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Bridging Faith and Finance: A Comparative Analysis of Islamic Bank Resilience and Contagion Risk During Global Economic Shocks (2008 vs. 2020 Crises)

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ABSTRACT

This study investigates the comparative resilience and contagion risk profiles of Islamic banking systems during two major global economic crises, the 2008 Global Financial Crisis (GFC) and the 2020 COVID-19 pandemic. Employing quantitative panel data analysis with Z-score stability metrics, capital adequacy ratios (CAR), non-performing financing (NPF), and return on assets (ROA) across Islamic banks in key markets, this study reveals differential resilience patterns between endogenous and exogenous shocks. The results indicate that Islamic banks demonstrated superior stability during the initial phase of the 2008 crisis owing to their Shariah-compliant business model emphasizing real economy linkages and prohibiting toxic derivatives. However, profitability declined significantly in 2009 when the crisis affected the real economy. Conversely, during the COVID-19 pandemic, Islamic banks exhibited comparable systemic vulnerabilities to conventional banks when face with exogenous shocks, although with significantly reduced spillover effects. CAR increased from 24.0% to 26.5%, while NPF improved from 2.1% to 2.0% during the COVID-19 pandemic, demonstrating structural resilience despite ROA declining from 1.9% to 1.4%. CoVaR analysis reveals that Islamic banks receive significant directional risk spillover from conventional banks, but transmit substantially less contagion. These findings suggest that while Islamic banking's profit-loss sharing principles and asset-backed financing provide buffer against financial sector crises, the system remains vulnerable to real economy disruptions, challenging the prevailing narrative of unconditional Islamic banking superiority during economic turbulence. This study investigates the comparative resilience and contagion risk profiles of Islamic banking systems during two major global economic crises: the 2008 Global Financial Crisis (GFC) and the 2020 COVID-19 pandemic. Employing quantitative panel data analysis with Z-score stability metrics, capital adequacy ratios (CAR), non-performing financing (NPF), and return on assets (ROA) across Islamic banks in key markets, this study reveals differential resilience patterns between endogenous and exogenous shocks. The results indicate that Islamic banks demonstrated superior stability during the initial phase of the 2008 crisis owing to their Shariah-compliant business model emphasizing real economy linkages and prohibiting toxic derivatives. However, profitability declined significantly in 2009 when the crisis affected the real economy. Conversely, during the COVID-19 pandemic, Islamic banks exhibited comparable systemic vulnerabilities to conventional banks when faced with exogenous shocks, although with significantly reduced spillover effects. CAR increased from 24.0% to 26.5%, while NPF improved from 2.1% to 2.0% during the COVID-19 pandemic, demonstrating structural resilience despite ROA declining from 1.9% to 1.4%. CoVaR analysis reveals that Islamic banks receive significant directional risk spillover from conventional banks, but transmit substantially less contagion. These findings suggest that while Islamic banking's profit-loss sharing principles and asset-backed financing provide a buffer against financial sector crises, the system remains vulnerable to real economic disruptions, challenging the prevailing narrative of unconditional Islamic banking superiority during economic turbulence.

Keywords: Islamic Banking, Financial Crisis, COVID-19, Resilience, Contagion Risk

INTRODUCTION

Global financial architecture has witnessed unprecedented upheavals in the 21st century, with two distinct yet equally devastating crises: the 2008 Global Financial Crisis (GFC) and the 2020 COVID-19 pandemic, esting the resilience of banking systems worldwide. These crises, which fundamentally differ in origin and transmission mechanisms, provide an extraordinary natural experiment for examining the stability characteristics of Islamic banking relative to conventional finance. The 2008 crisis, rooted in endogenous financial sector failures, including subprime mortgage securitization and excessive leverage, contrasted sharply with the 2020 pandemic shock, which originated exogenously through public health measures that abruptly contracted economic activity. Understanding how Islamic banks navigate these contrasting crises has profound implications for financial system design, regulatory policy, and ongoing discourse on sustainable finance (Modjo et al., 2025).

Islamic banking, predicated on the Shariah principles prohibiting interest (riba), excessive uncertainty (gharar), and speculation (maysir), has experienced remarkable growth since its inception. Global Islamic finance assets exceeded $2.4

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trillion in 2019, growing at 11.4% annually. Indonesia, housing the world's largest Muslim population, has witnessed Islamic banking assets surge from 49.5 trillion rupiah in 2008 to 593.9 trillion rupiah by 2020, representing average annual growth exceeding 10%. This expansion occurred alongside persistent claims by industry advocates that Islamic banking's distinctive business model—emphasizing profit-loss sharing (PLS), asset-backed financing, and real economy linkages—confers superior resilience during financial turbulence (Sami, 2025).

The theoretical foundation of these claims relies on several structural differentiators. First, Islamic banks' prohibition of interest-based lending theoretically eliminates the debt accumulation cycles and leverage spirals that characterize the 2008 crisis. Second, the requirement that financial transactions be backed by tangible assets creates intrinsic linkages between the financial and real sectors, potentially reducing speculative bubbles. Third, profit-loss sharing arrangements in mudarabah and musharakah contracts align the risk distribution between capital providers and entrepreneurs more equitably than in conventional debt contracts. Fourth, Shariah compliance precludes participation in complex derivatives and structured products that amplify losses during the GFC (Yanti & Aziz, 2025).

However, the empirical evidence presents a more nuanced picture. While early studies by the International Monetary Fund documented that Islamic banks maintained stronger profitability and credit growth during the initial 2008 crisis period, subsequent research revealed a significant deterioration when the crisis impacted the real economy in 2009. This temporal pattern suggests that Islamic banking's resilience may be conditional rather than absolute, and potentially vulnerable to specific shock types. Furthermore, the low implementation rates of pure PLS financing, constituting less than 20% of Islamic banks' portfolios globally, raises questions about whether contemporary Islamic banking practices fully embody the theoretical ideals.

The 2020 COVID-19 pandemic introduced a fundamentally different dynamic crisis. Unlike the 2008 financial sector implosion, the pandemic originated in public health constraints that simultaneously disrupted supply chains, depressed consumer demand, and necessitated unprecedented fiscal and monetary intervention. This exogenous shock bypassed financial intermediaries' balance sheet vulnerabilities, affecting Islamic and conventional banks through the common channels of business closure, unemployment, and sovereign distress. Early pandemic research indicated that Islamic banks maintained stable capital positions with CAR exceeding 25%, but experienced profitability compression, with ROA declining approximately 25% year-over-year. Notably, systemic risk measures showed significant increases during the first half of 2020, followed by recovery in the second half, suggesting rapid, but temporary contagion effects (Gkirtsou et al., 2022).

Despite the proliferation of single-crisis studies, systematic comparative analyses examining how Islamic banks performed across both the 2008 and 2020 crises using consistent methodological frameworks remain scarce. Existing research has several critical gaps. First, most studies analyzed either the GFC or COVID-19 in isolation, preventing, has identification of crisis-type-specific vulnerabilities. Second, contagion risk assessment through advanced metrics, such as Conditional Value at Risk (CoVaR), has been underutilized in Islamic banking contexts, leaving directional spillover effects poorly understood. Third, insufficient attention has been paid to the heterogeneity within Islamic banking systems, particularly between full-fledged Islamic banks and the Islamic windows of conventional institutions (Benbachir & Beraich, 2025).

This study addresses these gaps through a comprehensive comparative analysis guided by three primary research objectives:

To quantify and compare the financial stability of Islamic banks during the 2008 GFC versus the 2020 COVID-19 pandemic using standardized metrics including Z-scores, CAR, NPF, and ROA across the pre-crisis, crisis, and post-crisis periods.

To assess contagion risk and systemic spillover effects between Islamic and conventional banks during both crises using CoVaR methodology and extreme risk transmission analysis.

To identify crisis-type-specific vulnerabilities and determine whether Islamic banking resilience is conditional upon shock origin (endogenous financial sector failure versus exogenous real economy disruption).

The significance of this study extends across multiple dimensions. Theoretically, it contributes to the literature on financial stability by testing whether the Shariah-compliant banking architecture provides structural resilience or merely shifts vulnerability patterns. The contrasting nature of the two crises allows for a natural experimental design, isolating the effects of financial sector linkages versus real economic dependencies. Empirically, this study employs panel data regression with time-varying stability metrics to advance the methodological approaches in Islamic finance research beyond cross-sectional comparisons. Practically, the indings inform regulatory policy design for dual banking systems, capital buffer requirements, and liquidity management frameworks specific to Islamic financial institutions (Suleman et al., 2025).

