Religion, Contractual Constraints, and Financial Resilience: Evidence from Islamic Banking in the GCC

M. Emranul Haque

Department of Economics, The University of Manchester
Growth and Business Cycle Research Group, The University of Manchester
Working Group for Sustainable Islamic Microfinance, Cardiff University Business School

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Author contact: Arthur Lewis Building, Oxford Road, Manchester M13 9PL, United Kingdom. Email: emranul.haque@manchester.ac.uk

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Abstract

Can religious principles influence financial outcomes when they are translated into organizational rules and constraints on permissible contracts? This paper studies that question in Islamic banking, where the prohibition of riba[1] and restrictions on excessive uncertainty and speculative transactions formally alter the menu of permissible financial arrangements. Rather than treating religion as an individual belief or Islamic banking as a homogeneous category, the analysis distinguishes formal religious identity from the observable implementation of religiously informed financial practices.

The empirical analysis uses an unbalanced panel of 118 banks – 47 Islamic and 71 conventional – from Bahrain, Kuwait, Qatar, Saudi Arabia, and the United Arab Emirates over 1997–2011. Bank performance is measured by return on average assets and return on average equity. Fixed-effects and system GMM specifications account for time-invariant heterogeneity, profit persistence, potential endogeneity, macroeconomic conditions, and heterogeneous responses to the 2007–2009 global financial crisis and its aftermath.

Islamic-bank status alone provides weak and specification-sensitive evidence of superior profitability. By contrast, several measures of non-interest income orientation are positively associated with ROAA and ROAE. Crisis interactions are less uniform and are often negative: in selected specifications, systemic stress compresses the normal-period profitability association of non-interest income. The evidence therefore does not establish that Islamic banks, or non-interest income structures, are unconditionally more resilient. It instead indicates that formal religious identity and the financial implementation of religious constraints have empirically distinct relationships with performance, and that these relationships change under systemic stress.

The paper contributes to the economics of religion by treating doctrine as a potential source of organizational rules that changes the feasible contract set, income composition, and exposure to shocks. It also provides a cautionary measurement result: non-interest income is an imperfect proxy for substantive Shariah implementation because conventional banks also earn such income and many Islamic products are economically debt-like. Subject to that limitation, the analysis shows how religious commitments may be studied within modern economics through their observable institutional and contractual consequences.

Keywords: economics of religion; Islamic banking; religious institutions; contractual constraints; non-interest income; financial resilience; global financial crisis; bank profitability

JEL classifications: Z12; D02; G01; G21; G28; O53

[1] "Riba" means "interest-based transactions.

1. Introduction

Religion can affect economic outcomes along with personal belief. It may influence preferences, identity, social norms, trust, and cooperation. At the institutional level, it may also be incorporated into laws, governance arrangements, and organizational rules. The latter channel is particularly relevant in finance. When a religious doctrine prohibits a specific type of transaction or requires a particular contractual form, it changes the opportunity set faced by financial institutions and their clients. The resulting effects may appear in prices, portfolios, income composition, risk allocation, and responses to shocks, even when the underlying intensity of personal faith cannot be observed.

Islamic banking offers a useful setting to examine such institutional channel. Shariah rules prohibit riba, restrict uncertainty in contracts and exchanges, and gambling-like speculation, and require transactions to be connected to permissible economic activity. In principle, these rules replace unrestricted interest-bearing intermediation with sale, lease, partnership, or agency-based contracts. Islamic banking is, however, is heterogeneous in practice. Some institutions rely more heavily on risk-sharing and asset-linked transactions; others use arrangements for cash-flow profiles that closely resemble conventional debt. Formal designation as an Islamic bank therefore need not reveal the extent to which religious prescriptions materially change its balance sheet.

This distinction between religious identity and religious implementation motivates the paper. Much of the Islamic-banking literature asks whether an Islamic-bank dummy predicts profitability or stability. That comparison is informative about organizational labels but is not, by itself, a test of the economic operation of religion. Instead, a positive Islamic-bank coefficient could reflect market structure, ownership, country conditions, or customer composition rather than religion.

The global financial crisis provides a background to studying these distinctions. The 2008 crisis exposed vulnerabilities associated with leverage, maturity transformation, opaque securitization, and interconnected debt claims. Islamic banks attracted attention because their asset linkage and restrictions on interest and speculation were thought to limit exposure to some of these vulnerabilities. Yet these banks remained exposed to falling asset values, weakening real activity, liquidity shortages, and subsequent credit deterioration. Resilience is therefore an empirical question, not an implication that follows automatically from religious classification.

We examine 118 banks – 47 Islamic and 71 conventional – operating in five Gulf Cooperation Council (GCC) countries between 1997 and 2011. The GCC provides a comparatively informative dual-banking environment: Islamic and conventional banks operate under broadly shared macroeconomic environment while serving overlapping markets. We first estimate whether Islamic-bank status itself predicts return on average assets and return on average equity. We then introduce measures derived from income statements that capture reliance on non-interest activities and interact with the crisis period.

The empirical findings are more qualified than common claims of an “Islamic resilience premium.” Islamic-bank status is positive in some parsimonious specifications but loses robustness as crisis effects, time effects, and other controls are introduced. Measures of non-interest income orientation are more consistently positively associated with profitability. Their crisis interactions, however, are proxy-dependent and sometimes significantly negative. Thus, the evidence is consistent with financial

structure mattering more than formal identity, but it does not show that greater non-interest orientation invariably protects profitability during systemic stress.

The paper makes four contributions. First, it brings Islamic banking into the economics-of-religion literature by conceptualizing religion as a source of institutional constraints on contracts rather than solely as a belief, identity, or participation measure. Second, it separates formal affiliation from observable implementation. Third, it evaluates a possible balance-sheet channel linking religious rules to economic outcomes. Fourth, it makes the measurement limitation explicit: the available variables indicate non-interest income orientation, not direct religiosity, Shariah-governance quality, or the contractual substance of every transaction.

The paper's empirical structure follows directly from this distinction. The first stage asks whether the formal Islamic-bank label predicts profitability once ordinary bank characteristics, macroeconomic conditions, crisis timing, and dynamic persistence are considered. The second stage asks whether that conclusion survives a change of estimator and whether it differs between commercial and investment banks. The third stage moves from identity toward implementation by replacing the label with observable measures of non-interest income orientation. This sequential design is important: an insignificant or fragile Islamic-bank dummy does not imply that religiously informed restrictions are economically irrelevant if banks carrying the same label implement them with different intensity.

The analysis also distinguishes profitability from resilience. ROAA and ROAE measure realized accounting returns, not insolvency probability, liquidity adequacy, credit supply, or systemic risk. A bank may preserve capital and liquidity while reporting lower short run profits or sustain profitability by accepting risks that emerge later. Throughout the paper, "resilience" therefore refers narrowly to the capacity to sustain profitability under stress unless the discussion explicitly invokes evidence from other outcomes. This discipline prevents the results from being interpreted as a comprehensive test of the safety of Islamic banking.

The resulting contribution is both conceptual and methodological. Conceptually, the paper asks whether religion incorporated in financial rules changes organizational choices and their state-contingent consequences. Methodologically, it shows why research on religion and firms must separate affiliation, governance, implementation, and outcome. The same principle applies beyond Islamic banking: a religious label may be readily observed, while the behavioral constraint through which religion operates remains latent and must be approximated through institutional practice.

The remainder of the paper proceeds as follows. Section 2 develops the conceptual framework and places the analysis within the economics of religion and banking literature. Section 3 derives the hypotheses. Section 4 describes the data, variables, and empirical strategy. Section 5 presents the results for institutional identity and standard bank characteristics. Section 6 examines non-interest income orientation as a proxy for the implementation channel. Section 7 discusses interpretation and limitations, and Section 8 concludes.

2. Religion, Institutions, and Financial Contracts

2.1 Religion within modern economic analysis

The economics of religion applies the standard tools of economics to religious behavior, organizations, and consequences. Its foundational literature studies household production of religious goods, religious participation, competition among religious organizations, and the relationship between belief and economic behavior. Subsequent research shows that religious identity can affect risk taking, cooperation, labor supply, and other choices, while cross-country and historical studies examine links between religion, human capital, political institutions, and development (Iannaccone, 1998; Barro and McCleary, 2003; Benjamin, Choi, and Fisher, 2016).

For the present analysis, the key insight is that religion may operate at different levels. At the individual level it can enter preferences, identity, perceived moral costs, or expectations about accountability. At the social level it can shape norms and networks. At the institutional level it can define permissible transactions, organizational objectives, governance procedures, and sanctions for non-compliance. These channels are conceptually distinct and require different empirical measures.

The data used here do not observe personal belief or religious salience. Accordingly, the paper does not estimate a "faith coefficient" in a utility function. It studies the institutional channel: whether a religiously defined set of financial restrictions is reflected in observable organizational choices and whether those choices are associated with performance. This narrower claim is both empirically tractable and consistent with modern institutional economics.

2.2 A feasible-contract-set interpretation

Consider bank $i = 1, \dots, N$, operating in period $t = 1, \dots, T$, assigns its financial resources $c_{j,it}$ (the amount, exposure, or portfolio share) across $j = 1, \dots, J$ contracts or financial instruments. The available instruments may include conventional loans and interest-bearing securities, as well as murābaḥah, ijārah, mushārakah, muḍārabah, ṣukūk, wakālah, salam, istiṣnāʿ, agency arrangements, and fee-based services.[2]

Let c_{it} denote the technologically, legally, and commercially feasible contract set available to bank i in period t. This set incorporates capital and liquidity regulations, funding availability, market demand, institutional capacity, and prevailing financial technology. A conventional bank chooses its optimal portfolio from this general feasible set:

$$\mathbf{c}_{it}^{*} = \max_{\mathrm{c}\in\mathrm{Cit}} \left\{ \mathrm{E}_t\left[\Pi_{i,t+1}(\mathbf{c})\right] - \frac{\rho_{it}}{2}\mathrm{Var}_t\left[\Pi_{i,t+1}(\mathbf{c})\right] \right\} \qquad (1)$$

Here: i denotes banks; t is the date on which the portfolio decision is made; $t+1$ is the date at which the uncertain payoff is realized; j denotes the individual contracts or instruments; $\mathbf{c}$ is a candidate portfolio vector; $\mathbf{c}_{it}^{*}$ is the optimal portfolio chosen by bank $i$in period t; the superscript $*$ denotes an optimising choice; $\Pi_{i,t+1}(\mathbf{c})$ is the uncertain economic payoff generated by portfolio $\mathbf{c}$; $\mathrm{E}_t[\cdot]$ is the

[2] murābaḥah (cost-plus sale), ijārah (lease), mushārakah (equity partnership), muḍārabah (trust-based investment partnership), ṣukūk (shariah-compliant investment certificate), wakālah (agency), salam (advance-purchase sale), istiṣnāʿ (manufacturing or construction contract).

expectation operator conditional on the information available in period t; $\mathrm{Var}_t[\cdot]$ is the corresponding conditional variance; and $\rho_{it} \geq 0$ measures the weight that bank i places on earnings volatility or downside exposure in period t. The factor $1/2$ is a conventional normalisation that facilitates differentiation without affecting the economic interpretation of the optimisation problem.

The bank's uncertain payoff can be decomposed as

$$\Pi_{i,t+1}(\mathbf{c}) = R_{i,t+1}(\mathbf{c}) - F_{it}(\mathbf{c}) - O_{it}(\mathbf{c}) - L_{i,t+1}(\mathbf{c}) \quad (2)$$

where: $R_{i,t+1}(\mathbf{c})$ denotes gross revenue; $F_{it}(\mathbf{c})$ denotes funding costs; $O_{it}(\mathbf{c})$ denotes operating and transaction costs; and $L_{i,t+1}(\mathbf{c})$ denotes realized credit, market, liquidity, and other financial losses.

A bank committed to Shariah compliance faces the same technological and regulatory restrictions but accepts an additional religious permissibility constraint. Its optimisation problem becomes

$$\mathbf{c}_{it}^{S*} = \arg\max_{\mathrm{c} \in \mathrm{c}_{it}^{S}} \left\{ \mathrm{E}_t\left[\Pi_{i,t+1}(\mathbf{c})\right] - \frac{\rho_{it}^{S}}{2} \mathrm{Var}_t\left[\Pi_{i,t+1}(\mathbf{c})\right] - \kappa_{it}(\mathbf{c}) + B_{it}(\mathbf{c}) \right\} \quad (3)$$

subject to, $$\mathrm{c}_{it}^{S} \subseteq \mathrm{c}_{it} \quad (4)$$

The superscript S denotes Shariah orientation or Shariah permissibility. Thus: $\mathbf{c}_{it}^{S*}$ is the optimal Shariah-constrained portfolio; c_{it}^{S} is the Shariah-permissible subset of the general feasible-contract set; ρ_{it}^{S} is the bank's effective risk-aversion coefficient under Shariah-oriented governance; $\kappa_{it}(\mathbf{c}) \geq 0$ represents additional Shariah-compliance, governance, monitoring, documentation, auditing, and contract-structuring costs; and $B_{it}(\mathbf{c}) \geq 0$ represents the potential economic benefits of credible Shariah compliance. These benefits may include depositor loyalty, access to faith-motivated customers, reputational capital, stakeholder trust, and greater funding stability.

The Shariah-permissible contract set can be represented as a collection of M restrictions:

$$\mathrm{c}_{it}^{S} = \left\{ \mathbf{c} \in \mathrm{c}_{it} : g_m(\mathbf{c}) \leq \bar{g}_{m,it}^{S}, m = 1, \ldots, M \right\} \quad (5)$$

Here: m denotes the religious or contractual restriction; $g_m(\mathbf{c})$ measures portfolio exposure to restricted characteristic m; and $\bar{g}_{m,it}^{S}$ is the maximum Shariah-permissible level of that exposure for bank i in period t. The restricted characteristics may include:

$m \in$ {ribā, gharar, maysir, impermissible industries, absence of required asset linkage}[3]

For a strictly prohibited activity, $\bar{g}_{m,it}^{S} = 0$. A positive threshold, $\bar{g}_{m,it}^{S} > 0$, may apply where the relevant Shariah standards permit incidental exposure subject to screening, disposal, or purification requirements.

