Journal of Islamic Monetary Economics and Finance, Vol. 12, No. 2 (2026), pp. 229 - 262
p-ISSN: 2460-6146, e-ISSN: 2460-6618

CLIMATE CHANGE ADAPTATION: DOES ISLAMIC BANKING PLAY A ROLE?

Nazrul Hazizi Noordin[1,2*] and Faaza Fakhrunnas[3]

[1] IIUM Institute of Islamic Banking and Finance, International Islamic University Malaysia, Malaysia;
[2] Oxford Centre for Islamic Studies, United Kingdom;
[3] Department of Economics, Universitas Islam Indonesia, Indonesia

ABSTRACT

This study examines the role of Islamic banking in advancing climate change adaptation. Applying fixed effects and System Generalized Method of Moments estimators to panel data from 29 dual banking countries from 1995 to 2021, we find that a one-standard-deviation increase in the share of Islamic banking assets is associated with a 1.773-point improvement in the climate adaptability index. When climate adaptation is decomposed into its two constituent dimensions, climate vulnerability and climate readiness, we find that Islamic banks contribute significantly to enhancing climate readiness, while their impact on reducing vulnerability is less pronounced. The contribution is particularly salient in countries where Islamic banking is systemically important, underscoring the significance of market penetration and institutional embeddedness. Additionally, Islamic banks are shown to have maintained a consistent, positive contribution to climate adaptation both before and after the adoption of the Paris Agreement in 2015. These findings underscore the normative alignment between the ethical foundations of Islamic finance and the environmental commitment of global communities. This study offers important policy implications, including the need for stronger regulatory support, deeper integration of Islamic finance within national climate strategies, and strengthened climate governance within Islamic banks. It also adds to the literature by providing new empirical evidence on the distinctive and evolving role of Islamic banking in supporting macro-level climate resilience.

Keywords: Islamic banking, Sustainable banking, Climate change, Climate risk, Climate adaptation.
JEL classification: G21; O16; Q54; Q56.

Article history:
Received : July 12, 2025
Revised : October 31, 2025
Accepted : May 22, 2026
Available online : June 30, 2026

https://doi.org/10.21098/jimf.v12i2.3322

* **CONTACT** Nazrul Hazizi Noordin: hazizi@iium.edu.my; IIUM Institute of Islamic Banking and Finance, International Islamic University Malaysia, P.O. Box 10, 50728 Kuala Lumpur, Malaysia

I. INTRODUCTION

Climate change is regarded as the most pressing threat facing humanity in the 21st century. The Intergovernmental Panel on Climate Change (IPCC), in its Sixth Assessment Report, warns that under current emission trajectories and without significant policy shifts, the world is on a path to exceed the 1.5°C threshold within the next five years, potentially reaching 2.1 to 3.5°C above pre-industrial levels by the end of the century (IPCC, 2023). The consequences of the increased frequency and intensity of extreme weather events due to this unprecedented rise in temperature are far-reaching, profoundly affecting economies and people's well-being. Recent estimates indicate that every 1°C increase in global temperature can be linked to a 12% decline in global GDP (Bilal & Känzig, 2024). Furthermore, the World Meteorological Organization (2023) highlights that weather-related disasters have caused approximately USD 4.3 trillion in economic losses over the past five decades, a substantial increase from USD 184 billion in the 1970s.

Such an alarming trajectory underscores the critical urgency of addressing these environmental challenges through effective climate adaptation strategies. While mitigation efforts aim to address the root causes of climate change by reducing greenhouse gas emissions, adaptation focuses on the process of adjusting to actual or expected climate and responding to its effects, with the aim of moderating harm or exploiting beneficial opportunities (World Bank, 2021). This involves governments and policymakers implementing measures to reduce vulnerabilities and enhance the resilience of societies to withstand and recover from the inevitable, ever-intensifying impacts of climate change.

