambda_t + \varepsilon_{i,t} \quad (1)$$

$$Z_{i,t} = \alpha_0 + \alpha_1 PSF_{it} + \alpha_2 PMF_{it} + \alpha_3 CR_{it} + \alpha_4 PSF * CR_{it} + \alpha_5 PMF * CR_{it} + \alpha_6 PROF_{it} + \alpha_7 FEE_{it} + \alpha_8 MP_{it} + \alpha_9 CAP_{it} + \alpha_{10} LRISK_{it} + \alpha_{11} RR_{it} + \alpha_{12} CAR_{it} + \alpha_{13} RGDP_{it} + \alpha_{14} ISPREAD_{it} + \alpha_{15} INF_{it} + \alpha_{16} ER_{it} + \alpha_{17} LEX_{it} + \mu_i + \lambda_t + \varepsilon_{i,t} \quad (2)$$

When estimating each of the aforementioned equations, it is useful to account for cross-section heterogeneities using fixed effects, as was previously discussed. In addition, it

reduces the likelihood of omitted variable biases, which occur when time-invariant factors associated with each bank that have the potential to affect the Z-score are not controlled. Among these factors are bank management systems, marketing strategies, geography, climate, official language, etc. Using the time and country fixed effects, respectively, the estimates for the previous equations are computed. Accounting for time fixed effects is also beneficial because it captures global shocks that may have occurred during the examined time period and affected the four countries. Time-fixed effects could have accounted for these global shocks. In addition to using the cross-sectional clustered errors in our estimations of fixed effects, we also employ the cross-sectional clustered errors. These errors are unaffected by heteroscedasticity and serial correlation (Joseph, 2022).

We determined to implement the Roodman (2020) difference GMM estimator, which was initially proposed by Holtz-Eakin, Newey, and Rosen (1988) because of the characteristics of our panel dataset, which include a short time horizon and larger country dimensions. We did so because we wished to adhere to the advice of bin Hidthiir, Basheer, and Hassan (2019) and utilize the estimator. In addition to static FE models, it is advantageous to have a dynamic model specification that allows us to account for the autocorrelation that results from using the lagged dependent variable on the right-hand side of the equation. Listed below is a description of the dynamic model:

$$y_{it} = \alpha_1 y_{it-1} + \alpha_1 x_{it} + \alpha_2 w_{it} + \varepsilon_{i,t} \quad \text{..... (3)}$$

$$\varepsilon_{i,t} = U_i + V_{i,t} \quad \text{..... (4)}$$

Analysis

In the beginning, we ensured that our variables were stationary. The Philipps-Perron method was applied to the panel Fisher-type unit root test in order to determine the stationarity of all variables and reduce the occurrence of spurious regressions. According to Choi (2001), the results indicate that the current values of the variables are stable. In this study, we employed the Fisher-type unit root test, which applies the Augmented Dickey Fuller (ADF) test to each cross-section and generates aggregated p-values by combining the results of the panel-specific unit-root tests utilizing the four methods proposed by Lee and Chien (2011). Three of the methods imply the transformations of p-values known as inverse 2, inverse normal, and inverse logit, while the fourth method involves a modification of the inverse 2 transformation, which is typically employed when the sample size (N) approaches infinity. This study's objective is to test the null hypothesis that each panel contains a unit root. The results provide additional evidence that the variables are stationary at the levels examined. The null hypothesis of the test is that each panel demonstrates a unit root. In our experimental design, we vary the lag times systematically within a given range. Our analysis, however, reveals no statistically significant differences between the observed outcomes.

Table 3 presents the Pearson correlation coefficients, which serve as indicators of the magnitude of the associations among the independent variables examined in this research. All correlation coefficients between the independent variables in Table 1 do not exceed the value of 0.80. In accordance with the recommendation put forth by Dormann et al. (2013), a correlation threshold of 0.8 was employed to ascertain the existence of multicollinearity. The correlation matrix reveals that there is no evidence of multicollinearity among the variables. Pearson's correlation matrix was utilized to assess the presence of collinearity exceeding a threshold of 80% among all variables. There exists a strong correlation between two variables, specifically the loan ratio and liquidity. In order to prevent potential model misspecification, we opted to exclude the loan ratio variable from our list of variables (JS Ramalho & da Silva, 2009).

A variety of diagnostic tests were employed in order to ascertain the most suitable estimates (refer to Table 2). The White Heteroscedasticity test was initially utilized to detect heteroscedasticity issues in our aggregate model. The test results demonstrate that our aggregate model exhibits statistical significance at the 5 percent level of significance, as indicated by the p-value falling within the range of 0.0000 to 0.0020, leading to the rejection of the null hypothesis. This observation suggests that the aggregate pooled model exhibits heteroscedasticity, thus indicating the need for random effect estimates.