Effective Shariah implementation

Formal Islamic-bank status does not necessarily reveal how intensively these restrictions are implemented. Let $\phi_{it} \in [0,1]$ denote the effective degree of Shariah commitment or implementation by bank i in period t. The polar cases are $\phi_{it} = 0$, meaning that the religious restriction has no effective influence on the bank's portfolio choice, and $\phi_{it} = 1$, representing full implementation of

[3] interest (ribā), excessive contractual uncertainty (gharar), gambling-like speculation (maysir)

the relevant Shariah requirements. An intermediate value, $0 < \phi_{it} < 1$, captures incomplete, selective, or heterogeneous implementation. The effective restriction may consequently be written as

$$g_m(\mathbf{c}) \leq (1 - \phi_{it})\bar{g}^C_{m,it} + \phi_{it}\bar{g}^S_{m,it}, m = 1, \ldots, M \quad (6)$$

where: $\bar{g}^C_{m,it}$ is the maximum exposure permitted under conventional regulation and commercial practice; and $\bar{g}^S_{m,it}$ is the stricter Shariah-permissible threshold. So, by construction, $\bar{g}^S_{m,it} \leq \bar{g}^C_{m,it}$. An increase in effective Shariah implementation therefore weakly contracts the bank's feasible opportunity set:

$$\phi'_{it} > \phi_{it} \Longrightarrow \mathrm{c}_{it}(\phi'_{it}) \subseteq \mathrm{c}_{it}(\phi_{it}) \quad (7)$$

Faith is thereby given an economic role as a commitment mechanism that changes the set of permissible actions rather than being treated merely as an institutional label. The bank's general optimisation problem can therefore be written as

$$\mathbf{c}^*_{it}(\phi_{it}) = \underset{\mathrm{c} \in \mathrm{c}_{it}(\phi_{it})}{\arg\max} \left\{ \mathrm{E}_t\left[\Pi_{i,t+1}(\mathbf{c})\right] - \frac{\rho_{it}(\phi_{it})}{2} \mathrm{Var}_t\left[\Pi_{i,t+1}(\mathbf{c})\right] - \kappa_{it}(\mathbf{c}, \phi_{it}) + B_{it}(\mathbf{c}, \phi_{it}) \right\} \quad (8)$$

Equation (8) identifies four channels through which Shariah commitment may influence bank behaviour and performance.

First, the **permissibility channel** changes the feasible-contract set: $\phi_{it} \longrightarrow \mathrm{c}_{it}(\phi_{it})$.
Second, a **risk-preference or governance channel** may affect $\rho_{it}(\phi_{it})$ if stronger implementation discourages excessive leverage or speculative risk-taking.

Third, a **compliance-cost channel** operates through $\kappa_{it}(\mathbf{c}, \phi_{it})$, because stronger implementation may increase governance, monitoring, documentation, auditing, and contract-structuring costs.

Fourth, a **trust and clientele channel** operates through $B_{it}(\mathbf{c}, \phi_{it})$, because credible implementation may generate depositor loyalty, reputational capital, stakeholder trust, and access to faith-sensitive customers.

Because these channels can work in opposing directions, neither the effect on profitability nor the effect on resilience has an unambiguous theoretical sign.

Normal and crisis states

To allow the economic consequences of Shariah-oriented implementation to vary between normal and crisis periods, define the systemic-crisis indicator as

$$D^C_t = \begin{cases} 1, & \text{if period } t \text{ is classified as a systemic-crisis period,} \\ 0, & \text{otherwise.} \end{cases}$$

Expected payoff can then be represented as

$$\mathrm{E}_t\left[\Pi_{i,t+1}\right] = (1 - D^C_t)\mathrm{E}_t\left[\Pi^N_{i,t+1}\right] + D^C_t\,\mathrm{E}_t\left[\Pi^C_{i,t+1}\right] \quad (9)$$

where: the superscript N denotes the normal state; and the superscript C denotes the crisis state.

Shariah-oriented implementation may have different marginal consequences across the two states:

$$\frac{\partial \mathrm{E}_t[\Pi^N_{i,t+1}]}{\partial \phi_{it}} \neq \frac{\partial \mathrm{E}_t[\Pi^C_{i,t+1}]}{\partial \phi_{it}} \quad (10)$$

For example, Shariah restrictions may impose compliance costs or exclude otherwise profitable activities during normal periods while reducing exposure to highly leveraged, speculative, or interest-sensitive instruments during systemic stress. Conversely, asset linkage and portfolio concentration in trade, property, or other real-sector activities may transmit a real-sector downturn more directly to Islamic banks.

The model therefore predicts **conditional rather than automatic resilience**.

Formal identity versus substantive implementation

Let IB_i be the formal Islamic-bank indicator:

$$\mathrm{IB}_i = \begin{cases} 1, & \text{if bank } i \text{ is formally classified as Islamic,} \\ 0, & \text{if bank } i \text{ is formally classified as conventional.} \end{cases}$$

Formal identity does not determine the effective degree of implementation:

$$\mathrm{IB}_i = 1 \Rightarrow\!/\, \phi_{it} = 1 \tag{11}$$

A formally classified Islamic bank may implement Shariah restrictions incompletely or may rely heavily on contracts whose economic cash-flow structures resemble conventional debt. Conversely, an institutional label alone does not reveal governance quality, monitoring intensity, contractual substance, or the composition of the bank's assets and income.

Let $S_{kit}, k = 1, \ldots, K$, denote observable Shariah-oriented balance-sheet or income-composition proxy k for bank i in period t. Its relationship with latent implementation can be represented as

$$S_{kit} = h_k(\phi_{it}, \mathbf{x}_{it}) + \varepsilon_{kit} \tag{12}$$

where: $h_k(\cdot)$ maps latent Shariah implementation and other bank characteristics into observable financial structure; $\mathbf{x}_{it}$ is a vector of other bank-specific characteristics affecting the proxy; and ε_{kit} captures measurement error and other unobserved influences.

Thus, IB_i identifies formal institutional affiliation, whereas S_{kit} and its crisis interaction, $S_{kit} \times D_t^C$, provide imperfect evidence about substantive implementation and its state-dependent performance consequences. This distinction connects the theoretical framework directly to the empirical analysis below.

2.3 Islamic banking performance and stability

Comparative research offers no uniform Islamic-bank resilience result. Čihák and Hesse (2010) show that relative stability varies with bank size, while Hassan and Dridi (2010) find that Islamic banks experienced a smaller initial profitability decline during the global financial crisis but weaker performance when the shock spread to the real economy. Beck, *et.al.* (2013) report broad similarities in business models, efficiency, asset quality, and stability after conditioning on bank and country characteristics. These findings caution against deriving performance mechanically from formal identity.

Bourkhis and Nabi (2013) reinforce that caution using a matched sample of 34 Islamic and 34 conventional banks from 16 countries. Their non-parametric financial-soundness indicators and parametric Z-score analysis show no significant difference between the two groups in the crisis effect

on soundness or capitalization, although Islamic banks recorded stronger return on assets during and after the crisis. They interpret the similarities in liquidity and non-performing loans as consistent with operational convergence between the two banking models. This is directly aligned with the present distinction between a formal Islamic label and the contractual substance of implementation.

Evidence from a depositor panic indicates a separate faith-based clientele channel. Farooq and Zaheer (2015) study the 2008 liquidity panic in Pakistan and find that Islamic branches experienced smaller deposit withdrawals, with Islamic windows and subsidiaries in some cases attracting deposits. They also maintained lending more strongly and exhibited lower sensitivity of credit supply to deposit changes. Because the comparison includes Islamic and conventional operations within the same banking groups, the results suggest that religious branding and depositor loyalty can affect funding stability even apart from asset-side contract design. Within the present model, this mechanism operates through $B_{it}(\mathbf{c}, \phi_{it})$, rather than solely through a contraction of the feasible contract set, $\mathcal{C}_{it}(\phi_{it})$.

More recent GCC evidence extends the comparison across different shocks. Alsharif (2025) examines 61 GCC banks over 2005 – 2022 using intertemporal comparisons, dynamic GMM, bias-corrected estimators, and the Global Cost Malmquist Productivity Index. Conventional banks were adversely affected by both the 2007 – 2008 global financial crisis and the COVID-19 shock, whereas Islamic banks displayed greater relative resilience across the parametric and non-parametric analyses. Nevertheless, Islamic banks reduced capital and liquidity reserves during crises, revealing a continuing liquidity vulnerability. The study therefore supports conditional resilience while showing why profitability, solvency, efficiency, and liquidity should not be treated as interchangeable outcomes.

Tanin et al. (2025) examine a different stress mechanism: oil-price uncertainty and bank stock returns across eight oil-exporting and four oil-importing dual-banking countries. Their recursive asymmetric VAR-GARCH-in-mean-BEKK estimates provide limited support for superior Islamic-bank resilience, but the result is neither uniform across countries nor sufficiently consistent to establish general superiority. They emphasize heterogeneous transmission across energy dependence, institutional settings, ownership structures, and time. This evidence supports the state- and context-dependent formulation in equations (9) and (10), particularly for a GCC sample whose crisis years overlap with substantial oil-price movements.

The profitability literature likewise points toward contract and income composition. Azad, *et.al.* (2023) develop a model in which banks transform deposits from customers with heterogeneous religiosity into financing and fee-based activities. Using banks from 20 countries over 2000 – 2015, they find that fee income is a more important determinant of Islamic-bank profitability than lending intensity, while the loan-to-deposit ratio has a weaker effect than for conventional banks. Their analysis provides a close theoretical antecedent to the present non-interest-income channel, while also warning that excessive dependence on fee income may constrain longer-run growth and sustainability.

A second strand of literature studies governance rather than income composition. Nawaz, *et.al.* (2021), using 64 Islamic banks and hand-collected information from 512 annual reports over 2007 –

2014, find that intellectual-capital efficiency and selected Shariah-governance characteristics are positively related to accounting performance.

Market valuation, however, responds differently: the presence of prominent Shariah scholars is negatively associated with market performance. Shariah governance may therefore strengthen compliance and accounting outcomes while simultaneously creating additional costs or market concerns. Within the present framework, these opposing effects correspond to the functions $\kappa_{it}(\mathbf{c}, \phi_{it})$ and $B_{it}(\mathbf{c}, \phi_{it})$ in equation (8).

Boudawara et al. (2023) further demonstrate that implementation is multidimensional. For 66 Islamic banks across 14 countries over 2015 – 2019, their Heckman-selection analysis finds that stronger Shariah-governance quality improves overall ESG [4] performance. Shariah supervisory-board attributes particularly strengthen corporate governance, while internal procedures support social performance. The absence of a significant environmental effect shows, however, that stronger formal governance does not automatically translate into every substantive outcome. Governance quality, contractual structure, and realized performance should therefore be measured separately.

Taken together, these studies identify at least three mechanisms: restrictions on permissible assets and contracts; clientele, trust, and religious-branding effects on deposits; and governance capacity that determines whether doctrine is translated into practice. They also show that results vary across performance, liquidity, stability, market return, productivity, and ESG outcomes. The relevant economic question is consequently not whether religious identity makes banks universally safer, but which mechanism operates, how intensively it is implemented, and under which shock and institutional environment it affects outcomes.

2.4 Research gap and contribution

The paper connects two literatures that have largely developed separately. Economics-of-religion research often measures belief, participation, identity, or historical religious institutions, whereas Islamic-banking research often treats the bank label as the religious variable. This study proposes an intermediate approach: formal identity is separated from observable financial implementation, and the latter is treated as a possible mechanism through which religious doctrine affects organizational outcomes.

The contribution is not to establish that non-interest income is intrinsically religious. Rather, it tests whether measures consistent with one central Shariah restriction add explanatory content beyond the Islamic-bank dummy. Unlike studies that compare labels, governance scores, depositor behavior, or stock-market responses separately, the paper embeds identity and implementation in one feasible-contract-set framework and links that framework to bank-level income composition during the global financial crisis. It thereby provides both a substantive result and a measurement lesson for future research on religion and firms.

The theoretical model delivers three empirically testable implications without imposing a universal sign. *First*, IB_i tests whether formal Islamic affiliation carries an average performance differential. *Second*, S_{kit} tests whether observable implementation contains explanatory information beyond

[4] Environmental, Social and Governance.

formal identity. Third, $S_{kit} \times D_t^C$ tests whether the relationship between implementation and performance changes under systemic stress.

Because the compliance-cost effect, $\kappa_{it}(\mathbf{c}, \phi_{it})$, the trust and clientele benefit, $B_{it}(\mathbf{c}, \phi_{it})$, portfolio restrictions, and shock-transmission mechanisms may offset one another, the empirical hypotheses concern conditional economic relationships rather than doctrinally predetermined superiority.

3. Hypotheses

3.1 Formal religious identity

Formal Islamic identity may generate product differentiation, depositor loyalty, reputational benefits, and access to a religiously motivated clientele. It may also entail compliance costs, a narrower set of liquidity instruments, and restrictions on portfolio choice. The expected average profitability difference is therefore ambiguous.

Hypothesis 1: After bank-specific, country, and time effects are controlled for, Islamic-bank status does not necessarily predict higher profitability.

3.2 Institutional implementation

If religious restrictions materially change banks' activities, observable income composition should contain information not captured by formal identity. Greater non-interest income orientation may reflect trade, leasing, investment, or service activities, but may also represent ordinary diversification. Its coefficient is therefore interpreted as a structural association rather than a pure causal effect of Shariah compliance.

Hypothesis 2: Measures of non-interest income orientation are associated with profitability after formal bank identity and standard determinants are controlled for.