Adapting to climate change, however, requires immense financial investments, and current funding falls significantly short of global needs. The United Nations Environment Programme (UNEP) projects that annual adaptation costs in developing countries could reach USD 300 billion by 2030 and USD 500 billion by 2050 (UNEP, 2021). Although international public finance flows to developing countries increased from USD 22 billion in 2021 to USD 28 billion in 2022, this rise addresses only a small portion of the adaptation finance gap, estimated at USD 187–359 billion per year, reducing it by approximately 5% (UNEP, 2024).

As the backbone of credit markets, banks serve as critical actors in bridging this adaptation financing gap. Their involvement ranges from reallocating credit away from polluting firms to green firms (Reghezza et al., 2022) to providing capital for the construction of climate-resilient infrastructure (Kennedy & Corfee-Morlot, 2012; White & Wahba, 2019). By offering preferential loan terms, along with green advisory services and technical assistance, banks can incentivize businesses and the private sector to invest in climate-resilient technologies and ventures. For example, loans linked to sustainability metrics can encourage companies to implement adaptive measures, such as adopting energy-efficient manufacturing processes or the use of climate-proof materials in construction (Auzepy et al., 2023). Additionally, banks may underwrite and facilitate the issuance of innovative financial instruments tailored to climate adaptation, including green bonds and catastrophe bonds (Bedendo et al., 2023).

However, the ability of banking systems to fulfill this role has recently been subject to scrutiny. Critics argue that traditional commercial banks often prioritize short-term profitability and shareholder returns, which may lead them to shy away

from financing green projects typically perceived as high-risk investments with longer maturity, thereby exacerbating the financing gap for climate adaptation (e.g., Furrer et al., 2012; Caby et al., 2022; Lee et al., 2024). Compounding this is banks' procyclical lending behavior (Abdelsalam et al., 2023). Traditional banks tend to tighten credit for adaptation projects precisely when it is most needed, particularly during and following climate crises, hindering efforts to help communities and businesses from recovering and building their resilience. Additionally, the issue of greenwashing poses another significant challenge, as some banks may overstate their commitment to climate actions without delivering meaningful and tangible support for adaptation (Caby et al., 2020; Galletta et al., 2024).

Islamic banking emerges as a compelling alternative, offering principle-based solutions to the shortcomings of conventional interest-based banking. In theory, rooted in the foundational framework of Islamic economics, Islamic banks are intrinsically motivated by the pursuit of justice, social welfare, and human well-being (Asutay, 2013). The objectives of Islamic teachings, which mandate the preservation of faith, life, intellect, offspring, and wealth, underpin Islamic banks' commitment to promoting environmental wellness and stewardship. Consequently, Islamic banks are expected to integrate environmental considerations into their operational and financial decision-making processes, thereby reinforcing their responsibility to contribute to global efforts in mitigating climate change (Tabet & Khan, 2024). The evolving nexus between Islamic banking and climate change represents a critical area of inquiry, particularly in understanding the extent to which Islamic banks translate their normative commitments into tangible environmental outcomes.

Against this backdrop, the present study seeks to examine the contribution of Islamic banks to fostering climate change adaptability. Our results show that the presence of Islamic banks significantly enhances a country's climate change adaptation, as measured by the Notre Dame Global Adaptation Initiative's (ND-GAIN). More specifically, a higher share of Islamic banking assets is positively associated with improved climate adaptability, particularly through increased climate readiness rather than reduced vulnerability. The effect is especially pronounced in countries where Islamic banks play a systemic role and it turns more significant in the post-Paris Agreement era, reflecting greater alignment with global sustainability commitments. These findings highlight the potential of Islamic banking to support national climate adaptation efforts, especially when integrated into broader financial systems and regulatory frameworks.

The study contributes to advancing the empirical literature on the nexus between Islamic banking and environmental well-being by redirecting the analytical focus from performance-related impacts of sustainability practices on Islamic banks, extensively explored in existing studies (e.g., Alam et al., 2022; Sendi et al., 2024; Alghafes et al., 2024; Fakhrunnas et al., 2025), to the role of Islamic banks in fostering climate change adaptability at the national level. This study also broadens the discourse on the macroeconomic developmental role of Islamic banking by introducing climate change adaptation as a novel dimension of its contribution. Existing literature on the developmental impact of Islamic banking has predominantly focused on traditional macroeconomic indicators such as GDP growth and human development. For instance, Kassim (2016) and Junaidi (2024)

examine the contribution of Islamic banking to economic growth, while M. Anwar et al. (2020) explore its role in poverty alleviation, and Avdukic & Asutay (2025) assess its impact on broader economic and human development outcomes.