This study's conceptual framework integrates agency theory, financial stability theory, and Islamic economics perspectives. From an agency standpoint, profit-loss sharing mechanisms should theoretically mitigate moral hazard by aligning principal-agent incentives more closely than fixed-return debt contracts. However, empirical evidence suggests that information asymmetries and monitoring challenges persist, potentially explaining the low PLS implementation rates. Financial stability theory emphasizes capital adequacy, liquidity management, and interconnectedness as core determinants of banking resilience. Islamic banking introduces unique considerations including restricted access to conventional liquidity facilities, underdeveloped secondary markets for Shariah-compliant securities, and displaced commercial risk from profit-sharing investment accounts.

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Methodologically, this research employs a quantitative analysis of bank-level and systemic data spanning 2007-2021, encompassing pre-crisis baselines, crisis periods, and recovery phases for both shocks. The analytical framework combines panel data regression to assess the determinants of individual bank stability, using network analysis techniques to map contagion pathways. The Z-score serves as the primary stability metric, calculated as (ROA + CAR) / σ(ROA), and captures the distance to insolvency. This is complemented by the traditional CAMELS framework indicators adapted for Islamic finance: capital adequacy (CAR), asset quality (NPF), management efficiency (BOPO), earnings (ROA/ROE), and liquidity (FDR).

The research focuses on Islamic banking systems in regions with substantial market presence, particularly the Gulf Cooperation Council (GCC) countries and Southeast Asia, with specific emphasis on Indonesia given its status as the world's largest Muslim-majority nation and rapid Islamic banking expansion. Sample selection employed purposive sampling targeting full-fledged Islamic banks and Islamic windows with complete financial reporting across the study period, ensuring data consistency and comparability.

The contribution of this study are as follows. It provides the first systematic comparison of Islamic banking performance across two fundamentally different crisis types, using aconsistent quantitative methodology. Measuring contagion effects bidirectionally between Islamic and conventional systems illuminates the interconnectedness patterns obscured in single-system analyses. The identification of crisis-type-specific vulnerabilities offers actionable insights into risk management and challenging simplistic narratives about Islamic banking's unconditional resilience. Furthermore, by examining the gap between Islamic banking theory and practice, particularly regarding PLS implementation, this research contributes to ongoing debates on authenticity and evolution in Islamic finance (Carlsson, 2026).

The remainder of this paper is organized as follows. Section 2 reviews the theoretical foundations and empirical literature on Islamic banking stability, crisis impact, and contagion mechanisms. Section 3 details the research methodology, including the data sources, variable construction, and analytical techniques. Section 4 presents the comprehensive results with descriptive statistics and regression analyses for both crises. Section 5 discusses the findings within broader theoretical and policy contexts and, addresses the implications for financial system design and regulatory frameworks. Section 6 concludes the paper with summary insights, limitations, and recommendations for future research.

Through rigorous empirical analysis within robust theoretical frameworks, this study seeks to move beyond rhetorical claims about Islamic banking superiority toward an evidence-based understanding of its actual resilience characteristics under varying stress conditions. The findings promise to inform not only Islamic finance scholarship, but also broader discussions on financial system reform, sustainable banking models, and crisis preparedness in an increasingly interconnected global economy. As policymakers worldwide grapple with designing resilient financial architectures capable of withstanding diverse shock types, understanding the conditional nature of Islamic banking's stability offers valuable lessons for both Muslim-majority and minority contexts.

METHODS

This study adopts a quantitative approach employing panel data analysis to examine Islamic banking resilience and contagion risk during the 2008 Global Financial Crisis and the 2020 COVID-19 pandemic. This study focuses on Islamic commercial banks and Islamic windows operating in key Islamic finance jurisdictions, including the GCC, Southeast Asia (notably Indonesia and Malaysia), and selected OIC countries, from 2007 to 2021. Bank-level secondary data are obtained from published financial statements, supervisory statistics, and international databases, while macroeconomic indicators, such as GDP growth and inflation, are drawn from international financial institutions and national statistics agencies (Arikunto, 2017).

The core stability indicator is the bank Z score, calculated as the sum of return on assets (ROA) and the equity-to-assets ratio divided by the standard deviation of ROA, which captures the distance to insolvency. Additional dependent variables include ROA as a measure of profitability and non-performing financing (NPF) as an indicator of asset quality, whereas key explanatory variables comprise the capital adequacy ratio (CAR), financing-to-deposit ratio (FDR), operational efficiency (BOPO), bank size, and share of profit-loss sharing (PLS) contracts in total financing. Crisis-specific dummy variables identify the GFC (2008–2009) and COVID-19 (2020–2021) periods, enabling the estimation of differential crisis effects through interaction terms distinguishing Islamic and conventional institutions (Sugiyono, 2019)

The empirical strategy relies on a fixed-effects panel regression, selected using specification tests to control for unobserved bank heterogeneity, and dynamic panel estimators, where lagged dependent variables raise endogeneity concerns. Complementary systemic risk analysis is conducted using conditional value at risk (CoVaR) and spillover indices derived from vector autoregression to quantify directional contagion between Islamic and conventional banks across normal and crisis states. Robustness checks include alternative crisis window definitions; the use of alternative stability metrics such as distance-to-default, and sub sample estimations by region, bank size, and institutional form (full-fledged Islamic banks versus Islamic windows) to validate the consistency of the findings.

RESULTS AND DISCUSSION

A. Descriptive Statistics

Table 1 presents the composition of the sample across regions and time periods. The 84 Islamic banks analyzed 12 countries, with total assets ranging from USD 530 million to USD 89 billion. The GCC region dominated the sample with 38 institutions (45.2%), followed by Southeast Asia with 28 banks (33.3%), and other regions with 18 banks (21.4%). This distribution reflects the global concentration of Islamic banking in these markets.

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Table 1: Sample Distribution by Region and Period.

Region	Number of Banks	Percentage	Average Assets (USD Billion)	Years Covered
GCC Countries	38	45.2%	12.4	2007-2021
- Saudi Arabia	12	14.3%	18.7	2007-2021
- UAE	10	11.9%	14.2	2007-2021
- Kuwait	7	8.3%	9.8	2007-2021
- Qatar	5	6.0%	11.3	2007-2021
- Bahrain	3	3.6%	4.2	2007-2021
- Oman	1	1.2%	3.1	2007-2021
Southeast Asia	28	33.3%	5.8	2007-2021
- Malaysia	14	16.7%	7.9	2007-2021
- Indonesia	13	15.5%	3.8	2007-2021
- Brunei	1	1.2%	4.2	2007-2021
Other Regions	18	21.4%	4.6	2007-2021
- Pakistan	8	9.5%	3.9	2007-2021
- Turkey	6	7.1%	6.4	2007-2021
- Jordan	4	4.8%	2.8	2007-2021
Total	84	100%	8.7	2007-2021

The matched sample of 84 conventional banks exhibits similar regional distribution and asset size characteristics, constructed through propensity score matching with covariates, including total assets, geographic location, and market capitalization.

Table 2 summarizes the key financial indicators during the pre-crisis baseline periods (2007-H1 2008 for GFC; 2019 for COVID-19). Islamic banks demonstrated higher capital adequacy ratios (average 15.8% vs. 12.4% for conventional banks) and lower leverage, consistent with Shariah's constraints on debt financing. However, the profitability metrics were comparable, with Islamic banks' ROA averaging 1.87% versus 1.92% for conventional banks. Asset quality showed slightly higher NPF for Islamic banks (3.12%) compared to NPL for conventional banks (2.67%), suggesting inherent credit risk challenges in Islamic financing models.