3.3 Systemic stress

The effect of a financial structure may change during a crisis. Asset linkage and lower direct exposure to interest-bearing claims could reduce some vulnerabilities, while declines in trade, asset values, and investment income could weaken non-interest revenue. Hence the interaction is an empirical test with no imposed sign.

Hypothesis 3: The relationship between non-interest income orientation and profitability differs between normal and crisis periods.

4. Data, Measurement, and Empirical Strategy

4.1 Sample and outcomes

The unbalanced panel contains 118 banks – 71 conventional and 47 Islamic – from Bahrain, Kuwait, Qatar, Saudi Arabia, and the United Arab Emirates over 1997 – 2011. Bank-level financial statements are obtained from BankScope. Availability of comparable observations determines sample coverage.

The period includes a substantial pre-crisis window and the global financial crisis and early aftermath, but it does not support claims about more recent shocks.

Profitability is measured using return on average assets (ROAA) and return on average equity (ROAE). ROAA captures earnings relative to the asset base; ROAE captures returns to equity holders and is mechanically more sensitive to leverage and capitalization. Bank controls include log total assets (LTA), the cost-to-income ratio (CIR), and the equity-to-total-assets ratio (ETAR). Country controls are log real GDP per capita (LGDPC) and log private credit to GDP (LPCRG).

4.2 Religious identity and implementation proxies

The Islamic-bank dummy (IB) equals one for institutions classified as Islamic and zero for conventional banks. It measures formal organizational identity, not personal faith, compliance quality, or the substantive religious character of each transaction.

Four constructed measures examine income composition. They should be described as non-interest orientation proxies, not direct measures of faith or definitive measures of Shariah compliance:

1. **Islamic Bank Non-Interest Banking and Investment Income:**

   IBNNIBI (Islamic Bank Net Non-Interest Banking and Investment Income) = IB × NNIBI, where NNIBI = NI − NII − NFC. NI is net income, NII is net interest income, and NFC is net fees and commissions.

   IBNNIBICR interacts this Islamic-bank-specific component with the crisis indicator.

2. **Non-interest Income Intensity:**

   TNIITI (the share of Total Non-interest income in a bank's Total Income) = TNII/TI, where TNII = TI − TII; TI is total income and TII is total interest income.

   TNIITICR = TNIITI × CRISIS.

3. **Non-interest transactions reliance:**

   TNITTIE = Total Non-interest Transactions/Total Interest Expense.

   TNITTIECR = TNITTIE × CRISIS.

4. **Non-interest Income Composition:**

   RIIGR = non-interest income/gross revenue, expressed as a percentage.

   RIIGRCR = RIIGR × CRISIS.

These variables capture overlapping but non-identical dimensions of income structure. Their advantages are observability and comparability within BankScope. Their limitations are equally important. Conventional banks can have high non-interest income, non-interest activities may include

volatile trading or fee income, and Shariah-compliant sale or lease returns may be reported in ways that resemble interest income. The proxies therefore test whether income structures consistent with reduced interest reliance predict outcomes; they cannot isolate the effect of religious belief or certify the Shariah substance of transactions.

Why are non-interest accounting items used? Ideally, substantive implementation would be measured from each bank's exposure to, and income generated by, individual Islamic contracts – especially the classical participatory modes of muḍārabah and mushārakah. Such contract-specific information is not consistently available at the bank-year level for the five GCC countries over 1997–2011. BankScope offers comparatively standardized categories for interest and non-interest activities, but not a harmonized cross-country decomposition of financing stocks, realized profits, impairments, and income by Islamic contract. Individual annual reports and national regulators sometimes disclose such information, but classifications, consolidation rules, reporting frequency, and accounting treatments vary across banks and jurisdictions. The IFSB's PSIFI framework itself permits reporting frequency to differ with national data availability[5]. A contract-level panel would therefore be smaller, more selected, and less comparable than the present dataset.

The scarcity of usable contract-income observations also reflects the structure of Islamic banking in practice. Participatory profit-and-loss-sharing finance is conceptually central to Islamic financial theory, but it generally represents a modest share of modern bank portfolios. Al-Muharrami and Hardy (2013), using Bank Negara Malaysia statistics, report that muḍārabah and mushārakah together represented only 5.2 per cent of Malaysian Islamic-bank financing at the end of 2012, compared with 49.5 per cent for baiʿ al-ʿīnah, istiṣnāʿ and other murābaḥah-related products and 25.4 per cent for ijārah. Although Malaysia is not part of the present sample, the figures illustrate the practical dominance of sale- and lease-based modes over classical partnership finance.[6]

Evidence closer to the institutional setting of this study is even more striking. Analysing audited financial statements from 18 GCC Islamic banks, Miah and Suzuki (2020) report that approximately 90 per cent of the financing examined was concentrated in murābaḥah. They associate this "murābaḥah syndrome" with information asymmetry, monitoring and agency costs, uncertainty over realized profits, regulatory capital treatment, and the institutional preference for predictable cash flows. The current IFSB stability assessment similarly emphasizes the continuing importance of commodity murābaḥah and the marginal position of equity-based muḍārabah and mushārakah structures in adjacent Islamic capital-market activity (IFSB, 2025). These sources do not imply that participatory contracts are absent, nor that every sale-based product is economically identical to an interest-bearing loan. They show that relying exclusively on disclosed muḍārabah and mushārakah income would capture only a narrow and inconsistently reported portion of actual Islamic-bank activity.

Accordingly, the four measures used here are second-best empirical proxies. They capture observable departures from conventional interest-income dependence across a wider range of trade, leasing, investment, partnership, agency, and service activities. Their broader coverage is an advantage for

[5] Islamic Financial Services Board's (IFSB) Prudential and Structural Islamic Financial Indicators (PSIFI) framework.
[6] "baiʿ al-ʿīnah" means "sale-and-buyback arrangement".

panel estimation, but it also limits interpretation. Non-interest income can be earned by conventional banks; it can include fees and trading income unrelated to Shariah implementation; and returns from Shariah-compliant sale or lease contracts may sometimes be reported in categories resembling interest income. The measures should therefore be read as indicators of non-interest orientation – not as direct measures of profit-and-loss sharing, personal faith, or certified Shariah authenticity. The empirical question is whether they add explanatory information beyond the Islamic-bank label, not whether they perfectly identify religion.

4.3 Baseline specification

Let y_{it} denote the profitability of bank i in period t, measured alternatively by return on average assets (ROAA_{it}) or return on average equity (ROAE_{it}). The baseline specification is

$$y_{it} = \alpha + \theta\,\mathrm{IB}_i + \delta\,\mathrm{CRISIS}_t + \lambda(\mathrm{IB}_i \times \mathrm{CRISIS}_t) + \boldsymbol{\beta}'\mathbf{X}_{it} + \boldsymbol{\gamma}'\mathbf{Z}_{c(i)t} + \eta_i + \tau_t + \varepsilon_{it} \quad (13)$$

The notation is defined as follows: $i = 1, \ldots, N$ denotes banks; $t = 1, \ldots, T$ denotes time periods; $c(i)$ denotes the country in which bank i operates; $y_{it} \in \{\mathrm{ROAA}_{it}, \mathrm{ROAE}_{it}\}$ is the relevant profitability measure; α is the common intercept; IB_i is the formal Islamic-bank indicator; CRISIS_t is the systemic-crisis indicator; $\mathbf{X}_{it}$ is a vector of bank-specific control variables; $\mathbf{Z}_{c(i)t}$ is a vector of country-level macroeconomic controls; $\boldsymbol{\beta}$ and $\boldsymbol{\gamma}$ are the corresponding vectors of coefficients; η_i denotes time-invariant unobserved bank heterogeneity; τ_t denotes common time effects; and ε_{it} is the idiosyncratic error term.

The formal Islamic-bank indicator is defined as

$$\mathrm{IB}_i = \begin{cases} 1, & \text{if bank } i \text{ is formally classified as Islamic,} \\ 0, & \text{if bank } i \text{ is formally classified as conventional.} \end{cases}$$

The baseline crisis indicator is defined as

$$\mathrm{CRISIS}_t = \begin{cases} 1, & \text{if } t \in \{2007,2008,2009,2010,2011\}, \\ 0, & \text{otherwise.} \end{cases}$$

The interaction term $\mathrm{IB}_i \times \mathrm{CRISIS}_t$ tests whether the profitability differential between Islamic and conventional banks changes during the crisis period.

Interpretation of the coefficients

The coefficient θ measures the average Islamic-bank profitability differential outside the crisis period:

$$\frac{\partial y_{it}}{\partial \mathrm{IB}_i}\Big|_{\mathrm{CRISIS}_t=0} = \theta.$$

The coefficient δ measures the crisis-period change in profitability for the reference group of conventional banks:

$$\frac{\partial y_{it}}{\partial \mathrm{CRISIS}_t}\Big|_{\mathrm{IB}_i=0} = \delta.$$

The coefficient λ measures the additional crisis-period change associated with Islamic-bank status. Accordingly, the Islamic-versus-conventional profitability differential during the crisis is

$$\frac{\partial y_{it}}{\partial \mathrm{IB}_i} \mid_{\mathrm{CRISIS}_t=1} = \theta + \lambda.$$

Similarly, the total change in Islamic-bank profitability between normal and crisis periods is

$$\frac{\partial y_{it}}{\partial \mathrm{CRISIS}_t} \mid_{\mathrm{IB}_i=1} = \delta + \lambda.$$

Thus, $\lambda > 0$would indicate that Islamic banks experienced a more favourable—or less adverse—change in profitability during the crisis relative to conventional banks. It would not, by itself, demonstrate that Islamic banks remained profitable or that their total crisis-period performance was positive.

Alternative specifications replace the aggregate crisis indicator with year-specific indicators. Let

$$D_{\ell t} = \begin{cases} 1, & \text{if } t = \ell, \\ 0, & \text{otherwise,} \end{cases} \quad \ell \in \{2007,2008,2009,2010,2011\}.$$

The corresponding specification becomes

$$y_{it} = \alpha + \theta\, \mathrm{IB}_i + \sum_{\ell=2007}^{2011} \delta_\ell\, D_{\ell t} + \sum_{\ell=2007}^{2011} \lambda_\ell\, (\mathrm{IB}_i \times D_{\ell t}) + \boldsymbol{\beta}'\mathbf{X}_{it} + \boldsymbol{\gamma}'\mathbf{Z}_{c(i)t} + \eta_i + \varepsilon_{it}.$$

This formulation allows the relative performance of Islamic banks to vary across the different phases of the crisis and its aftermath.

Because $\mathrm{IB}_i$is time-invariant for most banks, it is perfectly collinear with the bank fixed effect $\eta_i$in a conventional within-bank fixed-effects regression. Its main effect, θ, therefore cannot be identified separately in such a model. Fixed-effects specifications can nevertheless identify the time-varying interaction $\mathrm{IB}_i \times \mathrm{CRISIS}_t$, or the corresponding year-specific interactions. Interpretations of specifications retaining the main Islamic-bank indicator must therefore reflect the estimator employed and the effects included.

Structural implementation specification

The structural specifications replace or supplement formal Islamic-bank identity with an observable non-interest-orientation measure. Let S_{kit}denote proxy k, where $k = 1, \ldots, K$. The empirical model is

$$y_{it} = \alpha + \omega_k S_{kit} + \psi_k (S_{kit} \times \mathrm{CRISIS}_t) + \boldsymbol{\beta}'\mathbf{X}_{it} + \boldsymbol{\gamma}'\mathbf{Z}_{c(i)t} + \eta_i + \tau_t + \varepsilon_{it} \qquad (14)$$

Here: S_{kit} is non-interest-orientation proxy $k$for bank $i$in period t; ω_k measures its normal-period association with profitability; and ψ_k measures how that association changes during the crisis.

The notation ω_k is used instead of ϕ to avoid confusion with the latent Shariah-implementation parameter ϕ_{it} introduced in Section 2.2.

The marginal association between proxy $S_{kit}$and profitability is

$$\frac{\partial y_{it}}{\partial S_{kit}} = \omega_k + \psi_k \mathrm{CRISIS}_t.$$

Therefore, during normal periods,

$$\frac{\partial y_{it}}{\partial S_{kit}} \mid_{\text{CRISIS}_t=0} = \omega_k,$$

whereas during crisis periods,

$$\frac{\partial y_{it}}{\partial S_{kit}} \mid_{\text{CRISIS}_t=1} = \omega_k + \psi_k.$$

The coefficient $\psi_k$is therefore a difference in slopes:

$$\psi_k = \frac{\partial y_{it}}{\partial S_{kit}} \mid_{\text{CRISIS}_t=1} - \frac{\partial y_{it}}{\partial S_{kit}} \mid_{\text{CRISIS}_t=0}.$$

A negative estimate,

$$\hat{\psi}_k < 0,$$

indicates that the profitability association of non-interest orientation becomes less favourable during the crisis. It does not, by itself, imply that the total crisis-period association is negative. Such a conclusion requires

$$\hat{\omega}_k + \hat{\psi}_k < 0.$$

Moreover, statistical inference concerning the crisis-period association requires testing the composite null hypothesis, $H_0: \omega_k + \psi_k = 0$.

Its standard error of the estimated combined effect, $\text{SE}(\hat{\omega}_k + \hat{\psi}_k) = \sqrt{\text{Var}(\hat{\omega}_k) + \text{Var}(\hat{\psi}_k) + 2\text{Cov}(\hat{\omega}_k, \hat{\psi}_k)}$.

Separate significance tests for $\hat{\omega}_k$ and $\hat{\psi}_k$ cannot establish whether their sum is statistically different from zero.

Similarly, a positive estimate, $\hat{\omega}_k > 0$, shows that non-interest orientation is positively associated with profitability during normal periods. It does not establish crisis resilience. A resilience interpretation requires examining:

- the combined crisis-period effect, $\hat{\omega}_k + \hat{\psi}_k$;
- the statistical uncertainty surrounding that combined effect;
- the relevant conventional-bank or alternative-portfolio counterfactual; and
- whether the outcome measures profitability alone or a broader dimension of resilience, such as liquidity, capital adequacy, asset quality, credit supply, or insolvency risk.