Moreover, this paper extends the body of work by situating Islamic banking within the climate resilience agenda, thereby offering a more holistic perspective on its potential to support sustainable and inclusive national development. While previous works, such as that by Iskandar et al. (2020), have examined the relationship between Islamic finance and environmental indicators like carbon emissions (i.e., climate mitigation), they fall short in capturing Islamic banks' contributions to climate resilience. In contrast, the present study focuses on climate adaptation, assessing the extent to which Islamic banking enhances a country's institutional readiness and capacity to manage climate-related risks, an area that remains underexplored within the Islamic finance literature.

The remainder of this paper is structured as follows. Section 2 provides a review of the relevant literature. Section 3 outlines the methodology employed in the empirical analysis. Section 4 presents and discusses the main findings. Lastly, Section 5 concludes the study and offers policy recommendations.

II. LITERATURE REVIEW

2.1. Theoretical Foundation

Does a higher presence of Islamic banks contribute to advancing climate change adaptation? From a theoretical standpoint, the proponents of Islamic finance argue that it does, asserting that Islamic banks are better positioned to support climate adaptation efforts due to their several specificities. First, the role of Islamic banks in climate adaptation itself aligns unequivocally with *Maqasid al-Shariah* or the objectives of Islamic law, which aim to promote human well-being by safeguarding essential aspects of life, including the environment (Laldin & Furqani, 2013; Zulfiqar et al., 2024; Güney, 2024). This ethical framework encourages Islamic banks to go beyond profit maximization to focus on long-term environmental benefits, prioritizing financing projects that address climate adaptation needs.

Second, another key distinction between Islamic and conventional banks lies in the presence of the Shariah Advisory Council (SAC). The SAC serves as an additional layer of governance that oversees and advises on *Shariah* compliance, ensuring that the bank's operations and products not only meet religious requirements but also reflect environmental stewardship embedded in Islamic teachings (Haridan et al., 2018; Muhmad et al., 2021).

Third, Islamic banking upholds the principle of profit-and-loss sharing (PLS). Climate adaptation projects often involve significant uncertainties, such as unpredictable weather patterns or evolving climate behavior. Unlike conventional loans, which transfer all risks to the borrower through fixed interest payments, the PLS approach (i.e., using *mudarabah* and *musharakah* contracts) ensures that the financier bears a portion of the risk (Mirakhor et al., 2015; Noordin et al., 2022; Ben Amar & El Alaoui, 2023). This equitable distribution of risk could encourage greater partnerships and collaborations with stakeholders, including governments and private sector actors, in long-term, sustainable infrastructure projects, such as flood barriers and resilient agriculture (Liu & Faure, 2018). With risk-sharing,

financing is tied to project outcomes, ensuring that repayments are proportional to the project's success. This flexibility reduces the debt stress of governments and communities adapting to climate change (Gardiner et al., 2015; Pickering et al., 2015).

Furthermore, the shared responsibility incentivizes banks to carefully plan, monitor, and manage resources to ensure the success and sustainability of the climate adaptation project, rather than focusing primarily on recovering their principal, as is often the case in conventional lending. Risk-sharing mechanisms also encourage innovation, as they provide flexible financing options for novel, high-impact climate adaptation technologies that may otherwise be deemed too risky by conventional lenders (Deng et al., 2024).