Table 2: Descriptive Statistics - Pre-Crisis Baseline Periods

Variable	Islamic Banks (n=84)			Conventional Banks (n=84)		
	Mean	Std Dev	Median	Mean	Std Dev	Median
Pre-GFC (2007-H1 2008)						
Total Assets (USD Billion)	7.82	11.24	4.35	8.15	12.87	4.18
CAR (%)	15.8	4.3	14.9	12.4	3.1	11.8
ROA (%)	1.87	0.92	1.76	1.92	0.88	1.83
ROE (%)	14.3	5.7	13.8	16.8	6.2	16.1

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Variable	Islamic Banks (n=84)			Conventional Banks (n=84)		
NPF/NPL (%)	3.12	1.84	2.78	2.67	1.52	2.41
FDR/LDR (%)	82.4	18.6	84.2	88.7	16.3	90.1
BOPO (%)	58.3	12.4	56.7	54.2	10.8	52.9
Z-score	28.45	12.67	26.32	26.78	11.34	24.91
Pre-COVID (2019)						
Total Assets (USD Billion)	11.26	15.83	6.47	12.34	17.92	6.21
CAR (%)	17.2	5.1	16.3	13.8	3.7	13.2
ROA (%)	1.94	0.86	1.88	1.87	0.79	1.79
ROE (%)	13.9	5.4	13.2	15.6	5.8	14.9
NPF/NPL (%)	2.94	1.67	2.52	2.43	1.38	2.19
FDR/LDR (%)	86.8	17.2	87.9	91.3	15.4	92.6
BOPO (%)	62.1	13.6	60.4	56.8	11.2	55.1
Z-score	31.72	14.28	29.45	29.34	12.86	27.18

The Z-scores during the pre-crisis periods averaged 28.45 (GFC) and 31.72 (COVID) for Islamic banks, slightly higher than conventional banks' 26.78 and 29.34 respectively, indicating marginally superior stability entering both crises. The increase in Z-scores from 2007 to 2019 reflects post-GFC regulatory reforms that strengthened capital buffers globally.
Table 3 documents performance during the 2008 GFC (Q3 2008 – Q4 2009). Islamic banks' CAR remained relatively stable, declining modestly from 15.8% to 14.6%, compared to conventional banks' sharper decrease from 12.4% to 10.8%. This pattern confirms Islamic banks' limited exposure to toxic assets requiring write downs. However, profitability metrics revealed complex dynamics: Islamic banks' ROA declined from 1.87% to 1.52% in 2008, then plummeted to 0.89% in 2009 as the crisis affected the real economy, while conventional banks experienced more gradual but consistent declines (1.92% → 1.48% → 1.24%).

Table 3: Financial Performance During 2008 Global Financial Crisis

Variable	Islamic Banks		Conventional Banks		Change IB	Change CB
	Q2 2008	Q4 2009	Q2 2008	Q4 2009	(%)	(%)
CAR (%)	15.8	14.6	12.4	10.8	-7.6%	-12.9%
ROA (%)	1.87	0.89	1.92	1.24	-52.4%	-35.4%
- 2008 Level	1.87	1.52	1.92	1.48	-18.7%	-22.9%
- 2009 Level	-	0.89	-	1.24	-41.4%	-16.2%
ROE (%)	14.3	6.8	16.8	9.2	-52.4%	-45.2%
NPF/NPL (%)	3.12	5.87	2.67	4.23	+88.1%	+58.4%
FDR/LDR (%)	82.4	78.6	88.7	72.3	-4.6%	-18.5%
BOPO (%)	58.3	68.7	54.2	62.4	+17.8%	+15.1%
Z-score	28.45	19.34	26.78	17.82	-32.0%	-33.5%

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Variable	Islamic Banks		Conventional Banks		Change IB	Change CB
Asset Growth (YoY %)	18.4	12.7	14.2	3.8	-31.0%	-73.2%
Financing Growth (YoY %)	22.1	15.3	17.6	4.2	-30.8%	-76.1%

NPF increased dramatically from 3.12% to 5.87% (+88.1%), exceeding that of conventional banks' NPL, which increased from 2.67% to 4.23% (+58.4%), indicating that Islamic banks experienced more severe asset quality deterioration. This pattern aligns with the literature documenting Islamic banks' heightened vulnerability as the crisis transitioned to the real economy, where their financing concentrates. Operational efficiency deteriorated for both bank types, with BOPO ratios increasing as revenues declined amid rising costs, although Islamic banks' increase (+17.8%) slightly exceeded that of conventional banks (+15.1%).

Z-scores declined significantly for both groups, falling by 32.0% for Islamic banks and 33.5% for conventional banks, indicating comparable stability impairment, despite differential profitability patterns. This confirms prior research that found no significant Z-score differences during the GFC crisis period. Notably, Islamic banks maintained substantially higher asset and financing growth rates (12.7% and 15.3, respectively) than conventional banks (3.8% and 4.2%), supporting the claim that Islamic banks contributed to financial stability through continued intermediation.

Table 4 presents performance metrics during the COVID-19 pandemic (Q1 2020 – Q2 2021). In stark contrast to the GFC, Islamic banks' CAR increased from 17.2% to 18.9%, while conventional banks experienced modest decline from 13.8% to 13.2%. This divergence reflects differential regulatory treatment, with many jurisdictions relaxing capital requirements for conventional banks to facilitate lending while maintaining or raising Islamic banking standards.

Table 4: Financial Performance During 2020 COVID-19 Pandemic

Variable	Islamic Banks		Conventional Banks		Change IB	Change CB
	Q4 2019	Q2 2021	Q4 2019	Q2 2021	(%)	(%)
CAR (%)	17.2	18.9	13.8	13.2	+9.9%	-4.3%
ROA (%)	1.94	1.46	1.87	1.52	-24.7%	-18.7%
- 2020 Level	1.94	1.38	1.87	1.41	-28.9%	-24.6%
- H1 2021 Level	-	1.46	-	1.52	+5.8%	+7.8%
ROE (%)	13.9	10.2	15.6	11.8	-26.6%	-24.4%
NPF/NPL (%)	2.94	2.67	2.43	2.89	-9.2%	+18.9%
FDR/LDR (%)	86.8	91.3	91.3	83.7	+5.2%	-8.3%
BOPO (%)	62.1	71.4	56.8	68.2	+15.0%	+20.1%
Z-score	31.72	27.89	29.34	24.16	-12.1%	-17.7%
Asset Growth (YoY %)	11.8	9.7	9.4	5.2	-17.8%	-44.7%
Financing Growth (YoY %)	13.2	10.8	10.7	4.8	-18.2%	-55.1%

Profitability declined for both bank types, although Islamic banks experienced a slightly larger ROA compression (-24.7%) than conventional banks (-18.7%). Interestingly, the NPF for Islamic banks improved from 2.94% to 2.67% (-9.2%), while conventional banks' NPL increased from 2.43% to 2.89% (+18.9%). This unexpected pattern likely reflects widespread loan deferral and restructuring programs that temporarily masked credit deterioration, with Islamic banks implementing a more comprehensive forbearance due to Shariah considerations prohibiting penalty interest.

FDR increased for Islamic banks (+5.2%) and declined or conventional banks (-8.3%), indicating that Islamic institutions maintained intermediation despite crisis conditions, consistent with their mandates supporting real economic activity. However, operational efficiency deteriorated sharply for both groups, with the BOPO increasing by 15.0% for Islamic banks and 20.1% for conventional banks, reflecting pandemic-related cost increases and revenue compression.

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Z-score declines during COVID-19 were less severe than during the GFC for both bank types: Islamic banks' scores fell by 12.1% compared to 32.0% during the GFC, while conventional banks declined by 17.7% versus 33.5% during the GFC. This suggests that the pandemic crisis, despite its broader economic impact, posed a less immediate threat to banking solvency than the financial sector crisis of 2008, potentially due to rapid policy interventions and banks' stronger pre-crisis capital positions.

B. Comparative Crisis Impact Analysis

Table 5 presents difference-in-differences estimates comparing Islamic and conventional banks' performance changes across both crises. The coefficient of interest is the interaction term (Islamic × Crisis), which captures the differential crisis impact on Islamic banks relative to conventional banks.

Table 5: Difference-in-Differences Estimates of Crisis Impact

Dependent Variable	GFC Crisis (2008-2009)		COVID-19 Crisis (2020-2021)	
	Coef (Islamic×Crisis)	Std Error	Coef (Islamic×Crisis)	Std Error
Panel A: Stability				
Z-score	2.187	(1.834)	-3.427**	(1.562)
Panel B: Profitability				
ROA	-0.284**	(0.118)	-0.092	(0.076)
ROE	-1.867*	(0.987)	-0.445	(0.634)
Panel C: Asset Quality				
NPF/NPL	1.024***	(0.287)	-0.534**	(0.241)
Panel D: Capital & Liquidity				
CAR	1.342***	(0.427)	2.187***	(0.512)
FDR/LDR	3.876***	(1.142)	4.523***	(1.287)
Panel E: Efficiency				
BOPO	2.134*	(1.098)	-1.876	(1.423)

Notes: *** p<0.01, ** p<0.05, * p<0.1; Standard errors in parentheses; Fixed effects models with bank and year dummies; control variables include bank size and macroeconomic indicators; N=1,260 for GFC; N=840 for COVID-19.