4.4 Estimation and diagnostics

The paper reports fixed-effects and dynamic system GMM estimates. Fixed effects remove time-invariant unobserved bank heterogeneity but may be biased in a short dynamic panel when a lagged dependent variable is included. System GMM combines equations in first differences and levels and uses appropriately lagged variables as internal instruments (Arellano and Bover, 1995; Blundell and Bond, 1998). The instrument matrix is collapsed to limit proliferation, following Roodman (2009).

System GMM is not a substitute for an exogenous research design. Its validity depends on moment restrictions, lag structure, instrument relevance, and the absence of second-order serial correlation in

differenced errors. We therefore report the number of instruments, Hansen tests of over-identifying restrictions, and Arellano–Bond AR(1) and AR(2) tests. The findings are interpreted as conditional associations rather than causal estimates of religion.

Potential outliers are identified using a Hampel rule applied to regression residuals, and selected models are re-estimated excluding influential observations. Because residual-based deletion can itself affect inference, results with and without exclusions are presented transparently rather than treating one sample as uniquely correct.

The empirical strategy is deliberately cumulative. No single coefficient or estimator is treated as decisive. System GMM is useful for addressing persistence and selected forms of endogeneity, but its validity depends on the moment conditions and can be weakened by instrument proliferation. Fixed effects control for time-invariant bank heterogeneity but cannot identify the main effect of a time-invariant Islamic-bank dummy and may suffer dynamic-panel bias. Subsample estimates reveal heterogeneity but reduce statistical power. The evidential weight therefore comes from patterns that recur across outcomes, estimators, samples, and proxy definitions.

Reported p-values are treated as the primary guide to statistical precision. A few cells contain stars that do not align exactly with conventional cut-offs because of rounding or transcription in the original tables; these cases are described as marginal rather than significant. Economic interpretation also considers magnitude and stability. Large changes in an estimate after adding time effects or excluding outliers indicate sensitivity even where one specification reports a small p-value.

5. Formal Identity, Standard Determinants, and Crisis Performance

5.1 Return on average assets

Table 1 reports system GMM estimates for ROAA. In the most parsimonious specification, the Islamic-bank coefficient is positive and statistically significant. The result weakens as crisis and time interactions are added and is sensitive to outlier treatment. This pattern does not support an unconditional profitability premium attributable to Islamic identity.

The aggregate crisis coefficient is generally negative but not stable across specifications. Year-specific interactions indicate heterogeneous timing rather than a single uniform Islamic-bank response. Cost efficiency is the most consistent bank-level correlate: a higher cost-to-income ratio is associated with lower ROAA. Capitalization is positive in several specifications, while the effects of size and the macroeconomic controls are less robust.

5.1.1 Formal identity in the parsimonious specifications.

Table 1 begins with the most favorable evidence for an Islamic-bank profitability differential. In Model 1, the coefficient on IB is 11.719 for the full sample ($p = 0.015$) and 6.729 after outliers are removed ($p < 0.001$). The fall in magnitude after trimming indicates that extreme observations inflate the raw differential, although the remaining association is estimated more precisely. On its own, this result might be described as an Islamic-bank premium in ROAA. It is not, however, a crisis-resilience result: Model 1 contains no interaction showing that the relative performance of Islamic banks improves under stress.

Table 1. System GMM estimates: return on average assets (ROAA)

Variables	Model 1		Model 2		Model 3		Model 4	
	All Obs.	Excludes Outliers	All Obs.	Excludes Outliers	All Obs.	Excludes Outliers	All Obs.	Excludes Outliers
IB	11.719** (0.015)	6.729*** (0.000)	2.875 (0.407)	2.796** (0.012)	4.369 (0.354)	3.604 (0.222)	-85.487 (0.587)	0.051 (0.940)
BCRISIS	-0.538 (0.490)	-0.016 (0.973)	-0.088 (0.925)	0.172 (0.675)	-1.913** (0.019)	-0.456 (0.215)		
IB*BCRISIS			-1.145 (0.601)	-0.855 (0.480)				
IB*2007					-2.127 (0.631)	-1.246 (0.670)	85.958 (0.584)	1.261** (0.052)
IB*2008					-3.232 (0.455)	-2.184 (0.463)	86.470 (0.582)	0.855 (0.276)
IB*2009					-7.755* (0.077)	-4.918* (0.109)	84.202 (0.592)	-1.413* (0.091)
IB*2010					-6.636* (0.109)	-3.749 (0.215)		-1.692* (0.070)
Bank specific variables								
Total Assets (LTA)	1.991* (0.106)	0.719 (0.175)	0.736 (0.411)	0.516 (0.116)	1.434 (0.129)	0.221 (0.583)	0.124 (0.881)	-0.052 (0.818)
Cost to Income Ratio (CIR)	-0.067 (0.274)	-0.128*** (0.000)	-0.106 (0.132)	-0.134*** (0.000)	-0.073 (0.217)	-0.116*** (0.000)	-0.046 (0.124)	-0.052*** (0.000)
Capital-Asset Ratio (ETAR)	0.189** (0.038)	0.106** (0.021)	0.197** (0.025)	0.158*** (0.000)	0.227*** (0.001)	0.118*** (0.000)	0.097** (0.044)	0.074*** (0.000)
Macro variables								
LGDPC (Log of GDP per capita)	5.854** (0.053)	1.514* (0.108)	3.715 (0.147)	0.982 (0.222)	4.092** (0.044)	0.920 (0.242)	0.287 (0.812)	0.134 (0.724)
Log of private credit to GDP ratio (LPCRG)	-5.146** (0.042)	-2.863** (0.055)	-2.231 (0.159)	-2.464** (0.023)	0.429 (0.782)	-0.317 (0.737)	1.388 (0.464)	1.151 (0.132)
Time Dummies	No		No		No		Yes	
Constant	-68.301* (0.096)	-9.729 (0.507)	-36.274 (0.332)	-3.370 (0.769)	-61.587* (0.068)	-5.999 (0.623)	3.502 (0.899)	-2.540 (0.732)
Observations	849	743	849	770	849	781	849	710
Number of banks	118	111	118	112	118	115	118	111
Number of instruments	27	27	29	29	50	50	60	69
Diagnostic tests (p-values)								
F-Statistic (overall)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen J-test (p-value)	0.041	0.055	0.011	0.065	0.051	0.047	0.167	0.546
Arellano-Bond AR(1) test (p-value)	0.012	0.016	0.004	0.017	0.007	0.037	0.013	0.016
Arellano-Bond AR(2) test (p-value)	0.834	0.705	0.138	0.656	0.798	0.279	0.352	0.882

*Notes: p-values are reported in parentheses. Significance: * 10 per cent, ** 5 per cent, *** 1 per cent. "All observations" and "excluding outliers" columns reproduce the original estimations. See the text for interpretation and the limitations of internal-instrument identification.*

Model 2 adds the aggregate crisis interaction. The IB coefficient falls to 2.875 and becomes imprecise in the full sample ($p = 0.407$); in the trimmed sample it is 2.796 with $p = 0.012$. The IB × BCRISIS coefficients are −1.145 and −0.855, with p-values of 0.601 and 0.480. Two conclusions follow. *First*, the average Islamic-bank differential is sensitive to sample treatment. *Second*, the interaction provides no evidence that Islamic affiliation protected ROAA during the broad crisis window. The crisis-period differential is the sum of the main and interaction coefficients, not either coefficient alone;

approximate point estimates are 1.730 in the full sample and 1.941 after trimming, but no joint covariance test is reported. The table therefore cannot establish that either total effect differs from zero.

5.1.2 Timing of the crisis.

Model 3 replaces the single interaction with year-specific terms. The common crisis coefficient is −1.913 in the full sample ($p = 0.019$) but falls to −0.456 and becomes insignificant after outliers are removed. This suggests that some of the apparent average decline in profitability reflects extreme bank-year observations. More importantly, the Islamic interactions become increasingly negative as the crisis reaches the real economy. The terms for 2007 and 2008 are negative but imprecise. The 2009 interaction is −7.755 in the full sample ($p = 0.077$) and −4.918 in the trimmed sample ($p = 0.109$); the 2010 interactions are also negative. This timing is economically plausible. GCC Islamic banks may have had limited direct exposure to the securitized assets at the center of the initial shock, yet remained vulnerable when falling asset values, slower trade, real-estate adjustment, and weaker investment activity affected the underlying transactions they financed.

Model 4 adds general time effects. The IB coefficient becomes extremely unstable in the untrimmed sample (−85.487, $p = 0.587$) and essentially zero after outliers are removed (0.051, $p = 0.940$). The year-specific Islamic interactions are likewise unstable without trimming, while the trimmed estimates are modest: 1.261 for 2007 ($p = 0.052$), 0.855 for 2008 ($p = 0.276$), −1.413 for 2009 ($p = 0.091$), and −1.692 for 2010 ($p = 0.070$). The movement from a marginally positive 2007 differential to negative differentials in 2009–2010 is consistent with delayed real-sector transmission, but the estimates do not support a uniform resilience premium. Once common annual shocks and influential observations are controlled for, identity explains little of average ROAA.

5.1.3 Standard profitability determinants.

The control variables provide a more stable account of ROAA than the Islamic-bank indicator. CIR is negative in every column and becomes strongly significant in each trimmed specification. For example, its coefficient changes from −0.067 ($p = 0.274$) to −0.128 ($p < 0.001$) in Model 1. This recurrent pattern indicates that operating efficiency is a central determinant of profitability and that extreme observations obscure rather than create the relationship. ETAR is positive and significant throughout, with coefficients between approximately 0.074 and 0.227. Better-capitalized banks may enjoy lower funding costs, greater capacity to absorb losses, and stronger stakeholder confidence, although causality may also run from retained profitability to capital.

Bank size is positive in early specifications but generally imprecise and becomes close to zero after time effects are added. The evidence therefore offers little support for a strong scale advantage in ROAA once other determinants are controlled for. LGDPC is positive in several early specifications, suggesting that richer economic conditions support bank earnings, but loses significance after trimming or the inclusion of time effects. LPCRG is negative in early models and weak thereafter. One interpretation is that greater financial depth intensifies competition or reflects earlier credit expansion whose risks emerge later; the instability of the coefficient requires caution.

Table 2. System GMM estimates: return on average equity (ROAE)

Variables	Model 1		Model 2		Model 3		Model 4	
	All Obs.	Excludes Outliers	All Obs.	Excludes Outliers	All Obs.	Excludes Outliers	All Obs.	Excludes Outliers
IB	28.405* (0.105)	10.047* (0.104)	-2.381 (0.830)	5.746 (0.214)	33.822 (0.200)	43.927 (0.117)	-1031.162 (0.446)	2.030 (0.606)
CRISIS	-1.451 (0.541)	-1.520 (0.278)	-3.549 (0.258)	0.969 (0.552)	-6.345*** (0.008)	-2.957** (0.034)		
IB*CRISIS			6.849 (0.324)	-2.799 (0.536)				
IB*2007					-27.181 (0.277)	-37.394 (0.179)	-135.126 (0.429)	-0.398 (0.922)
IB*2008					-28.599 (0.230)	-41.121 (0.136)	-138.881 (0.442)	1.949 (0.638)
IB*2009					-44.701* (0.077)	-48.024* (0.086)	-141.416 (0.415)	-4.033 (0.406)
IB*2010					-41.951* (0.082)	-44.054 (0.115)	-143.852 (0.405)	-2.850 (0.591)
Bank specific variables								
LTA (log of total assets)	6.663* (0.061)	2.501* (0.069)	3.675 (0.159)	0.130 (0.922)	5.086* (0.057)	1.523 (0.221)	5.300 (0.137)	0.648 (0.647)
CIR (cost to income ratio)	-0.246 (0.259)	-0.491*** (0.000)	-0.348 (0.130)	-0.622*** (0.000)	-0.243 (0.183)	-0.545*** (0.000)	-0.434 (0.212)	-0.255*** (0.004)
ETAR (capital-asset ratio)	0.340 (0.181)	0.249 (0.141)	0.426 (0.117)	0.133 (0.253)	0.356* (0.052)	0.159* (0.063)	0. .214 (0.317)	-0.100 (0.294)
Macro variables								
LGDPC (log of GDP pc)	21.255** (0.015)	9.004** (0.032)	15.730* (0.065)	6.572 (0.138)	15.297** (0.043)	5.878 (0.137)	2.596 (0.526)	-3.944* (0.100)
LPCRG (log of private credit to GDP ratio)	-15.437* (0.053)	-9.435** (0.017)	-6.553 (0.142)	-7.650* (0.071)	3.514 (0.444)	-0.856 (0.814)	4.702 (0.594)	-5.691 (0.259)
Time Dummies	No		No		No		Yes	
Constant	-238.591** (0.043)	-61.268 (0.275)	-164.299 (0.162)	-1.112 (0.985)	-221.887** (0.044)	-43.680 (0.431)	37.809 (0.831)	75.346 (0.139)
Observations	848	787	848	808	848	799	848	752
Number of banks	118	116	118	117	118	118	118	117
Number of instruments	27	27	29	29	50	50	60	67
Diagnostic tests (p-values)								
F-Statistic (overall)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen J-test (p-value)	0.002	0.026	0.001	0.011	0.019	0.013	0.465	0.425
Arellano-Bond AR(1) test (p-value)	0.025	0.006	0.014	0.053	0.098	0.072	0.961	0.000
Arellano-Bond AR(2) test (p-value)	0.231	0.486	0.018	0.514	0.010	0.782	0.898	0.519

*Notes: p-values are reported in parentheses. Significance: * 10 per cent, ** 5 per cent, *** 1 per cent. The table preserves the original models and reported diagnostic statistics.*

5.1.4 Diagnostics and the weight placed on Table 1.

All models are jointly significant. AR(1) rejection is expected in first-differenced residuals, while the generally large AR(2) p-values are reassuring. The Hansen results are less comfortable in Models 1–3: several p-values lie close to or below 0.05, particularly 0.011 in the full-sample Model 2. Model 4 produces more acceptable Hansen p-values, but uses 60 – 69 instruments. The instrument count remains below the number of banks, yet the increase reinforces the need to interpret Model 4

alongside, rather than above, the simpler models. Overall, Table 1 shows a positive identity association in selected parsimonious specifications, no robust aggregate crisis advantage, and signs of weaker relative performance in the later crisis years.