Nevertheless, others may argue that the perceived advantages of Islamic banking in promoting climate change adaptation remain largely theoretical and underdeveloped in practice. First, despite the ethical and value-based underpinnings of Islamic finance, critics assert that the industry has yet to fully integrate environmental considerations into its core operations (Kunhibava et al., 2018; Irfany et al., 2024). Many Islamic banks operate in a manner similar to their conventional counterparts, prioritizing short-term financial returns and risk transfer, rather than equitably financing green or adaptation-oriented projects. The alignment with Maqasid al-Shariah, while conceptually strong, is not always translated into actionable policies or frameworks that prioritize environmental well-being over profits at the institutional level (Julia & Kassim, 2020; Khan et al., 2024).

Second, although the presence of SACs introduces an added layer of governance, these bodies often focus primarily on ensuring contractual and procedural Shariah compliance rather than influencing the corporate decisions to design policies promoting sustainability or climate-related goals (Noordin & Kassim, 2019; Jaafar & Brightman, 2022). In many jurisdictions, environmental impacts are not systematically embedded in the criteria used by SACs to assess the permissibility of financial products. This results in a narrow interpretation of Shariah compliance that may overlook the broader environmental and social dimensions of Islamic teachings.

Third, while the principle of PLS is often cited as a tool for equitable risk distribution in uncertain climate adaptation investments, its practical application remains limited. In reality, the Islamic banking industry has shown a strong preference for debt-like instruments such as *murabahah* and *ijarah*, which resemble conventional fixed-income structures and involve minimal risk-sharing (Kayed, 2012; Ajmi et al., 2019). This is largely due to regulatory constraints, risk management challenges, and the relatively higher complexity of structuring and monitoring PLS contracts (Abdul-Rahman et al., 2014). As a result, the potential of Islamic finance to support climate-resilient infrastructure through innovative PLS models is far from being fully realized.

In addition, structural limitations, such as the relatively smaller asset base and market share, and the lower efficiency level of the majority of Islamic banks (Abdul-Majid et al., 2010; Beck et al., 2013), may restrict their ability to finance large-scale adaptation projects that require substantial capital and long-term commitments. These constraints limit their capacity to achieve scale, diversify risk, and engage

in strategic partnerships necessary for impactful climate financing, particularly in developing countries that are most vulnerable to climate change.

2.2. Previous Studies and Hypothesis Development

Empirically, little is known regarding the contribution of banks to climate adaptation. Among the few studies, Ul-Haq et al. (2024) reveal that financial and economic development play a significant role in shaping a country's capacity for environmental adaptation. Specifically, countries characterized by a high level of product diversification and a commitment to ecological preservation tend to demonstrate stronger climate adaptability. This suggests that financial sectors, including banking institutions oriented toward environmental sustainability, can positively influence adaptive capacity.

In the context of Islamic finance, Iskandar et al. (2020) examine the relationship between Islamic financial development and carbon dioxide emissions in Indonesia, concluding that such development correlates with increased emissions. While their study adopts a narrow proxy for environmental performance and does not directly measure climate adaptation, the findings underscore the need for stronger environmental commitments within Islamic financial practices. This appears misaligned with the moral expectations highlighted by Laldin & Furqani (2013), Zulfiqar et al. (2024), and Güney (2024), who emphasize the prescribed role of Islamic finance in preserving the environment as well as addressing climate change risks.

In contrast to conventional banks, Islamic banks are often driven by intrinsic motivations rooted in Shariah principles, which promote ethical conduct and sustainability. Issa et al. (2025) argue that Islamic banks' adoption of environmentally responsible operations is internally motivated, rather than imposed by external pressures like in the case of conventional banks. Similarly, Aracil (2019), in his analysis of the Turkish banking sector, finds that Islamic banks engage in sustainability practices due to value-based commitments rather than regulatory compliance. These findings suggest that Islamic banks, governed by non-formal institutions such as ethical and religious norms, may be more inclined to contribute to climate adaptation at the national level. Moreover, empirical studies by Alam et al. (2022), Alghafes et al. (2024), and Fakhrunnas et al. (2025) reinforce the view that environmentally responsible practices can enhance Islamic banks' financial performance, thereby aligning sustainability with profitability.