Alabi (2021) used the Bresuch Pagan Lagrange Multiplier (LM) test to choose between pooled OLS and random effects estimations in their seminal work. The test determines whether the pooled ordinary least squares (OLS) method produces a best linear unbiased estimator (BLUE) without autocorrelation, specifically whether the cross-sections' specific term is zero. The null hypothesis states that the likelihood ratio test statistic (LM) follows a Chi-square distribution with one degree of freedom. If the calculated chi-square value exceeds the tabulated value, we can reject the null hypothesis and infer cross-sectional individual effects. This makes the random effects model the preferred method (bin Hidthiir, 2021). The LM test in Table 1 suggests the random effects model is better than the pooled OLS model. Selecting between fixed and random effects models follows. The study compared fixed effect estimator 1 and random effect estimator 2 using the Hausman specification test. The null hypothesis states that estimator 2 estimates true parameters reliably and impartially. Thus, if this condition holds, the two estimators should be identical. Table 4.5 rejects the null hypothesis, favoring the fixed effects model. This study's GMM analysis used the Arellano-Bond test to determine zero autocorrelation (Mattayaphutron, 2022). The test results are in the table. The Pearson test assessed each model's cross-sectional dependence. The test results indicate cross-sectional dependence. For balanced panel data analysis, FGLS and PCSE are suitable. After each model, we used robust and clustering to account for our panel datasets' unbalanced nature. De Hoyos and Sarafidis (2006) clustered the data across banks.

Table 2: Results of the Diagnostic test

Model	Statistics	Breusch and Pagan test/ autocorrelation test	White Heteroscedasticity test	Hausman test	Arrelano-Bond Test
1	Prob>chi2 Prob>z	0.0000	0.0000**	0.0024**	0.782
2	Prob>chi2 Prob>z	0.0000	0.0000**	0.0021**	0.791

In the case of an identified GMM model, it can be observed that each endogenous variable is associated with a singular instrument. Due to the nature of our model, which consists of a single instrument for each endogenous variable, we are unable to conduct tests to assess the validity of the over-identification restrictions in this particular case. As a result, diagnostic tests are conducted subsequent to GMM estimation to verify the credibility of these instruments using autocorrelation tests, specifically the Arrelano-Bond Test. Similarly, the results of the Arrelano-Bond Test have indicated the absence of autocorrelation. Hence, it can be concluded that the estimates derived from the fixed effect and generalized method of moments (GMM) approaches are the most suitable for the aggregate model.

Table 3: Correlation Matrix

Variables		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Z	**1**	**1.0000**														
PSF	**2**	0.1261	**1.0000**													
PMF	**3**	0.1190	0.2158	**1.0000**												
PROF	**4**	0.1469	0.1104	-0.4533	**1.0000**											
MP	**5**	0.0239	0.1107	0.2395	-0.1254	**1.0000**										
CR	**6**	0.0515	-0.1254	-0.1501	-0.1552	-0.1007	**1.0000**									
LR	**7**	0.1143	0.3154	0.8220	-0.2091	0.2643	-0.1191	**1.0000**								
CAP	**8**	0.1568	0.2205	0.1693	-0.1247	0.4181	-0.1109	0.2314	**1.0000**							
RR	**9**	0.3635	-0.2411	-0.4783	0.5582	-0.0537	0.1462	-0.3482	-0.1179	**1.0000**						
CAR	**10**	0.0586	-0.2560	-0.2412	0.1181	0.2783	-0.1848	0.2325	0.2126	0.1431	**1.0000**					
RGDP	**11**	-0.1217	0.2172	0.0380	0.1846	-0.1574	-0.1975	-0.1400	-0.1554	0.1201	-0.6549	**1.0000**				
INF	**12**	0.1125	0.3169	0.1495	0.1297	0.1309	-0.1503	0.2213	0.2264	0.1257	0.3143	-0.2616	**1.0000**			
ER	**13**	0.2438	0.3244	0.1408	0.1350	0.0982	-0.2171	0.2279	0.1554	-0.1262	0.2437	0.1924	0.2149	**1.0000**		
LEX	**14**	0.1104	0.2136	0.0702	0.1607	-0.0997	0.2470	0.1855	-0.1263	-0.2151	-0.1024	0.1680	-0.1465	-0.1145	**1.0000**	
ISPREAD	**15**	0.1667	0.2662	-0.0330	0.1158	0.0384	0.1643	-0.1289	0.1303	0.2626	-0.2298	-0.1914	-0.1705	-0.6640	-0.0515	**1.0000**