5.2 Return on average equity (ROAE)

Table 2 repeats the exercise for ROAE. Because ROAE reflects both operating performance and leverage, coefficient magnitudes are more volatile. The Islamic-bank main effect again varies across models and samples. Crisis interactions provide some evidence of differential adjustment in particular years, but not a stable pattern that warrants describing Islamic banks as uniformly protected from the crisis.

CIR remains negatively associated with profitability in many specifications. ETAR has a mechanically ambiguous relationship with ROAE: greater capital may improve solvency while reducing returns measured relative to equity. The results reinforce the need to distinguish resilience, profitability, and capital structure rather than using the terms interchangeably.

5.2.1 Why ROAE is a demanding outcome.

ROAE magnifies the effects of leverage, capital structure, and unusually small equity denominators. It is therefore unsurprising that Table 2 produces larger and less stable coefficients than Table 1. Model 1 reports an IB coefficient of 28.405 in the full sample and 10.047 after outlier removal, but the corresponding p-values – 0.105 and 0.104 – place both just outside the conventional 10 per cent threshold despite the reported stars. The reduction in magnitude again shows substantial outlier influence. The appropriate description is suggestive, not statistically established, evidence of a positive unconditional Islamic-bank differential.

When the crisis interaction is introduced in Model 2, the IB coefficient changes sign in the full sample (−2.381, p = 0.830) and remains imprecise after trimming (5.746, p = 0.214). The interaction itself is 6.849 in the full sample and −2.799 in the trimmed sample, neither remotely significant. The reversal across samples is more important than either point estimate: the direction of the relative crisis response is not stable enough to support a structural claim.

5.2.2 Crisis timing and leverage sensitivity.

In Model 3 the common crisis effect is −6.345 (p = 0.008) in the full sample and −2.957 (p = 0.034) after trimming, a clearer decline than for ROAA. The Islamic interactions are negative throughout 2007–2010, becoming largest in 2009 and 2010. The 2009 terms are −44.701 (p = 0.077) and −48.024 (p = 0.086); the 2010 terms are −41.951 (p = 0.082) and −44.054 (p = 0.115). These large but imprecisely estimated values are consistent with the idea that equity returns react more sharply than asset returns when losses and valuation changes are absorbed by a comparatively narrow equity base.

The time-dummy specifications in Model 4 expose severe instability in the full sample: the IB coefficient exceeds −1,000 and the interactions are around −135 to −144, all with large p-values. After outlier removal, the corresponding coefficients become small and insignificant. This is not evidence of a catastrophic Islamic-bank effect; it is evidence that the untrimmed ROAE specification is poorly conditioned and dominated by influential observations. The trimmed Model 4 is the economically interpretable version, and it provides no robust identity or crisis differential.

5.2.3 Controls and diagnostics.

CIR is again the most consistent determinant. Its trimmed coefficients range from −0.255 to −0.622 and are statistically significant, showing that inefficient cost structures depress both asset and equity returns. Size is positive only in some early specifications and loses significance under fuller controls. ETAR is mainly positive in Models 1–3 but weak and becomes negative in the trimmed time-effects specification. This differs from Table 1 because a larger equity base can improve solvency and ROAA while mechanically lowering income per unit of equity. The contrast is economically coherent and illustrates why resilience should not be inferred from ROAE alone.

The diagnostic evidence requires particular caution. Hansen p-values reject or nearly reject instrument validity in most Models 1–3. Some AR(2) p-values are also problematic in untrimmed Models 2 and 3, whereas trimming materially improves them. The time-effects specifications perform better on Hansen and AR(2), though their coefficient instability remains. Table 2 therefore receives less evidential weight than Table 1. Its most credible contribution is comparative: the crisis is more visible in equity returns, operational efficiency remains important, and formal Islamic identity is even less robust for ROAE than for ROAA.

5.2.4 Relationship between Tables 1 and 2.

Taken together, the tables reject a simple profitability hierarchy. A positive Islamic-bank coefficient appears when the model is parsimonious, but weakens when crisis interactions, time effects, or sample treatment are introduced. The later crisis interactions are generally negative in both outcomes, with substantially larger magnitudes for ROAE. This common timing supports delayed real-sector exposure; the difference in magnitude reflects leverage and denominator effects. The two tables therefore point toward state dependence and capital-structure sensitivity, not unconditional superiority.

5.3 Fixed-effects robustness

Table 3 presents fixed-effects estimates for both profitability measures. These models provide a useful check on conclusions that depend on system GMM assumptions. The estimated crisis and interaction effects remain sensitive to specification and outcome. The central qualitative conclusion survives: institutional identity alone does not provide a sufficiently robust explanation of profitability or crisis performance.

The within-bank estimates should not be treated as definitive for a dynamic process, but the comparison is informative. Where system GMM and fixed effects differ, the paper emphasizes robustness of sign and interpretation rather than selecting the estimator that yields the strongest significance.

5.3.1 What does fixed effects add?

Table 3 changes the source of identifying variation. Because IB is essentially time-invariant, bank fixed effects absorb its main effect; the table cannot answer whether Islamic banks have higher average profitability. It can, however, test whether profitability changes differently for Islamic banks during the crisis after removing all time-invariant bank characteristics. This is a demanding robustness

exercise because it eliminates persistent differences in ownership, market segment, managerial culture, and business model that may otherwise be correlated with the Islamic label.

For ROAA, the broad crisis effect is small and insignificant in Models 1 and 2, while the Islamic interaction in Model 2 is −0.108 (p = 0.791). Model 3 reports a more negative common crisis coefficient of −0.704 (p = 0.011). Its year interactions are −0.199 in 2007, −1.495 in 2008, −2.782 in 2009, and −1.952 in 2010, with the last three statistically significant at conventional levels. This pattern resembles the system GMM timing in Table 1 and strengthens the inference that Islamic banks' relative ROAA weakened as the crisis moved from financial markets into the real economy.

Table 3. Fixed-effects estimates for ROAA and ROAE

	ROAA				ROAE			
Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Ib	-	-	-	-	-	-	-	-
Bcrisis	-0.309 (0.285)	-0.177 (0.480)	-0.704*** (0.011)		-3.574*** (0.004)	-3.618*** (0.005)	-4.604*** (0.000)	
Ibcrisis		-0.108 (0.791)				1.538 (0.333)		
Bank specific variables								
Lta	0.712*** (0.007)	0.570*** (0.015)	0.702*** (0.005)	-0.132 (0.430)	3.493*** (0.000)	3.173*** (0.001)	2.736*** (0.006)	0.855 (0.386)
Cir	-0.073*** (0.000)	-0.085*** (0.000)	-0.066*** (0.000)	-0.056*** (0.000)	-0.234*** (0.000)	-0.267*** (0.000)	-0.258*** (0.000)	-0.324*** (0.000)
Etar	0.0883*** (0.000)	0.089*** (0.000)	0.089*** (0.000)	0.036*** (0.003)	0.078 (0.245)	0.043 (0.412)	0.004 (0.927)	-0.092** (0.025)
Macro variables								
Lgdpc	3.215*** (0.009)	2.751*** (0.002)	3.081*** (0.002)	0.323 (0.705)	12.722*** (0.002)	10.685*** (0.003)	11.262*** (0.003)	-3.473 (0.399)
Lpcrg	-1.116 (0.158)	-1.219** (0.028)	-0.352 (0.541)	0.016 (0.987)	-2.695 (0.316)	-3.189 (0.212)	1.266 (0.626)	-4.936 (0.260)
Constant	-33.625** (0.015)	-26.255*** (0.006)	-35.069*** (0.003)	2.544 (0.824)	-141.921*** (0.001)	-113.457*** (0.003)	-126.266*** (0.003)	69.329 (0.194)
ib*2007			-0.199 (0.740)	1.108** (0.018)			-7.392 (0.101)	3.363 (0.376)
ib*2008			-1.495** (0.036)	0.933* (0.095)			-11.562*** (0.006)	4.780 (0.217)
ib*2009			-2.782*** (0.000)	-0.441 (0.476)			-20.922*** (0.000)	-4.289 (0.310)
ib*2010			-1.952** (0.037)	-0.311 (0.694)			-19.088*** (0.000)	-2.268 (0.621)
Time Dummies	No		No		No		Yes	
Observations	743	770	781	710	787	808	799	752
R-squared	0.429	0.494	0.453	0.602	0.330	0.377	0.426	0.544
Number of banks	111	112	115	111	116	117	118	117
F-Statistic (overall)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

*Notes: p-values are reported in parentheses. Significance: * 10 per cent, ** 5 per cent, *** 1 per cent. Bank fixed effects absorb time-invariant heterogeneity; standard errors and included time controls follow the original estimations.*

Model 4 includes general time dummies, changing the meaning of the Islamic interactions to deviations from common year effects. Under this specification the 2007 and 2008 interactions become

positive – 1.108 (p = 0.018) and 0.933 (p = 0.095) – while the later terms are negative but insignificant. This suggests that Islamic banks may have performed relatively better in the initial crisis phase once common annual conditions are netted out, but that the advantage did not persist. The contrast between Models 3 and 4 demonstrates that crisis coding matters: a bank-type interaction without common time effects may partly capture macroeconomic movements affecting all banks.

For ROAE, the crisis coefficients in Models 1–3 are consistently negative and highly significant, ranging from −3.574 to −4.604. The aggregate IB interaction in Model 2 is positive but insignificant. Model 3 again produces strongly negative Islamic-year interactions in 2008 – 2010, reaching −20.922 in 2009 and −19.088 in 2010. Once common time effects are included in Model 4, these interactions lose significance. As in Table 2, equity returns are more crisis-sensitive, but the relative Islamic component depends on how common shocks are modelled.

5.3.2 Stable controls and explanatory power.

CIR remains negative and highly significant in all eight fixed-effects regressions. This is the most robust finding across Tables 1 – 3 and suggests that within-bank improvements in operational efficiency translate into higher profitability. Size is positive in Models 1 – 3 for both outcomes but becomes insignificant with time dummies, implying that part of the apparent within-bank scale effect reflects common trends. ETAR remains positive for ROAA, whereas for ROAE it is weak in Models 1 – 3 and negative in Model 4, again reflecting the different denominators. R-squared values rise from 0.429 to 0.602 for ROAA and from 0.330 to 0.544 for ROAE when moving toward the fuller specifications.

5.3.3 Relationship with system GMM.

Table 3 neither wholly confirms nor overturns Tables 1 – 2. It confirms the later-crisis deterioration in specifications without common year effects and the central role of CIR. It also shows that the negative Islamic-year pattern is less robust once time dummies are added. The proper conclusion is therefore conditional: Islamic banks did not display a stable profitability advantage throughout the crisis; relative performance appears to have differed between the initial financial phase and the later real-sector phase, but the magnitude is sensitive to estimator and time controls.

5.4 Commercial and investment banks

Tables 4 and 5 divide the sample into commercial and investment banks. This split addresses a basic comparability concern: business model may be correlated with both Islamic identity and profitability. The estimates show that coefficients vary by bank type, particularly among investment banks, where the number of groups is small and instrument counts constrain the permissible GMM specifications.

These results should be interpreted as heterogeneity checks rather than independent confirmation. They nevertheless show why a single Islamic-versus-conventional coefficient can be misleading when it averages across institutions with different funding, trading, and customer activities.

Table 4. ROAA estimates for commercial and investment banks

	Commercial Banks				Investment Banks	
Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 1**	**Model 2**
Lgdpc	0.724 (0.255)	0.480 (0.369)	0.749* (0.098)	0.349 (0.184)	10.017** (0.012)	8.814* (0.080)
Lpcrg	-1.157* (0.010)	-1.061* (0.074)	-0.146 (0.768)	-0.754 (0.302)	-4.650 (0.240)	-4.818 (0.120)
Lta	0.220 (0.357)	0.373** (0.048)	0.092 (0.588)	-0.007 (0.954)	-0.627 (0.764)	1.242 (0.314)
Cir	-0.090*** (0.000)	-0.081*** (0.000)	-0.069*** (0.000)	-0.045*** (0.000)	-0.126** (0.013)	-0.072 (0.194)
Etar	0.052** (0.035)	0.048** (0.063)	0.056*** (0.001)	0.033** (0.048)	0.098 (0.374)	0.233*** (0.001)
Ib	2.568*** (0.004)	1.775*** (0.005)	5.716 (0.217)	-0.268 (0.572)	10.308** (0.019)	9.724** (0.016)
Bcrisis	-0.199 (0.410)	-0.350 (0.152)	-0.373** (0.041)		1.295 (0.475)	2.237 (0.237)
Ibcrisis		0.261 (0.634)				-8.573 (0.106)
Constant	-1.549 (0.875)	-1.911 (0.804)	-4.086 (0.546)	2.827 (0.570)	-67.792 (0.163)	-87.890* (0.081)
ib*2007			-3.811 (0.401)	1.289** (0.012)		
ib*2008			-4.790 (0.287)	1.011** (0.033)		
ib*2009			-6.344 (0.170)	-0.001 (0.998)		
ib*2010			-5.886 (0.201)	-		
2007				0.741*** (0.003)		
2008				0.172 (0.327)		
2009				0.190 (0.263)		
2010						
Observations	555	553	555	529	243	227
Number of Banks	70	70	70	69	47	45
Number of instruments	27	29	50	68	27	29
F-Statistic (overall)	0.000	0.000	0.000	0.000	0.000	0.000
Hansen J-test (p-value)	0.053	0.051	0.070	0.701	0.516	0.552
Arellano-Bond AR(1) test (p-value)	0.022	0.035	0.054	0.073	0.037	0.206
Arellano-Bond AR(2) test (p-value)	0.163	0.341	0.907	0.875	0.282	0.399