During the GFC, the Islamic × Crisis interaction coefficient for the Z-score is positive but statistically insignificant (2.187, p>0.1), confirming prior research finding no differential stability impact. However, profitability metrics show significantly negative coefficients: ROA interaction of -0.284 (p<0.05) and ROE interaction of -1.867 (p<0.1), indicating that Islamic banks suffered greater profitability impairment than conventional banks during the GFC, after controlling for other factors. This result contradicts popular narratives, but aligns with studies documenting the 2009 downturn of Islamic banks.

The NPF/NPL interaction coefficient of 1.024 (p<0.01) confirms that Islamic banks experienced a significantly worse asset quality deterioration during the GFC. Conversely, the CAR interaction of 1.342 (p<0.01) and FDR interaction of 3.876 (p<0.01) indicate that Islamic banks maintained superior capital adequacy and intermediation ratios, supporting claims that they contributed to financial stability through continued lending.

During the COVID-19 pandemic, the patterns diverged dramatically. The Z-score interaction becomes significantly negative (-3.427, p<0.05), suggesting that Islamic banks experienced greater stability deterioration than conventional banks during the pandemic, in contrast with the GFC pattern. However, the profitability interactions are statistically insignificant, indicating no differential impact on ROA or ROE. Most strikingly, the NPF/NPL interaction coefficient is significantly negative (-0.534, p<0.05), revealing that Islamic banks maintained better asset quality than conventional banks during the COVID-19 pandemic, reversing the GFC pattern.

Capital adequacy and intermediation results remain consistent: Islamic banks maintained higher CAR (interaction coefficient 2.187, p<0.01) and FDR (interaction coefficient 4.523, p<0.01) throughout the COVID-19 pandemic. The BOPO interaction turns negative, though it remains insignificant, suggesting no differential operational efficiency impact.

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C. Panel Data Regression Results: Determinants of Banking Stability

Table 6 presents panel data regression results examining determinants of banking stability measured by Z-score across the full sample period 2007-2021. Models 1-3 analyze Islamic banks separately during pre-crisis, GFC, and COVID-19 periods respectively, while Models 4-6 present corresponding results for conventional banks. Model 7 pools both bank types with Islamic dummy and interaction terms.

Table 6: Panel Data Regression Results - Z-score Determinants

Independent Variables	Model 1 IB Pre-Crisis	Model 2 IB GFC	Model 3 IB COVID	Model 4 CB Pre-Crisis	Model 5 CB GFC	Model 6 CB COVID	Model 7 Pooled
Bank Characteristics							
CAR	0.487***	0.612***	0.529***	0.521***	0.673***	0.594***	0.558***
	(0.092)	(0.118)	(0.104)	(0.087)	(0.124)	(0.112)	(0.081)
NPF/NPL	-0.824***	-1.147***	-0.967***	-0.892***	-1.234***	-1.089***	-1.056***
	(0.156)	(0.208)	(0.184)	(0.149)	(0.217)	(0.192)	(0.142)
SIZE (log assets)	2.134***	1.876**	2.012***	2.456***	2.187***	2.341***	2.201***
	(0.542)	(0.748)	(0.634)	(0.518)	(0.762)	(0.687)	(0.487)
BOPO	-0.178***	-0.234***	-0.212***	-0.163***	-0.221***	-0.198***	-0.197***
	(0.034)	(0.047)	(0.041)	(0.032)	(0.049)	(0.043)	(0.029)
FDR/LDR	0.087**	0.112**	0.098**	0.092**	0.124***	0.107**	0.103***
	(0.038)	(0.047)	(0.042)	(0.036)	(0.046)	(0.044)	(0.033)
PLS Ratio	0.142**	0.087	0.118*	-	-	-	-
	(0.067)	(0.089)	(0.071)	-	-	-	-
Crisis Dummies							
GFC Crisis	-	-8.234***	-	-	-7.918***	-	-8.076***
	-	(1.542)	-	-	(1.487)	-	(1.121)
COVID Crisis	-	-	-4.187***	-	-	-3.612***	-3.899***
	-	-	(1.234)	-	-	(1.176)	(0.987)
Islamic Interactions							
Islamic Bank	-	-	-	-	-	-	1.876*
	-	-	-	-	-	-	(0.987)
Islamic × GFC	-	-	-	-	-	-	-0.316
	-	-	-	-	-	-	(1.287)
Islamic × COVID	-	-	-	-	-	-	-2.134*
	-	-	-	-	-	-	(1.142)
Macroeconomic							
GDP Growth	0.234**	0.187*	0.276**	0.267**	0.198*	0.312**	0.251**

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Independent Variables	Model 1 IB Pre-Crisis	Model 2 IB GFC	Model 3 IB COVID	Model 4 CB Pre-Crisis	Model 5 CB GFC	Model 6 CB COVID	Model 7 Pooled
	(0.098)	(0.112)	(0.124)	(0.092)	(0.107)	(0.118)	(0.087)
Inflation	-0.156*	-0.213**	-0.187**	-0.142*	-0.198**	-0.167*	-0.173**
	(0.087)	(0.098)	(0.092)	(0.081)	(0.094)	(0.089)	(0.076)
Constant	18.234***	15.673***	16.987***	16.872***	14.234***	15.412***	16.123***
	(3.542)	(4.187)	(3.876)	(3.341)	(4.012)	(3.742)	(3.124)
Model Statistics							
Observations	630	1,260	840	630	1,260	840	2,520
R-squared (within)	0.624	0.687	0.643	0.641	0.702	0.658	0.671
Number of banks	84	84	84	84	84	84	168
F-statistic	47.32***	62.18***	51.76***	49.87***	65.43***	54.32***	89.67***
Hausman test (χ^2)	34.21***	42.87***	38.45***	36.74***	44.92***	40.13***	52.34***

Notes: *** p<0.01, ** p<0.05, * p<0.1; robust standard errors in parentheses; fixed effects models selected based on Hausman tests; all models include bank and year fixed effects; Pre-crisis period: 2007-H1 2008; GFC period: Q3 2008-Q4 2009; COVID period: Q1 2020-Q2 2021

Capital Adequacy: CAR exhibits consistently positive and highly significant coefficients across all models (0.487-0.673, p<0.01), confirming that higher capital buffers strongly enhance banking stability, regardless of bank type or crisis period. During crises, CAR's impact intensifies (coefficients increase from ~0.5, in the pre-crisis to ~0.6-0.67 in crisis periods), indicating capital's critical role in absorbing shocks.

Asset Quality: NPF/NPL shows uniformly negative and significant coefficients (-0.824 to -1.234, p<0.01) with magnitudes increasing during crises, confirming that credit deterioration directly impairs stability. Islamic banks' coefficients are generally larger in absolute value, suggesting a heightened sensitivity to asset quality deterioration.

Bank Size: Positive and significant SIZE coefficients (1.876-2.456, p<0.01) indicate that larger banks achieve greater stability, likely through diversification and economies of scale. Conventional banks exhibit slightly larger coefficients, potentially reflecting their more developed risk management infrastructure.

Operational Efficiency: BOPO's consistently negative coefficients (-0.163 to -0.234, p<0.01) confirm that operational inefficiency erodes stability by reducing profitability margins. The impact intensifies during crises, indicating that cost control becomes increasingly critical during stressful periods.

Liquidity: FDR/LDR shows positive coefficients (0.087-0.124, p<0.05, or p<0.01), suggesting that higher intermediation ratios enhance stability within reasonable ranges, consistent with Islamic banks' continued lending, supporting their resilience.

PLS Ratio: For Islamic banks, the PLS financing share exhibits positive coefficients in the pre-crisis and COVID periods (0.142 and 0.118, p<0.05, and p<0.1), suggesting that moderate PLS implementation enhances stability. However, during the GFC, the coefficient became insignificant (0.087, p>0.1), indicating that PLS offered no stability benefit during endogenous financial crises, possibly because agency problems intensified under stress.

Crisis Impacts: GFC Crisis dummy shows a larger negative coefficient (-8.234 for IB, -7.918 for CB) than the COVID Crisis dummy (-4.187 for IB, -3.612 for CB), confirming that the 2008 crisis posed a more severe stability threat than the pandemic. Model 7's interaction terms reveal that Islamic banks experienced no differential impact during the GFC (Islamic × GFC = -0.316, p>0.1) but significantly worse impact during COVID (Islamic × COVID = -2.134, p<0.1), contradicting resilience narratives.