Beyond environmental considerations, the literature also highlights the developmental contributions of Islamic banks. Avdukic & Asutay (2025) demonstrate the sector's role in reducing inequality and promoting human development, consistent with the Islamic finance mandate to uphold social justice and public welfare. Likewise, M. Anwar et al. (2020) identify Islamic banks as effective instruments for poverty alleviation, while Kassim (2016) and Junaidi (2024) find evidence of Islamic banking's positive impact on real economic growth. These studies collectively suggest a meaningful alignment between the theoretical underpinnings and practical outcomes of Islamic banking, underscoring its potential to support both economic development and environmental sustainability including, as this study posits, climate change adaptation.

H_1 : A higher presence of Islamic banks positively contributes to enhancing a country's climate change adaptation.

III. DATA AND METHODOLOGY

3.1. Sample

This study focuses on countries with dual banking systems, where Islamic banks operate alongside conventional counterparts. In total, our sample includes 29 dual banking economies with annual observations that span from 1995 to 2021. These countries represent a diverse range of income levels and institutional contexts in which Islamic banks maintain a non-trivial presence, thus providing a suitable empirical setting to explore the potential role of Islamic banking as a policy instrument in supporting national climate adaptation efforts. Note that the sample size in the regressions may be smaller and could vary across different specifications due to data availability constraints. The list of sample countries is provided in Appendix A.

3.2. Variables

The dependent variable used in the analysis is the Notre Dame Global Adaptation Initiative's (ND-GAIN) Country Index, developed by the University of Notre Dame (2024). The index aims to enhance understanding of global climate adaptation by providing an annual assessment of each country's vulnerability to climate disruptions and its readiness to leverage resources for adaptation. Covering 182 countries, the index offers historical insights from 1995 to the present (i.e., 2021 at the time of writing this paper), enabling a wide range of users, including governments, corporations, development organizations, and NGOs to track changes in countries' levels of adaptation to climate change over time in order to inform their policy decisions, investment strategies, and operational planning. The ND-GAIN Index has garnered substantial interest in recent economic literature exploring the intersection of finance and climate risk (e.g., Cevik & Jalles, 2022; Lee et al., 2022; Gong et al., 2023; Wu et al., 2024).

The ND-GAIN Index is composed of two primary components: (i) climate vulnerability and (ii) climate readiness. Climate vulnerability measures the degree to which a country's six life-supporting sectors, namely, food, water, health, ecosystem services, human habitat, and infrastructure, are exposed to climate-related risks and their ability to cope with these risks. This vulnerability component is further divided into three subcomponents: exposure, sensitivity, and adaptive capacity. Exposure assesses the extent to which a country's sectors are stressed by the changing climate conditions, sensitivity evaluates how susceptible these sectors are to the impacts of such changes, and adaptive capacity measures the country's ability to cope and respond to these impacts.

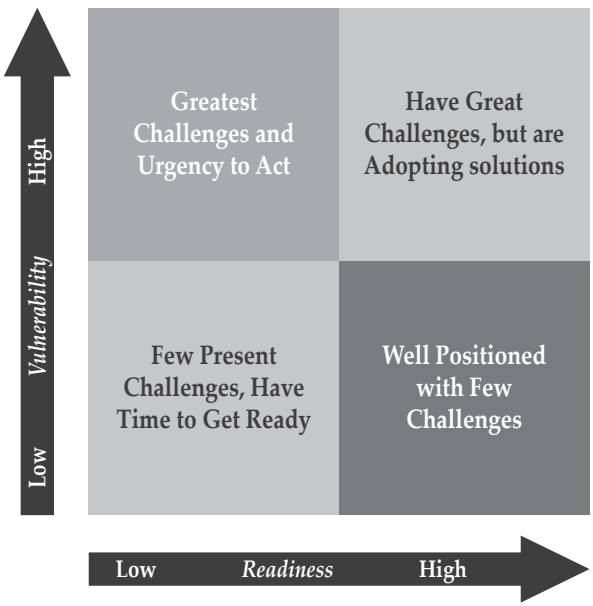
On the other hand, climate readiness indicates a country's ability to attract and deploy investments aimed at reducing vulnerability and enhancing adaptive capabilities. This component encompasses: (i) economic readiness, which examines how conducive the investment environment is for mobilizing capitals from private sector; (ii) governance readiness, which assesses how political landscape

and institutional arrangements lead to investment risks; and (iii) social readiness, which considers factors like social inequality and access to infrastructure, which are crucial for the effectiveness of adaptation efforts.