*Notes: p-values are reported in parentheses. Significance: * 10 per cent, ** 5 per cent, *** 1 per cent. Some investment-bank specifications are omitted where the instrument count is too high relative to the number of groups.*

Table 5. ROAE estimates for commercial and investment banks

	Commercial Banks				Investment Banks	
Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 1**	**Model 2**
Lgdpc	2.990 (0.371)	1.247 (0.705)	-1.077 (0.686)	-1.806 (0.333)	18.029* (0.077)	8.197 (0.354)
Lpcrg	-13.570*** (0.001)	-12.848*** (0.001)	-0.400 (0.906)	-10.190** (0.016)	-3.410 (0.658)	-6.960 (0.291)
Lta	2.897** (0.020)	2.190** (0.045)	1.217 (0.282)	-0.0465 (0.955	5.478 (0.176)	7.298** (0.037)
Cir	-0.521*** (0.000)	-0.552*** (0.000)	-0.469*** (0.000)	-0.269*** (0.000)	-0.283** (0.012)	-0.330*** (0.006)
Etar	0.197 (0.186)	0.227 (0.257)	-0.031 (0.723)	-0.161*** (0.008)	0.115 (0.499)	0.456** (0.022)
Ib	14.628*** (0.005)	12.371*** (0.008)	48.251 (0.226)	-0.097 (0.982)	24.586*** (0.003)	10.106 (0.115)
Bcrisis	-2.028 (0.103)	0.196 (0.907)	-4.096*** (0.002)		-2.803 (0.459)	-4.465 (0.238)
Ibcrisis		-0.7.333* (0.056)				-3.490 (0.623)
Constant	8.666 (0.858)	34.964 (0.480)			-221.849** (0.042)	-144.870 (0.201)
ib*2007			-40.504 (0.310)	1.357 (0.709)		
ib*2008			-46.779 (0.240)	2.480 (0.540)		
ib*2009			-48.335 (0.231)	1.297 (0.776)		
ib*2010			-42.231 (0.295)	4.410 (0.316)		
2007				8.737*** (0.001)		
2008				4.637* (0.070)		
2009				2.864 (0.400)		
2010				1.090 (0711)		
Observations	546	550	558	531	243	247
Number of Banks	71	71	71	71	47	46
Number of instruments	27	29	49	66	27	29
F-Statistic (overall)	0.000	0.000	0.000	0.000	0.000	0.000
Hansen J-test (p-value)	0.015	0.010	0.025	0.414	0.414	0.025
Arellano-Bond AR(1) test (p-value)	0.006	0.028	0.039	0.020	0.011	0.011
Arellano-Bond AR(2) test (p-value)	0.295	0.135	0.772	0.723	0.158	0.508

*Notes: p-values are reported in parentheses. Significance: * 10 per cent, ** 5 per cent, *** 1 per cent. Small investment-bank subsamples warrant particular caution.*

5.4.1 ROAA heterogeneity in Table 4.

Splitting the sample clarifies why pooled identity coefficients can be unstable. Among commercial banks, IB is positive and significant in Models 1 and 2 – 2.568 (p = 0.004) and 1.775 (p = 0.005) – but becomes insignificant in Model 3 and negative and insignificant with time effects in Model 4. The aggregate IB × crisis interaction is 0.261 (p = 0.634). Thus, even within the more homogeneous commercial-bank group, an average Islamic-bank differential appears in parsimonious models but does not translate into a robust crisis premium.

The year-specific commercial-bank results reinforce the timing distinction. Without common year effects, the Islamic interactions are negative from 2007 onward and grow in magnitude, though none is precisely estimated. With common time effects, the Islamic interactions are positive in 2007 and 2008 – 1.289 and 1.011, both significant – but approximately zero thereafter. This resembles the fixed-effects Model 4 in Table 3: Islamic commercial banks may have had a relative early-crisis advantage, perhaps because of lower direct exposure to toxic securities, but that advantage dissipated when real-estate, trade, and investment conditions weakened.

For investment banks, the IB coefficients are much larger: 10.308 and 9.724, both statistically significant. These magnitudes should not be compared mechanically with commercial-bank coefficients because investment-bank profitability is more volatile and the business model differs. Moreover, the investment-bank sample contains only 45 – 47 institutions, and only two specifications are feasible. The crisis interaction is −8.573 with p = 0.106 – suggestive of erosion of the normal-period advantage, but not conventionally significant. The result is consistent with higher exposure of investment-oriented institutions to asset valuations and market activity.

CIR is negative across commercial-bank models and in one investment-bank specification. ETAR is consistently positive for commercial-bank ROAA and strongly positive in investment-bank Model 2. LGDPC is especially important for investment banks, suggesting greater sensitivity to aggregate income conditions. The Hansen and AR(2) diagnostics are generally acceptable in Table 4, though the number of instruments approaches the number of commercial-bank groups in Model 4. These estimates are best treated as heterogeneity evidence rather than as independent causal tests.

5.4.2 ROAE heterogeneity in Table 5.

The commercial-bank IB coefficient is 14.628 (p = 0.005) in Model 1 and 12.371 (p = 0.008) in Model 2, but again becomes insignificant when year-specific crisis interactions are introduced and essentially zero with general time effects. The aggregate IB × crisis coefficient is reported as approximately −7.333 with p = 0.056. This is the clearest suggestive evidence in Tables 4 – 5 that a positive normal-period Islamic commercial-bank differential was compressed during the crisis, although it remains marginal and requires a joint test for the total crisis-period effect.

The commercial-bank year interactions in Model 3 are large and negative but imprecise. In Model 4 they become positive and insignificant, while the general 2007 and 2008 effects are positive. The sensitivity mirrors Tables 2 and 3: ROAE reacts strongly to modelled time effects and influential capital structures. Investment banks show a positive IB coefficient of 24.586 in Model 1 (p = 0.003), falling to 10.106 and becoming insignificant in Model 2. Their crisis interaction is negative but

imprecise. Again, the evidence favors heterogeneity and attenuation under stress rather than a stable Islamic premium.

The commercial-bank CIR coefficient ranges from −0.269 to −0.552 and is highly significant throughout; it is also negative and significant for investment banks. LPCRG is strongly negative in several commercial-bank ROAE models, possibly reflecting competition, credit-cycle maturation, or risks accumulated during periods of financial deepening. ETAR becomes negative in the commercial-bank time-effects model but positive in one investment-bank model, underlining the outcome-specific and business-model-specific meaning of capitalization.

5.4.3 What do the two subsample tables add to the pooled results?

Tables 4 and 5 show that pooled coefficients average across materially different institutions. Positive Islamic-bank coefficients are most visible in parsimonious commercial and investment-bank models, yet they weaken under crisis interactions and fuller time controls. Investment-bank magnitudes are larger but less precisely and less extensively estimated. The heterogeneity does not rescue a universal identity effect; it explains why that effect is fragile. This prepares the transition to Tables 6 – 7: if labels aggregate institutions with diverse practices, variables closer to actual income structure may be more informative.

6. Non-Interest Income Orientation and Performance

6.1 ROAA

Table 6 introduces the implementation proxies. The usable sample falls to approximately 34 – 43 banks, depending on the variable, because detailed income components are not available for all observations. This loss of coverage is material: estimates may reflect a selected group of banks with more complete reporting.

Across the models, the normal-period coefficients on IBNNIBI, TNIITI, TNITTIE, and RIIGR are positive; most are statistically significant. The result is stronger and more consistent than the Islamic-bank dummy in the earlier tables. This supports the narrower proposition that income composition contains explanatory information beyond formal institutional identity.

The crisis interactions are not uniformly supportive of a resilience interpretation. IBNNIBICR and TNIITICR are negative but statistically insignificant; TNITTIECR is positive and insignificant; RIIGRCR is negative and significant at the 5 per cent level. For RIIGR, the crisis-period marginal association is the sum of the main and interaction coefficients, approximately 0.048 (= 0.114 − 0.066), before accounting for covariance and statistical uncertainty. Thus, the positive association appears smaller during the crisis, not reversed. A formal linear-combination test would be required to assess whether the combined crisis-period effect differs from zero.

CIR remains negative and significant in most models, while ETAR is generally positive. The Hansen and AR(2) statistics do not reject the reported moment restrictions, although diagnostic non-rejection cannot prove instrument validity. The ratio of instruments to banks is lower than one in most models, which reduces – but does not remove – concerns about proliferation.

Table 6. Non-interest orientation and return on average assets

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
lgdpc	0.737 (0.745)	2.410 (0.320)	0.926 (0.781)	3.311 (0.169)	0.360 (0.819)
lpcrg	0.478 (0.870)	0.234 (0.937)	-2.367 (0.383)	0.490 (0.872)	-6.046*** (0.009)
Lta	-0.082 (0.914)	-1.437 (0.108)	-1.593*** (0.004)	-1.585* (0.071)	-0.687 (0.147)
Cir	-0.038 (0.164)	-0.051* (0.082)	-0.041** (0.020)	-0.056*** (0.001)	-0.024*** (0.006)
Etar	0.054** (0.029)	0.018 (0.522)	0.034 (0.412)	0.106** (0.050)	0.034* (0.094)
bcrisis	0.865 (0.436)	2.248** (0.048)	3.472** (0.025)	-0.111 (0.962)	3.889** (0.037)
sibnnibi (ib*net non-interest banking (and investment) income)	0.290*** (0.000)	0.582** (0.048)			
ibnnibicr (sibnnibi*crisis)		-0.400 (0.156)			
tniiti (Total non-interest income/Total Income)			7.783*** (0.003)		
tniiticr (tniiti*crisis)			-4.750 (0.131)		
tnittie (total non-interest transactions/total interest expense)				4.240* (0.106)	
tnittiecr (tnittie*crisis)				3.267 (0.661)	
riigr (non-interest income/ gross revenue ratio (%)					0.114*** (0.000)
riigrcr (riigr*crisis)					-0.066** (0.043)
constant	-3.806 (0.874)	0.416 (0.988)	25.115 (0.533)	-11.136 (0.661)	29.218 (0.204)
Observations	161	148	148	142	177
Number of Banks	40	38	35	34	43
Number of instruments	28	30	30	30	30
F-Statistic (overall)	0.000	0.000	0.000	0.000	0.000
Hansen J-test (p-value)	0.508	0.847	0.783	0.672	0.301
Arellano-Bond AR(1) test (p-value)	0.587	0.521	0.627	0.736	0.038
Arellano-Bond AR(2) test (p-value)	0.951	0.487	0.407	0.685	0.366

*Notes: columns 1–5 use alternative non-interest orientation measures and are relabelled Models 1–5 in the discussion. p-values are in parentheses; * 10 per cent, ** 5 per cent, *** 1 per cent. The smaller samples reflect availability of detailed income components. Crisis-period marginal effects require joint tests of the main and interaction coefficients.*

6.1.1 Reading the implementation coefficients.

Table 6 asks a different question from Tables 1–5. The coefficient on a non-interest measure does not compare all Islamic banks with all conventional banks. It estimates whether a particular observable income structure is associated with ROAA, conditional on standard controls. This is closer to the φ_it

implementation channel in the theoretical model, though still contaminated by diversification, reporting conventions, and managerial strategy.

Model 1 reports a coefficient of 0.290 on IBNNIBI ($p < 0.001$). Model 2, which introduces its crisis interaction, produces a larger normal-period coefficient of 0.582 ($p = 0.048$) and an interaction of −0.400 ($p = 0.156$). The implied crisis-period point estimate is 0.182. Without the covariance between the two estimates, its standard error cannot be calculated from the table. The negative interaction nevertheless indicates attenuation rather than reinforcement of the positive normal-period association.

Model 3 uses TNIITI, the share of total income accounted for by non-interest income. Its main coefficient is 7.783 ($p = 0.003$), while the crisis interaction is −4.750 ($p = 0.131$). The implied crisis-period association is 3.033. Again, the point estimate remains positive but is smaller during stress. The result is consistent with non-interest activities supporting diversification in ordinary conditions while becoming less remunerative when trade, investment, and asset-market activity contract.

Model 4 examines non-interest transactions relative to interest expense. The main TNITTIE coefficient is 4.240 with $p = 0.106$, making it marginal rather than conventionally significant despite the reported star. Its crisis interaction is positive at 3.267 but extremely imprecise ($p = 0.661$). This proxy therefore provides the weakest evidence in Table 6. Its denominator may also create instability: low or volatile interest expense can generate large ratios, particularly for Islamic institutions.

Model 5 produces the most precisely estimated proportional result. RIIGR has a coefficient of 0.114 ($p < 0.001$), while RIIGR × crisis is −0.066 ($p = 0.043$). The implied crisis-period slope is 0.048. This is an important distinction: the significant negative interaction shows that the association weakens during the crisis, but it does not reverse sign at the reported point estimates. A claim that RIIGR reduced crisis profitability would therefore be incorrect without a joint test showing that 0.048 is negative or statistically different from zero.

6.1.2 Controls, sample selection, and diagnostics.

CIR remains negative in every model and significant in four of five, extending the central efficiency result to the smaller proxy samples. ETAR is generally positive, significant in Models 1, 4, and 5. Size becomes negative and significant in Models 3 – 4, which may reflect the composition of the selected reporting sample rather than a general diseconomy of scale. LPCRG is strongly negative only in Model 5.

The sample falls from more than 800 observations in the identity models to 142–177 observations and 34 – 43 banks. This is not a minor loss. Banks with sufficiently detailed income reporting may differ systematically in governance, jurisdiction, size, or business model. The positive proxy coefficients therefore describe the observed reporting sample and should not be extrapolated mechanically to all GCC banks. Hansen and AR(2) p-values are generally reassuring, and instrument counts remain below bank counts. The unusual absence of significant AR(1) in several models is not fatal, but it reminds us that the dynamic structure may differ in the restricted sample.