Macroeconomic Factors: GDP growth positively influences stability (0.187-0.312, p<0.05, or p<0.01), whereas inflation negatively impacts stability (-0.142 to -0.213, p<0.05, or p<0.1), confirming the importance of macroeconomic conditions for banking stability. Table 7 presents the regression results for ROA, examining profitability drivers across crisis periods.

Table 7: Panel Data Regression Results - ROA Determinants

Independent Variables	Model 1 IB GFC	Model 2 IB COVID	Model 3 CB GFC	Model 4 CB COVID	Model 5 Pooled
CAR	0.034**	0.041**	0.038**	0.044***	0.039***

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Independent Variables	Model 1 IB GFC	Model 2 IB COVID	Model 3 CB GFC	Model 4 CB COVID	Model 5 Pooled
	(0.016)	(0.018)	(0.015)	(0.017)	(0.012)
NPF/NPL	-0.187***	-0.142***	-0.164***	-0.128***	-0.155***
	(0.034)	(0.038)	(0.032)	(0.036)	(0.026)
SIZE	0.287***	0.312***	0.298***	0.326***	0.306***
	(0.076)	(0.084)	(0.072)	(0.079)	(0.058)
BOPO	-0.028***	-0.031***	-0.026***	-0.029***	-0.028***
	(0.005)	(0.006)	(0.005)	(0.005)	(0.004)
FDR/LDR	0.012**	0.014**	0.013**	0.015***	0.014***
	(0.006)	(0.007)	(0.005)	(0.006)	(0.004)
PLS Ratio	0.018*	0.023**	-	-	-
	(0.010)	(0.011)	-	-	-
GFC Crisis	-0.876***	-	-0.724***	-	-0.800***
	(0.142)	-	(0.134)	-	(0.098)
COVID Crisis	-	-0.512***	-	-0.434***	-0.473***
	-	(0.128)	-	(0.121)	(0.089)
Islamic Bank	-	-	-	-	0.087
	-	-	-	-	(0.124)
Islamic × GFC	-	-	-	-	-0.152*
	-	-	-	-	(0.087)
Islamic × COVID	-	-	-	-	-0.078
	-	-	-	-	(0.093)
GDP Growth	0.067***	0.084***	0.072***	0.089***	0.078***
	(0.018)	(0.021)	(0.017)	(0.020)	(0.014)
Inflation	-0.034**	-0.028**	-0.031**	-0.026**	-0.030**
	(0.015)	(0.014)	(0.014)	(0.013)	(0.011)
Constant	1.234***	1.412***	1.187***	1.376***	1.301***
	(0.387)	(0.421)	(0.368)	(0.405)	(0.312)
Observations	1,260	840	1,260	840	2,520
R-squared (within)	0.734	0.712	0.748	0.725	0.729
Number of banks	84	84	84	84	168
F-statistic	73.42***	68.14***	76.87***	71.23***	102.56***

Notes: *** p<0.01, ** p<0.05, * p<0.1; robust standard errors in parentheses; fixed effects models; all models include bank and year fixed effects.

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The results reveal that profitability determinants align closely with stability factors. CAR enhances profitability (0.034-0.044, $p<0.05$, or $p<0.01$), challenging the notion that higher capital costs. NPF/NPL strongly reduced ROA (-0.128 to -0.187, $p<0.01$), confirming that credit losses directly erode earnings. BOPO's large negative coefficient (-0.026 to -0.031, $p<0.01$) demonstrates the critical importance of operational efficiency for profitability.
The PLS Ratio shows small but significant positive coefficients for Islamic banks (0.018 and 0.023, $p<0.1$, and $p<0.05$, respectively), suggesting that authentic profit-sharing enhances profitability when properly implemented. The GFC imposes a larger profitability shock (-0.876 for IB, -0.724 for CB) than COVID (-0.512 for IB, -0.434 for CB), consistent with the Z-score results. Model 5's Islamic × GFC interaction is significantly negative (-0.152, $p<0.1$), confirming that Islamic banks suffered disproportionate profitability impairment during the financial crisis, while Islamic × COVID remains insignificant, indicating no differential pandemic impact on profitability.

D. Contagion Risk and Spillover Analysis

Table 8 presents CoVaR estimates measuring each bank type's contribution to systemic risk during normal and crisis periods. ΔCoVaR represents the change in system-wide Value at Risk when a particular bank moves from its median state to its 5th percentile (distress) state.

Table 8: Conditional Value at Risk (CoVaR) Analysis

Period	Islamic Banks		Conventional Banks	
	ΔCoVaR (%)	Std Error	ΔCoVaR (%)	Std Error
2008 Global Financial Crisis				
Pre-Crisis (2007-H1 2008)	0.87	(0.14)	1.23	(0.18)
Crisis Peak (Q4 2008)	2.34	(0.32)	3.87	(0.45)
Crisis Average (Q3 08-Q4 09)	1.76	(0.24)	2.94	(0.36)
Post-Crisis (2010-2011)	0.94	(0.16)	1.38	(0.21)
2020 COVID-19 Pandemic				
Pre-Pandemic (2019)	0.92	(0.15)	1.31	(0.19)
Pandemic Peak (Q2 2020)	2.67	(0.38)	3.12	(0.42)
Pandemic Average (Q1 20-Q2 21)	1.89	(0.27)	2.43	(0.33)
Post-Pandemic (H2 2021)	1.02	(0.17)	1.46	(0.22)
Difference (IB - CB)				
GFC Crisis Average	-1.18***	(0.31)	-	-
COVID Crisis Average	-0.54**	(0.24)	-	-
Change (COVID - GFC)	0.64**	(0.29)	-	-

Notes: *** $p<0.01$, ** $p<0.05$, * $p<0.1$; ΔCoVaR estimated using quantile regression at the 5th percentile; Standard errors computed via bootstrap with 1,000 replications; negative differences indicate that Islamic banks contribute less to systemic risk.

During both crises, Islamic banks exhibited a significantly lower ΔCoVaR than conventional banks, confirming reduced systemic importance. In the GFC, Islamic banks' average ΔCoVaR was 1.76% versus 2.94% for conventional banks, a difference of -1.18 percentage points ($p<0.01$). During COVID-19, the gap narrowed to -0.54 percentage points ($p<0.05$), indicating that Islamic banks' systemic risk contribution converged toward conventional banks during the exogenous shock.
The convergence (difference of +0.64 percentage points, $p<0.05$) suggests that while Islamic banks transmitted less contagion during both crises, their relative advantage diminished during exogenous shocks affecting all economic sectors simultaneously. This pattern supports the hypothesis that Islamic banking's resilience depends on crisis type: it is stronger during financial sector crises but comparable during real economy shocks.

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Table 9 presents Diebold-Yilmaz spillover indices quantifying interconnectedness between Islamic and conventional banking systems during crisis periods.

Table 9: Spillover Index Analysis - Directional Connectedness

Direction	Pre-GFC	GFC Crisis	Post-GFC	Pre-COVID	COVID Crisis	Post-COVID
A. Total Spillover Index (%)						
System-wide	42.3	68.7	38.9	39.4	57.8	41.2
B. Directional Spillovers (%)						
Conventional → Islamic	18.4	32.6	16.7	17.2	28.4	18.1
Islamic → Conventional	8.7	14.2	7.9	8.4	13.7	8.9
Net (CB→IB minus IB→CB)	9.7***	18.4***	8.8***	8.8***	14.7***	9.2***
C. Within-System Spillovers (%)						
Among Islamic Banks	15.2	21.9	14.3	13.8	15.7	14.2
Among Conventional Banks	52.8	71.4	49.6	51.3	64.9	52.7

Notes: *** p<0.01; spillover indices based on 10-day ahead forecast error variance decomposition from VAR(4) models; Pre-GFC: 2007-H1 2008; GFC: Q3 2008-Q4 2009; Post-GFC: 2010-2011; Pre-COVID: 2019; COVID: Q1 2020-Q2 2021; Post-COVID: H2 2021

Total Spillover: System-wide interconnectedness increased dramatically during both crises, from 42.3% to 68.7% during the GFC, and from 39.4% to 57.8% during COVID-19. This confirms that crises intensify contagion channels. The GFC generated more extreme interconnectedness (+26.4 percentage points) than COVID-19 (+18.4 percentage points), consistent with its financial sector origin creating direct bank-to-bank transmission.
Directional Spillovers: In periods, conventional banks transmit substantially more risk to Islamic banks than to Islamic banks. During the GFC, conventional-to-Islamic spillovers reached 32.6% versus 14.2% in the reverse direction, with a net difference of 18.4 percentage points (p<0.01). During the COVID-19 pandemic the pattern persisted, but with a smaller magnitude: 28.4% versus 13.7%, a net difference of 14.7 percentage points (p<0.01).
This asymmetric spillover confirms that Islamic banks function as "risk receivers" rather than "risk transmitters," receiving significant contagion from conventional systems but transmitting substantially less back. The narrower gap during COVID-19 (14.7 vs. 18.4 percentage points during the GFC) again indicates that Islamic banking's relative isolation diminished during exogenous shocks.
Within-system Spillovers: Conventional banks exhibit much higher internal interconnectedness (52.8-71.4%) than Islamic banks (13.8-21.9%), reflecting conventional banking's greater size, market dominance, and complex interbank exposures. Islamic banks' lower internal spillovers suggest that their business model limits contagion propagation within the Islamic banking sector, potentially enhancing systemic stability.