The ND-GAIN Index uses 45 indicators derived from 74 data sources to compute a country's both vulnerability and readiness scores, which value between 0 and 1. A higher vulnerability score means greater (worse) vulnerability, while a higher readiness score signifies greater (better) preparedness. Using these scores, the ND-GAIN Index values ranging from 0 to 100 using the following Eq. (1):

$$ND - GAIN = (Climate\ Readiness - Climate\ Vulnerability + 1) * 50 \quad (1)$$

The ND-GAIN Index score can be interpreted using the matrix presented in Figure 1. Meanwhile, Figure 2 illustrates variations in climate vulnerability and readiness across countries with varying levels of Islamic banking asset share.



Source: The University of Notre Dame, 2024

Figure 1.
The ND-GAIN Matrix

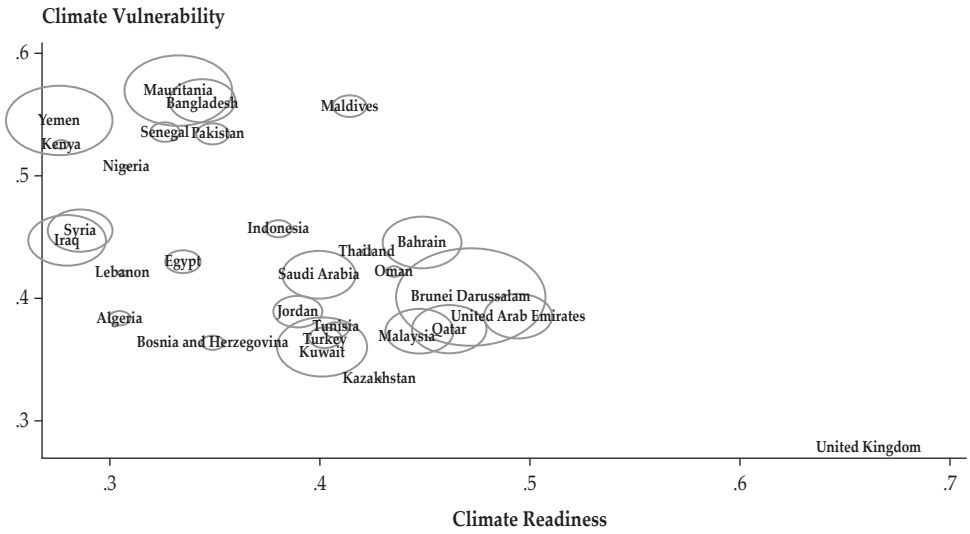


Figure 2.
Climate Vulnerability and Readiness Levels by Asset Share of Islamic Banks

There are two independent variables of interest in this study. The first is the share of assets held by Islamic banks relative to total bank assets in each country. The second is the share of assets held by conventional banks offering Islamic banking products and services through a window relative to total bank assets in each country. These Islamic banking development data are taken from the database constructed by Noordin et al. (2022). The file contains a dummy variable that indicates the presence of Islamic banks that were active at least one year between 1995 and 2018 in 29 dual banking countries. It also contains a dummy variable that indicates the presence of conventional banks that operate an Islamic window during the same period. For the purpose of conducting analysis in this study, we then added three years of more recent data, covering 2019 to 2021. The procedure for updating the Islamic banking database by Noordin et al. (2022) is detailed in Appendix B. Figure 3 depicts the trend in the growth in Islamic banking asset shares alongside climate adaptation scores from 1995 to 2021.