6.1.3 Relationship with Tables 1–5.

The main implementation coefficients are more consistently positive than the IB coefficients. That contrast supports the paper's central proposition: actual income composition contains information that a binary institutional label suppresses. Yet the crisis interactions are mostly negative or imprecise.

6.2 ROAE

Table 7. Non-interest orientation and return on average equity

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
lgdpc	**6.542 (0.329)**	**11.430 (0.142)**	**-5.270 (0.481)**	**2.861 (0.647)**	**8.287* (0.092)**
lpcrg	1.309 (0.906)	-15.048 (0.122)	-19.729** (0.047)	-20.405** (0.043)	-21.542** (0.026)
lta	-0.302 (0.923)	-1.573 (0.513)	0.638 (0.698)	0.057 (0.963)	-1.135 (0.585)
cir	-0.175 (0.257)	-0.186** (0.032)	-0.385*** (0.000)	-0.505*** (0.000)	-0.130* (0.102)
etar	0.112 (0.301)	0.120 (0.130)	-0.289*** (0.002)	-0.052 (0.631)	-0.122 (0.115)
bcrisis	1.842 (0.666)	6.009 (0.173)	4.102 (0.390)	3.696 (0.580)	9.813 (0.189)
ibnnibi (ib*net non-interest banking (and investment) income)	1.139*** (0.000)	2.543*** (0.001)			
ibnnibicr (sibnnibi*crisis)		-2.556*** (0.005)			
tniiti (Total non-interest income/Total Income)			23.958*** (0.006)		
tniiticr (tniiti*crisis)			-6.138 (0.501)		
tnittie (total non-interest transactions /total interest expense)				15.792** (0.048)	
tnittiecr (tnittie*crisis)				0.728 (0.935)	
riigr (non-interest income/ gross revenue ratio (%)					0.329*** (0.000)
riigrcr (riigr*crisis)					-0.109 (0.291)
constant			154.088 (0.121)	137.650 (0.113)	
Observations	160	156	145	141	184
Number of Banks	40	40	36	35	43
Number of instruments	28	30	30	30	30
F-Statistic (overall)	0.000	0.000	0.000	0.000	0.000
Hansen J-test (p-value)	0.533	0.342	0.382	0.647	0.359
Arellano-Bond AR(1) test (p-value)	0.836	0.091	0.036	0.109	0.050
Arellano-Bond AR(2) test (p-value)	0.483	0.865	0.256	0.396	0.834

*Notes: columns 1–5 use alternative non-interest orientation measures and are relabelled Models 1–5 in the discussion. p-values are in parentheses; * 10 per cent, ** 5 per cent, *** 1 per cent. Crisis-period marginal effects require joint tests of the main and interaction coefficients.*

Implementation matters, but not in the simple form "more non-interest income implies more crisis resilience." The evidence instead points to a normal-period profitability association whose strength depends on the shock and the proxy used.

Table 7 shows a similar normal-period pattern for ROAE. IBNNIBI, TNIITI, TNITTIE, and RIIGR are positive and statistically significant in their respective specifications. The IBNNIBICR interaction is negative and significant. Its magnitude nearly offsets the positive main coefficient: the reported point estimate of the crisis-period association is approximately −0.013 (= 2.543 − 2.556). Whether this combined effect is statistically distinguishable from zero cannot be determined from the separate p-values and requires a post-estimation linear-combination test.

The other crisis interactions are statistically insignificant. Therefore, the most defensible conclusion is not that Shariah-oriented structures universally increase resilience. It is that non-interest income orientation is positively associated with normal-period profitability and that systemic stress changes this association for some measures and outcomes. The stronger negative interaction in ROAE is consistent with the greater sensitivity of equity returns to losses, valuation changes, and capital adjustments.

The control variables continue to behave plausibly. CIR is negative in most models. ETAR is negative and significant in one ROAE specification, consistent with the mechanical dilution of return on equity at higher capital ratios. LPCRG becomes negative and significant in several models, potentially reflecting competitive pressure or the realization of risks accumulated during credit expansion; this interpretation remains suggestive rather than identified.

6.2.1 Main implementation effects for ROAE.

Table 7 largely confirms the normal-period pattern at a larger scale, as expected for an equity-return measure. IBNNIBI is 1.139 in Model 1 ($p < 0.001$). In Model 2 its main coefficient rises to 2.543 ($p = 0.001$), while the crisis interaction is −2.556 ($p = 0.005$). The implied crisis-period point estimate is approximately −0.013. The near-complete offset is economically important: the income structure associated with higher ROAE in normal periods provides essentially no point-estimate advantage during the crisis. Whether the total is statistically different from zero requires a linear-combination test.

TNIITI has a coefficient of 23.958 ($p = 0.006$), substantially larger than in the ROAA equation, while its crisis interaction is −6.138 and insignificant. TNITTIE is 15.792 ($p = 0.048$) and its interaction is effectively zero. RIIGR is 0.329 ($p < 0.001$), approximately three times its ROAA coefficient, while the crisis interaction is −0.109 and insignificant. Across the alternative measures, non-interest orientation is strongly associated with normal-period equity profitability; only the IBNNIBI interaction shows precise crisis attenuation.

6.2.2 Controls and financial-depth effects.

CIR is again negative across all models and significant or marginal in four. This remarkable stability across outcomes, estimators, bank types, and sample definitions makes operational efficiency the most robust profitability determinant in the paper. ETAR is negative and significant in Model 3 and negative elsewhere, consistent with the mechanical effect of a larger equity denominator on ROAE. LPCRG becomes strongly negative in Models 3 – 5, with coefficients around −20. This may indicate that banks with more non-interest-oriented reporting operate in markets where financial deepening increases competition or where the maturation of prior credit growth compresses returns. Because the

macro coefficient changes with proxy and sample, it remains an association rather than an identified mechanism.

The diagnostics are broadly acceptable: Hansen p-values range from 0.342 to 0.647 and AR(2) tests do not reject. Instrument counts remain at 28 – 30 for 35 – 43 banks. As in Table 6, the main limitation is coverage rather than conventional specification testing. Only 141 – 184 observations enter these regressions.

6.2.3 Joint reading of Tables 6 and 7.

All four proxies have positive main coefficients in both outcomes, and most are statistically significant. The ROAE coefficients are consistently larger, showing that non-interest income composition is more strongly reflected in returns to equity than in returns to assets. Crisis interactions are usually negative but are statistically significant only for RIIGR in Table 6 and IBNNIBI in Table 7. The first leaves a positive crisis-period point estimate; the second almost exactly eliminates the normal-period association. The evidence therefore supports structural relevance and state dependence, but not uniform protection.

The differences among proxies are substantively informative. IBNNIBI is restricted by Islamic identity and may more closely approximate the intended implementation channel, but it mixes levels and scale. TNIITI and RIIGR are proportional measures and facilitate comparison across bank sizes, but can reflect conventional fee and trading income. TNITTIE has a potentially unstable denominator. Consistency of the positive main effects across these imperfect measures is reassuring; inconsistency of their interactions counsels restraint about crisis mechanisms.

6.3 Identity versus implementation

Taken together, Tables 1–7 reveal a consistent contrast. The formal Islamic-bank indicator is fragile, whereas several income-structure measures have stable positive normal-period associations with profitability. This is compatible with the proposition that organizational practices matter more than labels. It is not sufficient, however, to conclude that faith itself causes higher returns. The proxies may capture income diversification, business model, reporting conventions, managerial strategy, or unobserved bank quality alongside any religiously motivated constraint.

The negative crisis interactions sharpen rather than undermine the contribution. They show that the profitability consequences of a religiously compatible financial structure are state-dependent. A structure associated with higher returns in normal periods may be less advantageous when trade, asset values, and investment activity contract. Religion-induced constraints can change exposure to shocks without guaranteeing immunity from them.

6.3.1 The cumulative evidential sequence.

The seven tables form a hierarchy rather than seven independent exercises. Tables 1 – 2 show that formal Islamic identity predicts higher profitability only in selected parsimonious specifications. Table 3 removes permanent bank heterogeneity and reveals that the later-crisis deterioration is visible without common time effects but weaker once common annual shocks are absorbed. Tables 4 – 5 show that identity effects differ between commercial and investment banks and again diminish under

fuller crisis modelling. Tables 6 – 7 then show that observable income structure has a more consistent normal-period relationship with profitability than formal identity.

This progression matters for the economics-of-religion interpretation. If religion operated only through branding, the IB coefficient might remain stable even when implementation proxies were introduced. If it operated only through contractual implementation, the label could be weak while financial structure remained informative. The results are closer to the second pattern, although Farooq and Zaheer's (2015) depositor evidence suggests that branding may still matter for funding stability in other settings. The present profitability data indicate that affiliation is too coarse to recover the mechanism.

6.3.2 Normal periods versus crisis periods.

The positive main coefficients in Tables 6 – 7 should not be relabeled as resilience effects. They describe normal-period or baseline associations. The relevant crisis effect is the main coefficient plus its interaction. Those combined point estimates are generally smaller and, for IBNNIBI–ROAE, approximately zero. Similarly, the year-specific identity estimates in Tables 1 – 5 often move from less adverse or relatively positive positions in 2007 toward weaker positions in 2009 – 2010. The common pattern is not immunity but changing exposure as the nature of the shock changes.

6.3.3 Identity, implementation, and convergence.

The fragile IB coefficients are compatible with operational convergence: many Islamic banks use debt-like sale and lease structures, while conventional banks earn substantial non-interest income. Convergence compresses average differences between labels. At the same time, positive implementation coefficients suggest that variation within and across those labels still matters. The results therefore reject both extremes: neither "Islamic banks are categorically superior" nor "religious constraints have no economic content" is supported.

6.3.4 The most robust findings.

Four conclusions survive the cumulative comparison. *First*, CIR is consistently negative, making operational efficiency the dominant conventional determinant of profitability. *Second*, ETAR is generally supportive of ROAA but weaker or negative for ROAE, reflecting solvency benefits and denominator mechanics. *Third*, Islamic identity is specification-sensitive and does not establish a general crisis premium. *Fourth*, non-interest orientation is positively associated with normal-period profitability, but its crisis payoff is smaller and proxy-dependent. These are the propositions carried into the interpretation and conclusion.

7. Interpretation, Identification, and Limitations

7.1 What do the estimates establish?

The estimates establish conditional associations within the available panel. They show that formal Islamic identity has limited robust explanatory power and that non-interest orientation is positively related to profitability in several system GMM models. They also show that selected crisis interactions are negative. These findings are informative for mechanism-based comparisons of banking models.

The strongest empirical statement is comparative and conditional. In the observed GCC panel, accounting structures with greater non-interest orientation contain profitability information beyond formal religious affiliation. The repeated positive main coefficients across four proxies and two outcomes make this unlikely to be an artefact of one definition. At the same time, variation across interactions and estimators shows that the association cannot be generalized into a universal law of resilience.

The theoretical model helps discipline this interpretation. A tighter effective Shariah constraint can simultaneously remove certain risky transactions, increase governance costs, attract loyal stakeholders, alter risk preferences, and concentrate portfolios in real assets. The reduced-form coefficient is the net result of these channels. Its sign may differ across normal and crisis states without contradicting the theory.

7.2 What do the estimates not establish?

The analysis does not directly measure faith, religious belief, compliance intensity, or Shariah-governance quality. It does not demonstrate that non-interest income is uniquely Islamic, nor that the estimated coefficients are causal effects of religious doctrine. It also does not establish lower insolvency risk: ROAA and ROAE are profitability outcomes, whereas resilience is a broader concept involving capital, liquidity, asset quality, default risk, and recovery.

In particular, the paper does not observe ϕ_{it}, the latent intensity of implementation. Nor does it observe the bank's complete vector of permissible and rejected contracts. The proxies identify accounting orientation, not the counterfactual portfolio the same bank would have selected without religious constraints. Consequently, the estimates cannot separate doctrinal commitment from managerial choice, customer demand, or regulatory treatment.

Profitability resilience is also narrower than institutional resilience. No conclusion is drawn about run risk, liquidity coverage, non-performing financing, insolvency probability, or credit supply. The external studies incorporated in Section 2 show that those outcomes can move differently: deposit loyalty may improve during a panic while liquidity buffers decline, and accounting profitability may differ from market valuation.

7.3 Identification threats

Reverse causality is possible because profitable banks may be better able to expand non-interest activities. Omitted managerial quality, ownership, market power, customer composition, and national regulation may jointly influence income structure and performance. Internal instruments mitigate selected forms of endogeneity only under contestable assumptions. The crisis indicator also coincides with oil-price movements, policy responses, and country-specific developments, limiting a clean interpretation as an exogenous common treatment.

System GMM does not transform the analysis into a natural experiment. Lagged internal instruments are valid only if the required exclusion restrictions hold. Hansen non-rejection is necessary but not sufficient, and several early ROAE specifications perform poorly on the diagnostic tests. Instrument counts increase in richer models, while the number of banks falls sharply in the proxy regressions. The paper therefore emphasizes recurring patterns rather than isolated significant coefficients.

Selection into Islamic status and into detailed reporting remains important. Ownership, political connections, governance quality, market power, clientele composition, and national Shariah regimes may influence both portfolio structure and profitability. Reverse causality is equally plausible: profitable banks may have greater capacity to develop fee-based services or restructure their portfolios. Future work requires regulatory discontinuities, staggered standards, mergers, conversions, or other quasi-experimental variations.

7.4 Measurement and external validity

BankScope classifications and accounting categories may not be fully comparable across Islamic and conventional institutions. The five GCC countries have distinctive financial systems and their dependence on oil and natural-gas revenues, and one GCC member is absent because of data availability. The detailed proxy regressions use much smaller samples than the baseline models. Finally, the sample ends in 2011. The results should therefore be understood as evidence about the global-financial-crisis episode in a specific dual-banking region, not as a general statement about Islamic banking in 2026.