E. Regional and Institutional Heterogeneity

Table 10 disaggregates results by region, revealing substantial heterogeneity in Islamic banking crisis performance.

Table 10: Regional Performance During Crises (% Changes)

Region	GFC Crisis (2008-2009)			COVID-19 Crisis (2020-2021)		
	Z-score	ROA	NPF	Z-score	ROA	NPF
GCC Countries						
- Saudi Arabia	-28.4%	-45.2%	+72.3%	-8.7%	-18.4%	-12.3%
- UAE	-34.6%	-52.7%	+94.5%	-11.2%	-22.6%	-8.4%
- Kuwait	-30.1%	-48.3%	+81.2%	-9.8%	-20.1%	-10.7%

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Region	GFC Crisis (2008-2009)			COVID-19 Crisis (2020-2021)		
- Qatar	-36.8%	-57.4%	+103.7%	-13.6%	-25.3%	-6.2%
- Bahrain	-42.3%	-68.9%	+127.4%	-16.4%	-29.7%	+4.3%
- Oman	-31.7%	-49.2%	+86.1%	-10.4%	-21.5%	-9.1%
Southeast Asia						
- Malaysia	-22.6%	-32.4%	+45.8%	-7.3%	-14.2%	-15.8%
- Indonesia	-26.4%	-38.7%	+62.3%	-9.1%	-17.6%	-11.4%
- Brunei	-24.1%	-35.6%	+52.7%	-8.2%	-15.9%	-13.2%
Other Regions						
- Pakistan	-29.8%	-44.6%	+78.4%	-11.7%	-23.4%	-7.8%
- Turkey	-33.2%	-51.3%	+89.7%	-14.3%	-26.8%	-5.6%
- Jordan	-31.4%	-47.9%	+84.6%	-12.1%	-24.2%	-8.9%

Source: Author's calculations from regional sub-samples

During the GFC, GCC Islamic banks suffered more severe impacts than their Southeast Asian counterparts did across all metrics. Bahrain, Qatar, and the UAE experienced the worst performance declines, with Z-scores falling 36.8-42.3%, ROA declining 57.4-68.9%, and NPF surging 94.5-127.4%. This reflects these countries' concentrated real estate exposure and rapid pre-crisis expansion that amplified vulnerabilities.

Malaysian Islamic banks demonstrated superior resilience during the GFC, with the smallest Z-score decline (-22.6%), modest profitability impairment (-32.4%), and an increase in NPF increase (+45.8%). Malaysia's well-developed Islamic finance regulatory framework, including Shariah-compliant deposit insurance and active secondary markets for Islamic securities, has enabled better risk management.

Indonesian Islamic banks performed moderately, experiencing a-26.4% Z-score decline and a +62.3% increase in NPF. Indonesia's Islamic banking sector, though smaller in market share, benefited from diversified financing across the consumer and MSME sectors less affected by the GFC.

During the COVID-19 pandemic, regional variations have narrowed dramatically. All regions experienced much smaller performance deterioration than during the GFC, with Z-score declines ranging from 7.3-16.4% (versus 22.6-42.3% during the GFC) and ROA declines 14.2-29.7% (versus 32.4-68.9% during the GFC). Notably, the NPF improved in most regions (except Bahrain), reflecting widespread forbearance measures.

GCC countries again showed larger impacts than Southeast Asia, but the differential narrowed. Bahrain remained the most vulnerable (Z-score: -16.4%, ROA: -29.7%, NPF: +4.3%), while Malaysia exhibited the strongest resilience (Z-score: -7.3%, ROA: -14.2%, NPF: -15.8%). Convergence suggests that exogenous shocks affect Islamic banks more uniformly across regions than endogenous financial crises, which exploit jurisdiction-specific vulnerabilities.

Table 11 compares the performance of full-fledged Islamic banks (FFIB) and Islamic banking windows/units (IBW) of conventional institutions.

Table 11: Performance Comparison - FFIB vs. IBW

Metric	GFC Crisis		COVID-19 Crisis	
	FFIB (n=58)	IBW (n=26)	FFIB (n=58)	IBW (n=26)
Stability (Z-score % change)				
Average	-33.7%	-27.8%	-13.2%	-9.4%
Std Deviation	8.4%	6.2%	4.3%	3.1%
Profitability (ROA % change)				
Average	-54.6%	-46.3%	-26.8%	-20.1%

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Metric	GFC Crisis		COVID-19 Crisis	
Std Deviation	12.3%	9.7%	7.2%	5.8%
Asset Quality (NPF % change)				
Average	+96.4%	+72.3%	-10.7%	-6.2%
Std Deviation	24.6%	18.4%	8.3%	5.7%
Capital Adequacy (CAR % change)				
Average	-8.4%	-5.7%	+11.2%	+7.8%
Std Deviation	3.2%	2.4%	4.1%	3.3%
Difference (FFIB - IBW)				
Z-score	-5.9%**	-	-3.8%*	-
ROA	-8.3%**	-	-6.7%**	-
NPF	+24.1%***	-	-4.5%*	-
CAR	-2.7%*	-	+3.4%*	-

Notes: *** p<0.01, ** p<0.05, * p<0.1; significance tests based on independent samples t-tests; FFIB = Full-Fledged Islamic Banks; IBW = Islamic Banking Windows.

During the GFC, fully fledged Islamic banks experienced significantly worse performance than Islamic windows across all metrics. The FFIBs' Z-scores declined by 5.9 percentage points more (p<0.05), ROA fell by 8.3 percentage points more (p<0.05), and NPF increased by 24.1 percentage points (p<0.01). This pattern suggests that Islamic windows benefited from their parent conventional banks' diversification, liquidity access, and risk management capabilities during the financial crisis.

The particularly large NPF differential (+24.1 percentage points, p<0.01) indicates that FFIBs suffered much greater asset quality deterioration, potentially due to their concentrated exposure to specific sectors without the diversification available to integrated conventional-Islamic operations. Islamic windows can reallocate resources and manage liquidity more flexibly through conventional treasury operations, thus providing a buffer against shocks.

During COVID-19, performance differentials persisted but narrowed. FFIBs' Z-scores declined by 3.8 percentage points more (p<0.1), ROA fell 6.7 percentage points more (p<0.05), and NPF improved 4.5 percentage points less (p<0.1) than Islamic windows. The narrower gaps suggest that the pandemic's exogenous nature reduced the advantages of diversified conventional-Islamic integration, as both faced common real economic shocks.

Interestingly, FFIBs increased CAR more aggressively during COVID-19 (+11.2% versus +7.8% for IBW, difference of +3.4 percentage points, p<0.1), possibly reflecting regulators' greater scrutiny of stand-alone Islamic institutions or FFIBs' deliberate capital accumulation to enhance market confidence.

F. Robustness Checks and Sensitivity Analysis

Table 12 presents results using alternative crisis period definitions to test robustness of main findings.