Table 4: Regression Results

	Model-1		**Model-2**	
	Fixed Affect	Difference GMM	Fixed Affect	Difference GMM
Z_{t-1}	-	0.2656***	-	0.2012*
PSF	0.2130***	0.2960**	0.3021***	0.2901**
PMF	0.2421***	0.1827***	0.2101***	0.3011***
CR	-0.2011**	-0.5090***	-0.2100**	0.2015***
PSF * CR			0.2010***	0.3120***
PMF * CR			0.2012**	0.362***
PROF	0.2231	0.0757	0.1211**	0.2321**
MP	0.2212**	0.3602***	0.3101**	0.2731***
LR	-0.4231***	0.9309***	0.4211***	0.2311**
CAP	0.3921**	0.2301**	0.2121**	0.0023***
RR	0.3321**	0.2108**	0.1421**	0.1521**
CAR	0.3731*	0.3431***	0.2212*	0.1621**
RGDP	0.2411**	0.4330***	0.2311**	0.3430***
INF	0.2123	0.1420	0.2131	0.0101
ER	0.1621**	0.1708**	0.1201**	0.4330***
LEX	0.1721**	0.1072**	0.1001**	0.0420***
ISPREAD	-0.1221	-0.0228	-0.2711	0.1708**
R-square	0.795		0.825	

The results of the model 1 and model 2 are presented in the Table 4. The results of the model 1 indicate that profit sharing financing and profit margin financing in fixed effect results of model 1, has significant impact on the stability of Islamic banks of our sample countries. The findings of GMM results confirms the findings of fixed effect and significance of lag of Z-score provide the evidence that bank stability of Islamic banks in our sample countries in our sample countries are persistent over sample time. Meanwhile results of fixed effect and GMM indicate that the credit risk is in negative and significant relationship with z-score, which indicate that credit risk significantly effects the stability of Islamic banks, and the findings are consistent with the prior findings of Trad, Trabelsi, and Goux (2017). The results of the control variables highlight interesting results, as the liquidity risk is in negative and capital adequacy ratio is in positive relationship with the stability of banks. Similarity the market power is in positive and significant relationship with the bank stability. The results indicate that the interaction term PSF*CR, and PMF*CR, are in significant positive relationship with the stability of Islamic banks. The result indicates that credit risk under the presence of profit-sharing financing and profit margin financing has significant impact on the stability of sample Islamic banks in our sample countries.

Conclusion

In conclusion, Model 1 and Model 2 analyses were utilized to investigate the elements that contribute to the stability of Islamic banks in the countries that composed our sample. This was done to evaluate the factors that contribute to the stability of Islamic banks. Both the fixed effect and the generalized method of moments (GMM) analyses produced results that provided significant new insights into the factors affecting the stability of Islamic institutions. According to the findings of Model 1, both profit sharing financing and profit margin financing were found to have significantly beneficial effects on the stability of financial institutions. The findings obtained using the GMM method were validated by the fact that the lag of Z-score had a significant impact throughout the course of time. This research brought to light the industry's long-term stability in the field of Islamic banking.

In addition, and in line with findings from prior studies, a negative connection that was statistically significant was discovered between credit risk and z-score; this highlights the strong influence that credit risk has on the stability of Islamic financial institutions. The control variables also produced some fascinating findings. The correlation between liquidity risk and bank stability was found to be

negative, whilst the correlation between market power and the capital adequacy ratio was found to be positive. In addition, the interaction terms PSFCR and PMFCR were found to be significant positive drivers for the stability of Islamic banks. It has been demonstrated that credit risk, in conjunction with profit-sharing financing and profit-margin financing, plays an essential role in determining the stability of financial institutions.

Policy implications

The study underlines the o0llwing policy implications

- Given the substantial positive influence that profit sharing and profit margin financing have on the stability of banks, it is imperative for policymakers to prioritize measures that encourage the adoption and growth of these forms of financing in Islamic banks. To disseminate knowledge regarding the benefits of profit-based financing options to both consumers and institutions, it may be imperative to establish facilitative legal structures, provide tax incentives, and engage in promotional initiatives aimed at raising awareness.
- Given the established inverse relationship between credit risk and bank stability, it is imperative for regulatory bodies to enact and enforce stringent credit risk management protocols within the Islamic banking sector. One potential approach involves the implementation of regulations aimed at limiting the allocation of capital to high-risk assets, while concurrently advocating for the promotion and development of innovative credit evaluation systems.
- To address the observed positive correlation between market dominance and bank soundness, regulators are required to engage in a process of reaching a mutually agreeable resolution. It is imperative for policymakers to diligently uphold the competitiveness of the banking sector while simultaneously safeguarding consumer protections and preventing monopolistic practices that may result in price escalation. To sustain a competitive market, it may be imperative to periodically assess the existing structure of the market and implement any requisite adjustments.

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