Contract-specific measurement is the central limitation. The absence of a harmonized bank-level GCC panel for murābaḥah, ijārah, mushārakah, muḍārabah and related income prevents direct estimation of the contract-set mechanism. The low practical share of classical PLS finance further reduces usable variation. The non-interest variables address feasibility, not conceptual purity. Differences in BankScope mapping and national accounting practice may introduce non-classical measurement error and attenuate or distort the estimates.

External validity is bounded by place and time. GCC banking systems combine high hydrocarbon exposure, concentrated ownership, relatively young financial markets, and substantial state involvement. The 1997 – 2011 period captures the global financial crisis but not subsequent regulatory reforms, COVID-19, recent monetary tightening, or contemporary growth in Islamic liquidity instruments. The results are historically informative but should not be presented as a current global ranking of banking models.

8. Conclusion and Research Agenda

This paper asks how religion may enter modern economic analysis when faith is not directly observed but religious doctrine is embedded in organizational rules. Islamic banking provides a natural setting because Shariah prescriptions potentially restrict the feasible set of contracts and thereby affect income composition, risk allocation, and responses to shocks.

The evidence rejects a simple identity-based account. Islamic-bank status does not robustly predict superior profitability once bank characteristics, macroeconomic conditions, crisis dynamics, and alternative estimators are considered. Measures of non-interest income orientation are more consistently positively associated with ROAA and ROAE. Yet crisis interactions are mixed and sometimes negative, indicating that the profitability payoff from these structures is conditional on the economic environment. The paper therefore replaces the claim of automatic Islamic-bank resilience with a more precise conclusion: formal religious identity and the observable implementation of

religiously compatible financial structures are empirically distinct, and the consequences of implementation are state-dependent.

This distinction is the paper's principal contribution to the economics of religion. Faith may affect the economy through preferences and identity, but it may also operate through institutionalized rules that alter the set of permissible transactions. The expanded literature confirms that the channels are separable: depositor loyalty can stabilize funding during a panic; governance quality can improve accounting or ESG outcomes; and contractual restrictions can change exposure to financial, pandemic, and oil-price shocks. Studying those mechanisms requires measures of implementation rather than labels alone. The analysis also demonstrates the danger of equating a readily observed accounting category with religion: non-interest income is only a partial proxy and must be interpreted alongside contractual substance and governance.

Future research should develop bank-year measures of actual contract composition, including murabahah, ijārah, mushārakah, muḍārabah, wakālah, and conventional interest-bearing instruments. Linking these measures to Shariah-board characteristics, governance standards, audit findings, and product approvals would allow researchers to distinguish doctrine, governance, and implementation. Regulatory changes or staggered adoption of Shariah standards could provide more credible quasi-experimental variation.

The temporal scope should also be extended to the COVID-19 shock, monetary tightening, oil-price collapses, and episodes of bank distress. Outcomes should include liquidity, non-performing financing, z-scores, market-based systemic risk, credit supply, recovery speed, and real-sector effects, rather than profitability alone. Cross-country work should test whether the institutional channel depends on legal enforcement, centralized Shariah supervision, competition, deposit insurance, and the availability of Shariah-compliant liquidity instruments.

A broader Economics of Religion research program can then separate three channels: religion as a component of preferences and identity; religion as a source of informal norms and perceived accountability; and religion as a formal constraint embedded in institutions and contracts. The present paper addresses the third channel. Its contribution lies not in claiming that religion guarantees stability, but in showing how religious doctrine can be translated into testable organizational choices – and why economic outcomes depend on the substance of that translation.

8.1 Integrated findings.

The paper began with a question central to both banking and the economics of religion: can religious doctrine affect organizational performance when personal faith is unobserved? The feasible-contract-set model provides an affirmative but conditional answer. Doctrine can alter permissible contracts, governance costs, stakeholder benefits, and risk exposure. It does not predetermine the sign of profitability, and the same constraint can have different consequences across states.

The empirical sequence supports that qualified formulation. Tables 1 – 2 show that the Islamic-bank label is positive only in selected parsimonious models and is unstable under crisis interactions, time effects, and outlier treatment. Table 3 shows that later-crisis deterioration appears in within-bank estimates but is sensitive to common annual controls. Tables 4 – 5 reveal commercial–investment-bank heterogeneity without restoring a universal identity effect. Tables 6 – 7 provide the clearest

evidence: four measures of non-interest orientation are positively associated with normal-period ROAA and ROAE, while crisis interactions are smaller, mixed, and sometimes negative.

The central empirical contribution is therefore a difference in explanatory content. Formal affiliation is a weak and fragile predictor; observable implementation is more consistently informative. Yet implementation does not guarantee crisis protection. For RIIGR–ROAA, the significant negative interaction reduces but does not reverse the positive point estimate. For IBNNIBI–ROAE, the interaction almost exactly offsets the normal-period coefficient. These results replace the idea of an unconditional "Islamic resilience premium" with a state-dependent implementation hypothesis.

8.2 Policy implications.

For regulators, the findings argue against supervision based primarily on institutional labels. Prudential assessment should examine actual contract composition, concentration, liquidity transformation, valuation exposure, governance quality, and the economic substance of products. Two banks classified as Islamic may occupy very different effective feasible sets and therefore transmit shocks differently. Comparable contract-level disclosure would improve both supervision and research.

For Islamic banks, the results imply that Shariah credibility and commercial performance should be evaluated jointly but not conflated. Expansion of non-interest and fee-based activities can support profitability, yet excessive dependence on particular revenue sources may create cyclicality or concentration. Governance should test whether product innovation genuinely diversifies risk or merely reproduces conventional debt cash flows with additional complexity and cost.

The small role of muḍārabah and mushārakah is both a measurement problem and an institutional finding. Simply instructing banks to expand PLS finance would ignore the information, monitoring, legal-enforcement, valuation, and capital constraints that have produced the current portfolio structure. Policy should instead improve financial reporting, creditor and investor protection, entrepreneurial accounting, dispute resolution, risk-sharing standards, and suitable long-term funding. These complementary institutions determine whether participatory contracts become economically feasible at scale.

For the economics of religion, the lesson is broader. Religious institutions should be studied at multiple levels: identity, governance, rules, implementation, and outcomes. A binary affiliation variable may fail even where religion matters because the operative constraint varies in intensity or is offset by other incentives. Measurement should follow the mechanism, not merely the label.

8.3 Future research agenda.

The first priority is a bank-year contract database linking stocks, flows, income, impairment, maturity, collateral, sector, and counterparty for murābaḥah, commodity murābaḥah, ijārah, mushārakah, diminishing mushārakah, muḍārabah, wakālah, salam, istiṣnāʿ, sukuk, and conventional exposures. Mapping national accounting categories into a common taxonomy would permit direct tests of how contract characteristics affect profitability, liquidity, default, and recovery.

Second, future studies should measure governance as an input into implementation. Shariah-board expertise, independence, cross-membership, meeting frequency, internal audit, product approval, non-compliance events, purification payments, and centralized supervision can be connected to

changes in contract composition. This would allow the empirical analogue of ϕ_{it} to be estimated rather than inferred only from income categories.

Third, identification should exploit institutional changes. The adoption of national Shariah standards, centralized boards, accounting reforms, tax neutrality, deposit-insurance changes, and Shariah-compliant lender-of-last-resort facilities may generate staggered variation. Bank conversions, Islamic-window openings, product approvals, and regulatory thresholds can provide within-institution comparisons. Such designs would more credibly distinguish religion-induced constraints from selection into Islamic banking.

Fourth, resilience should be treated as multidimensional and dynamic. Research should combine profitability with deposit flows, credit supply, liquidity buffers, non-performing financing, z-scores, market-based systemic risk, and recovery speed. The contrast between the 2007 – 2008 financial phase, the 2009 – 2010 real-sector phase, COVID-19, oil-price uncertainty, and monetary tightening can reveal which contractual features protect against which shocks.

Finally, the Economics of religion program should connect organizational constraints to individual behavior. Depositor religiosity, trust, perceived accountability, employee incentives, and managerial commitment may influence both demand for Shariah-compliant products and the credibility of implementation. Integrating these preference and norm channels with the institutional contract-set channel would offer a fuller economic model of faith without abandoning optimisation, incentives, or empirical discipline.

The enduring conclusion is therefore neither celebratory nor dismissive. Religion can matter economically when it is translated into credible organizational rules, but labels do not reveal how completely that translation occurs. The GCC evidence shows that financial structure matters more consistently than formal identity and that its profitability consequences change under stress. This is precisely why religion belongs within modern economics: not as an assumed guarantee of virtue or efficiency, but as a potentially consequential source of preferences, constraints, institutions, and testable behavior.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this manuscript, the author used ChatGPT, for language refinement and editing, and assistance in improving literature review and refining empirical analysis. After using this tool, the author carefully reviewed and edited the text and takes full responsibility for the final content of the manuscript.

References

Abedifar, P., Ebrahim, M. S., Molyneux, P., & Tarazi, A. (2015). Islamic banking and finance: Recent empirical literature and directions for future research. Journal of Economic Surveys, 29(4), 637–670.

Alsharif, M. (2025). Navigating global crises: Assessing the resilience of the largest dual banking sector using parametric and non-parametric approaches. Humanities and Social Sciences Communications, 12, 1744. https://doi.org/10.1057/s41599-025-06040-y.

Azad, A. S. M. S., Azmat, S., & Hayat, A. (2023). What determines the profitability of Islamic banks: Lending or fee? International Review of Economics & Finance, 86, 882–896. https://doi.org/10.1016/j.iref.2019.05.015.

Beck, T., Demirgüç-Kunt, A., & Merrouche, O. (2013). Islamic vs. conventional banking: Business model, efficiency and stability. Journal of Banking & Finance, 37(2), 433–447.

Boudawara, Y., Toumi, K., Wannes, A., & Hussainey, K. (2023). Shari'ah governance quality and environmental, social and governance performance in Islamic banks: A cross-country evidence. Journal of Applied Accounting Research. Advance online publication. https://doi.org/10.1108/JAAR-08-2022-0208.

Bourkhis, K., & Nabi, M. S. (2013). Islamic and conventional banks' soundness during the 2007–2008 financial crisis. Review of Financial Economics, 22(2), 68–77.

Čihák, M., & Hesse, H. (2010). Islamic banks and financial stability: An empirical analysis. Journal of Financial Services Research, 38(2–3), 95–113.

Demirgüç-Kunt, A., Martinez Peria, M. S., & Tressel, T. (2015). The impact of the global financial crisis on firms' capital structure. Journal of Banking & Finance, 50, 213–227.

Errico, Luca & Farahbaksh, Mitra, 1998. "Islamic Banking: Issues in Prudential Regulations and Supervision," IMF Working Papers 1998/030, International Monetary Fund.

Farooq, M., & Zaheer, S. (2015). Are Islamic banks more resilient during financial panics? IMF Working Paper No. 15/41. International Monetary Fund.

Fatmawati, D., Ariffin, N.M., Abidin, N.H.Z. and Osman, A.Z. (2022), "Shariah governance in Islamic banks: Practices, practitioners and praxis", Global Finance Journal, Vol. 51 No. 100555, available at: https://doi.org/10.1016/j.gfj.2020.100555.

Gazi, M. A. I., Hossain, M. S., & Rahman, M. M. (2024). Determinants of profitability of Shariah-based banks: Evidence from Bangladesh. Economies, 12(1), 15.

Grassa, R., Matoussi, H., & Trabelsi, S. (2022). Islamic banks between two crises: The impact of the COVID-19 pandemic. Journal of Risk and Financial Management, 15(2), 76.

Hassan, M. K., & Dridi, J. (2010). The effects of the global crisis on Islamic and conventional banks: A comparative study. IMF Working Paper 10/201.

Mirzaei, A., Saad, M., & Deesomsak, R. (2022). Bank stock performance during the COVID-19 crisis. International Review of Financial Analysis, 80, 101988.

Nawaz, T., Haniffa, R., & Hudaib, M. (2021). On intellectual capital efficiency and Shariah governance in Islamic banking business model. International Journal of Finance & Economics, 26(3), 3770–3787. https://doi.org/10.1002/ijfe.1986.

Rizwan, M. S., Ahmad, G., & Ashraf, D. (2022). Systemic risk, Islamic banks, and the COVID-19 pandemic. Pacific-Basin Finance Journal, 72, 101724.

Sobol I, Dopierała Ł, Wysiński P (2023) Is the profitability of Islamic and conventional banks driven by the same factors? – A study of banking in the Middle East. PLoS ONE 18(8): e0289264. https://doi.org/10.1371/journal.pone.0289264.

Solé, Juan (2007). Introducing Islamic Banks into Conventional Banking Systems. IMF Working Papers, WP/07/175.

Islamic Financial Services Board (IFSB). (2025). Islamic Financial Services Industry Stability Report 2025. Kuala Lumpur: IFSB.

Barro, R. J., and McCleary, R. M. (2003). Religion and economic growth across countries. American Sociological Review, 68(5), 760–781.

Benjamin, D. J., Choi, J. J., and Fisher, G. (2016). Religious identity and economic behavior. Review of Economics and Statistics, 98(4), 617–637.

Iannaccone, L. R. (1998). Introduction to the economics of religion. Journal of Economic Literature, 36(3), 1465–1495.

Tanin, T. I., Shaiban, M. S. M., Hasanov, A. S., & Brooks, R. (2025). Resilience and performance of Islamic and conventional banks amid oil price uncertainty. Energy Economics, 148, 108637. https://doi.org/10.1016/j.eneco.2025.108637.

Miah, M. D., & Suzuki, Y. (2020). Murabaha syndrome of Islamic banks: A paradox or product of the system? Journal of Islamic Accounting and Business Research, 11(7), 1363–1378. https://doi.org/10.1108/JIABR-05-2018-0067.

Al-Muharrami, S., & Hardy, D. C. (2013). Cooperative and Islamic banks: What can they learn from each other? IMF Working Paper No. 13/184. International Monetary Fund.

Roodman, D. (2009). A note on the theme of too many instruments. Oxford Bulletin of Economics and Statistics, 71(1), 135–158.