Table 12: Sensitivity to Crisis Period Definitions

Crisis Period Definition	Z-score Impact		ROA Impact		NPF Impact	
	IB	CB	IB	CB	IB	CB
2008 GFC Alternative Definitions						
Main: Q3 2008-Q4 2009	-32.0%	-33.5%	-52.4%	-35.4%	+88.1%	+58.4%
Early: Q2 2008-Q2 2009	-28.7%	-30.2%	-46.8%	-31.7%	+76.4%	+52.1%
Extended: Q3 2008-Q4 2010	-29.4%	-31.8%	-49.2%	-33.6%	+82.3%	+55.7%
Lehman: Sep 2008-Dec 2009	-31.3%	-32.9%	-51.7%	-34.9%	+86.5%	+57.2%

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Crisis Period Definition	Z-score Impact		ROA Impact		NPF Impact	
2020 COVID-19 Alternative Definitions						
Main: Q1 2020-Q2 2021	-12.1%	-17.7%	-24.7%	-18.7%	-9.2%	+18.9%
Short: Q1 2020-Q4 2020	-14.3%	-19.2%	-28.9%	-24.6%	-4.7%	+12.3%
Extended: Q1 2020-Q4 2021	-10.8%	-16.4%	-21.6%	-16.2%	-11.8%	+15.4%
Peak: Mar 2020-Jun 2021	-12.7%	-18.1%	-25.3%	-19.4%	-8.6%	+17.7%

Source: Author's calculations; all values represent percentage changes from the pre-crisis baselines.

The results remain qualitatively consistent across the alternative crisis period definitions, confirming the robustness of the main findings. Regardless of specific start and end dates, Islamic banks consistently experienced: (1) comparable or worse Z-score deterioration during the GFC than conventional banks, (2) significantly worse profitability impairment during the GFC, (3) larger NPF increases during the GFC, and (4) better or comparable performance during COVID-19 across most metrics.
Quantitative magnitudes vary moderately with different definitions, but key comparative patterns persist. The "Early" GFC definition (Q2 2008-Q2 2009) yields somewhat smaller impacts (-28.7% Z-score for IB versus -32.0% in main specification), suggesting crisis intensity peaked later than Q2 2008. The "Short" COVID definition (Q1-Q4 2020) shows larger impacts than main specification, indicating recovery began materializing in early 2021.
Table 13 replicates the main analyses by using alternative banking stability measures to confirm the Z-score findings.

Table 13: Alternative Stability Metrics

Metric	GFC Crisis Impact		COVID Crisis Impact		Difference
	Islamic	Conventional	Islamic	Conventional	GFC vs. COVID
Distance-to-Default					
% Change	-29.4%	-30.8%	-11.7%	-16.2%	17.7 pp
Diff (IB-CB)	+1.4 pp	-	+4.5 pp**	-	+3.1 pp
Capital-to-RWA Ratio					
% Change	-7.6%	-12.9%	+9.9%	-4.3%	17.5 pp
Diff (IB-CB)	+5.3 pp***	-	+14.2 pp***	-	+8.9 pp
Tier 1 Leverage Ratio					
% Change	-6.2%	-10.7%	+8.4%	-3.7%	14.6 pp
Diff (IB-CB)	+4.5 pp**	-	+12.1 pp***	-	+7.6 pp
Probability of Default (%)					
Absolute Change	+2.87	+3.24	+1.34	+1.89	-1.53 pp
Diff (IB-CB)	-0.37 pp	-	-0.55 pp*	-	-0.18 pp

Notes: *** p<0.01, ** p<0.05, * p<0.1; pp = percentage points; distance-to-default calculated using the Merton model; Probability of Default estimated from credit ratings and CDS spreads where available.

The alternative stability metrics corroborated the main Z-score findings. Distance-to-default (Merton model-based) shows comparable crisis impacts for Islamic and conventional banks during the GFC (difference of only +1.4 percentage points, p>0.1), but Islamic banks experiencd smaller deterioration during COVID-19 (+4.5 percentage points, p<0.05). Capital-to-RWA and Tier 1 leverage ratios confirm that Islamic banks maintained superior capital positions during both crises, with particularly large advantages during COVID-19 (+14.2 and +12.1 percentage, respectively, p<0.01).

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The probability of default estimates, though available for limited sub samples due to data requirements, show Islamic banks experienced slightly smaller default probability increases than conventional banks during both crises, although the differences are mostly insignificant. This suggests that market participants perceived similar solvency risks despite institutional differences.

Large vs. Small Islamic Banks: Splitting Islamic banks into large (assets > USD 10 billion, n=32) and small (assets ≤ USD 10 billion, n=52) sub-samples reveals that large Islamic banks experienced significantly less severe GFC impacts: Z-score declined 26.3% for large versus 35.8% for small (difference of 9.5 percentage points, $p<0.01$). During the COVID-19 pandemic, the size advantage diminished to 3.1 percentage points ($p>0.1$). This finds confirms the size-related diversification benefits documented in the literature.

High vs. Low PLS Implementation: Islamic banks with above-median PLS ratios (>15% of total financing in PLS contracts, n=38) versus below median (≤15%, n=46) showed no significant GFC performance differences (Z-score declined by 31.4% vs. 32.6%, $p>0.1$). During COVID-19, high-PLS banks exhibited marginally better resilience (Z-score declined by 10.7% vs. 13.8%, difference of 3.1 percentage points, $p<0.1$), providing weak support for authentic risk-sharing enhancing stability during exogenous shocks.

G. Discussion

The empirical findings reveal a crisis-type conditional pattern of Islamic banking resilience that challenges both triumphalist narratives of Islamic banking superiority and blanket skepticism regarding its differentiation from conventional finance. During the 2008 Global Financial Crisis, Islamic banks demonstrated mixed performance, maintaining superior capital adequacy and intermediation ratios while experiencing comparable or worse profitability impairment and asset quality deterioration relative to conventional banks. Conversely, during the 2020 COVID-19 pandemic, Islamic banks exhibited stronger capital strengthening and asset quality stability, although with reduced contagion transmission advantages compared to the GFC (Murthy & Rahman, 2025).

This conditional resilience aligns with the theoretical predictions of the structural characteristics of Islamic banking. During endogenous financial sector crises like 2008, Islamic banks benefited from Shariah prohibitions precluding direct exposure to toxic derivatives, structured products, and subprime securitization that devastated conventional banks. Limited leverage and asset-backed financing requirements create natural buffers against the financial contagion. However, these characteristics generate vulnerability when crises transition to real economic impacts, as Islamic banks' concentrated exposures to trade finance, real estate, and consumer lending channels lose directly to their balance sheets.

The particularly severe profitability impairment Islamic banks experienced in 2009 (ROA declining 41.4% that year alone) reflects their heightened dependency on the real economy. Unlike conventional banks. which can diversify across financial markets, Islamic banks derive nearly all income from financing real economic activities. When economic activity contracts, Islamic banks lack alternative profit sources, explaining that their steeper profitability collapses during reccesions. This finding contradicts popular claims that Islamic banking's real economy focuses unambiguously on enhancing stability; instead, it creates asymmetric vulnerability profiles: protection against financial shocks but exposure to real shocks (Riski Saputra et al., 2025).

During exogenous real economic crises such as COVID-19, Islamic banking's conditional advantages largely disappear. The pandemic directly impacted the real economy sectors, where Islamic banks concentrate financing, affecting both Islamic and conventional institutions through common channels of business closure, unemployment, and loan defaults. Islamic banks' superior capital strengthening during COVID-19 (+9.9% versus -4.3% for conventional banks) reflects regulatory treatment differences and deliberates capital accumulation rather than inherent business model advantages. The narrowing of contagion transmission differentials—with Islamic banks' lower spillover advantage declining from 1.18 percentage points during the GFC to 0.54 percentage points during COVID-19—confirms that their relative isolation diminishes during systemic shocks affecting all economic participants.

A striking finding concerns the limited role of profit-loss sharing financing in determining crisis resilience. Although PLS represents the theoretical core of Islamic banking, its share remains below 20% globally, and regression analyses reveal that its stability benefits are modest and statistically weak. During the GFC, PLS ratios showed no significant relationship with Z-scores (coefficient 0.087, $p>0.1$), suggesting that PLS offered no stability protection during the endogenous financial crises. During COVID-19, the PLS coefficient became marginally significant (0.118, $p<0.1$), indicating potential benefits during exogenous shocks, although the effect sizes remained small (Ruswin & Arwin, 2025).

The PLS paradox stems from several factors First, agency problems in PLS contracts intensify during crises as information asymmetries worsen and borrower incentives to under report profits increase. Islamic banks lack effective mechanisms for monitoring entrepreneurial activities and verifying profit claims, particularly when stressed economic conditions create moral hazard incentives for misreporting. Consequently, PLS's theoretical risk-sharing benefits fail to materialize in practice, with agency costs offsetting alignment advantages.

Second, regulatory discrimination against PLS creates institutional obstacles. The Basel capital adequacy framework treats equity-like PLS financing less favorably than debt instruments, increasing capital costs for authentic risk sharing. Deposit insurance schemes prove difficult to structure in Shariah-compliant ways to protect profit-sharing investment accounts without contradicting risk-sharing principles. In most jurisdictions, tax systems allow interest deductions while taxing profit distributions, making PLS economically disadvantageous. These institutional barriers incentivize Islamic banks toward debt-like murabahah and ijarah contracts that receive more favorable treatment, explaining PLS's limited implementation despite its theoretical advocacy (Islam et al., 2026).

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Third, there are competitive pressures from conventional banking force Islamic banks toward products mimicking conventional offerings. Customers demand deposit safety and return predictability comparable to those of conventional banks, creating pressure for Islamic banks to minimize risk sharing on the liability side through quasi-fixed returns on investment accounts. This "displaced commercial risk" requires Islamic banks to smooth returns using profit equalization reserves, transforming profit-sharing deposits into quasi-debt liabilities that contradict the risk-sharing principles.

The empirical finding that high-PLS banks showed no superior GFC resilience challenges the Islamic finance advocacy literature, promoting PLS as the sector's distinctive advantage. Instead, the results suggest that, in contemporary practice, Islamic banking resilience derives more from conservative balance sheet management, higher capital buffers, and regulatory supervision than from authentic risk-sharing implementation. This conclusion aligns with critiques arguing that Islamic banks operate as conventional banks with Islamic branding, rather than fundamentally different institutions.

The finding that Islamic banks function as "risk receivers" rather than "risk transmitters" carries important implications for financial system design and Islamic banking's role in dual banking systems. Throughout both crises, conventional-to-Islamic spillovers substantially exceeded Islamic-to-conventional transmissions (net differences of 18.4 and 14.7 percentage points respectively). This asymmetry reflects Islamic banking's subordinate position within financial systems dominated by conventional institutions, limited participation in derivatives markets creating complex interconnections, smaller asset bases reducing the systemic footprint, and structural isolation from conventional interbank markets (Kurnia, 2025).

From the systemic stability perspective, this asymmetry offers both benefits and concerns. Islamic banks' reduced contagion transmission limits their potential to amplify systemic crises through spillover effects. Lower ΔCoVaR estimates (1.76% for Islamic banks versus 2.94% for conventional banks during GFC) confirm that Islamic institutions pose less systemic risk per unit of assets than their conventional counterparts. If Islamic banking market share increases substantially, this could enhance overall financial system stability by reducing interconnectedness density and creating segmentation that contains contagion.

However, the risk receiver status generates vulnerabilities. Islamic banks' susceptibility to conventional banking shocks means that they cannot function as genuinely independent financial sector buffers during crises. When conventional systems experience stress, contagion is transmitted to Islamic banks through common exposures, funding market disruptions, and confidence effects, undermining claims that Islamic banking provides insulation from financial instability. The convergence of spillover differentials during COVID-19 (narrowing from 18.4 to 14.7 percentage points) suggests that Islamic banking's insulation decreased during severe systemic shocks affecting all institutions simultaneously.

Policy implications of contagion patterns center on dual banking system regulations. Regulators must recognize that Islamic banks, despite their different business models, remain integrated within broader financial systems and are susceptible to conventional banking distress. Islamic banking is treated as systemically unimportant due to small market share risks, neglecting contagion channels. Conversely, policies enhancing Islamic banking's genuine independence, including developing robust Shariah-compliant interbank markets, establishing Islamic lender-of-last-resort facilities, and creating Islamic deposit insurance schemes, could strengthen its buffer capacity (Pribadi et al., 2025).

The substantial regional performance variations documented in the results section challenge the monolithic treatment of "Islamic banking" as a homogeneous category. Malaysian Islamic banks consistently demonstrated superior resilience during both crises, with GFC Z-score declines of only 22.6% versus 36.8-42.3% for GCC counterparts. This performance advantage stems from Malaysia's comprehensive Islamic finance infrastructure, including well-developed regulatory frameworks (Islamic Financial Services Act 2013), Shariah-compliant deposit insurance (PIDM's Kafalah-based system), deep secondary markets for Islamic securities (sukuk), and integrated conventional-Islamic bank operations enabling cross-subsidization. Conversely, Bahrain and Qatar Islamic banks suffered the most severe GFC impacts (Z-score declines 36.8-42.3%, ROA declines 57.4-68.9%), attributed to concentrated real estate exposure, rapid pre-crisis expansion prioritizing growth over risk management, and smaller domestic economies amplifying external shocks. The crisis revealed that Islamic banking resilience depends heavily on supporting institutional infrastructure rather than on Shariah compliance alone. Strong regulatory supervision, diversified capital markets, and robust liquidity management frameworks are more determinative than theoretical authenticity.

The comparison of full-fledged Islamic banks and Islamic windows yields counterintuitive results. Islamic windows consistently outperformed standalone Islamic banks during both crises, exhibiting smaller Z-score declines (5.9 percentage points during the GFC, 3.8 percentage points during the COVID), better profitability maintenance (8.3 and 6.7 percentage points), and contained NPF increases (24.1 percentage points). This pattern contradicts the assumption that dedicated Islamic institutions with anundivided management focus would achieve superior performance (Asmi et al., 2024).

The advantages of Islamic windows are derived from organizational integration with conventional parents banks. They access conventional treasury and liquidity management capabilities during periods of stress, benefit from parental financial strength and diversification, share risk management systems and expertise, and leverage cross-selling opportunities within integrated customer bases. These benefits outweigh any advantages of a specialized Islamic banking focus and authentic Shariah commitment characterizing standalone institutions.

This finding poses a strategic dilemma for the development Islamic banking. Policymakers promoting Islamic finance must choose between encouraging full-fledged Islamic banks that embody theoretical ideals but face structural vulnerabilitie, versus integrated Islamic windows that demonstrate better resilience but may compromise authentic

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differentiation. Evidence suggests that pragmatic hybrid models balancing authenticity with operational efficiency may offer optimal paths, although theological purists may resist such compromises.

Although not the primary focus of the empirical analysis, the literature review and contextual evidence highlight liquidity management as a critical Islamic banking vulnerability that is inadequately addressed in crisis response frameworks. Islamic banks face structural liquidity constraints from Shariah prohibitions on interest-bearing instruments restricting access to conventional money markets, the limited availability of Shariah-compliant short-term securities for liquidity management, underdeveloped secondary markets for Islamic financial instruments inhibiting asset liquidation, and regulatory restrictions preventing participation in conventional central bank facilities.

During the 2008 crisis, many Islamic banks maintained high liquidity ratios due to conservative asset management but lacked mechanisms to quickly deploy or replenish liquidity as conditions changed. The "liquidity paradox" saw Islamic banks simultaneously holding idle funds that depressed profitability while facing potential runs if depositors lost confidence, unable to access conventional interbank markets or central bank discount windows restricted to interest-based transactions. This constraint limited the crisis response flexibility of Islamic banks compared with conventional banks with unrestricted access to central banks.

Policy responses during the COVID-19 pandemic have shown uneven attention paid to Islamic banking liquidity needs. Some jurisdictions (Malaysia, Bahrain, Pakistan, and Qatar) implemented targeted Shariah-compliant liquidity facilities, while others applied undifferentiated conventional policies that potentially disadvantaged Islamic institutions. The Islamic Financial Services Board (IFSB) has advocated the establishment of the (IILF) functioning as a Shariah-compliant lenders-of-last-resort, enabling Islamic banks to access emergency liquidity by pledging high-quality Islamic assets.

However, IILF implementation remains limited due to regulatory fragmentation across jurisdictions with inconsistent Shariah interpretations, political economy obstacles, including inadequate coordination among central banks and Shariah boards, technical challenges in valuing diverse Islamic assets for collateral purposes, and insufficient critical mass of Islamic institutions justifying dedicated infrastructure. Without addressing these liquidity management weaknesses, Islamic banking resilience will remain structurally constrained regardless of capital strength or asset quality, particularly during crises characterized by sudden confidence shocks requiring rapid liquidity deployment.

CONCLUSIONS

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All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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The authors declare that they have no affiliations with or involvement in any organization or entity with any financial interest in the subject matter or materials discussed in this manuscript.

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