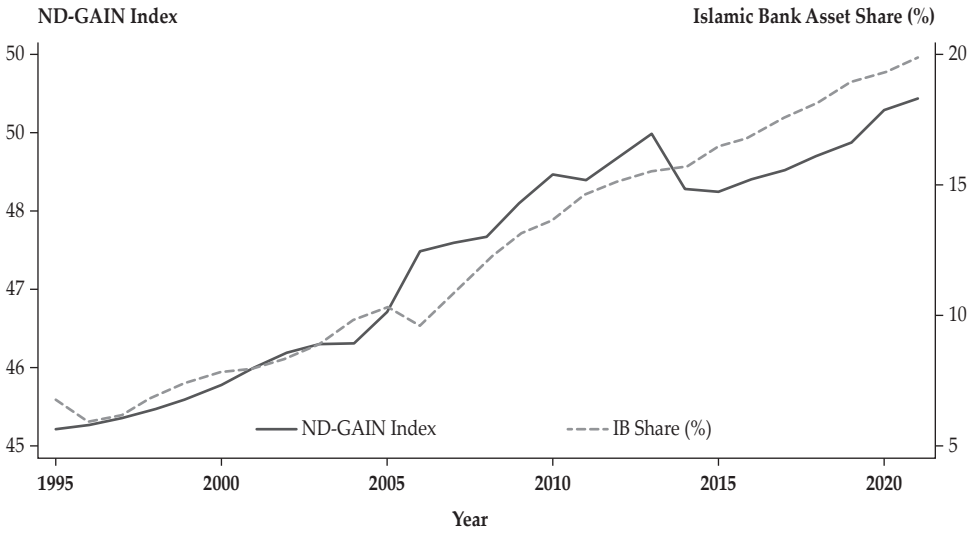


Figure 3.
Climate Adaptation and Asset Shares of Islamic Banks, 1995-2021

We control for a set of macroeconomic factors shown by previous studies to have influence over a country's level of climate adaptation (Abdelzaher et al., 2020; Halkos et al., 2020; Wouterse et al., 2022; Trentinaglia et al., 2023). They consist of GDP per capita, foreign direct investment (FDI), population density, the outputs of agricultural and manufacturing sectors, and government's expenditure on education. In addition, several governance indicators are included as control variables, including regulatory competence, political stability, and perceptions of the quality of public services.

The definitions and sources of all variables used in the analysis are provided in Table 1.

Table 1.
Variable Definitions

Variable	Acronym	Description	Source
		Dependent Variables	
ND-GAIN Country Index	NDG	A country's vulnerability to climate change and other global challenges, along with its capacity to enhance resilience measured by the ND–GAIN index.	Notre Dame Global Adaptation Initiative (ND-GAIN) of University of Notre Dame (https://gain.nd.edu/our-work/country-index/)
Climate Vulnerability Index	CV	A country's vulnerability to climate change determined by assessing its exposure to climate hazards, its sensitivity to these impacts, and its capacity to adapt or respond to these challenges.	Notre Dame Global Adaptation Initiative (ND-GAIN) of University of Notre Dame (https://gain.nd.edu/our-work/country-index/)

Table 1.
Variable Definitions (Continued)

Variable	Acronym	Description	Source
Climate Readiness Index	CR	A country's ability to leverage investments for climate adaptation by evaluating its economic environment, governance capacity and stability, and social conditions.	Notre Dame Global Adaptation Initiative (ND-GAIN) of University of Notre Dame (https://gain.nd.edu/our-work/country-index/)
		Independent Variables	
Islamic Bank Asset Share	IBS	The ratios of the assets of all Islamic banks to total bank assets in the country.	Noordin et al. (2022)
Islamic Window Asset Share	IWS	The ratios of the assets of all conventional banks that operate Islamic banking windows to total bank assets in the country.	Noordin et al. (2022)
		Macroeconomic Control Variables	
GDP per capita	GDP	Natural logarithm of GDP per capita (current US$).	World Bank's World Development Indicators
FDI % of GDP	FDI	The net inflows of foreign direct investment as percentage of GDP.	World Bank's World Development Indicators
Population Density	DEN	A country's midyear population divided by land area in square kilometers.	World Bank's World Development Indicators
Agriculture % of GDP	AGRI	The net output of a country's agriculture sector as percentage of GDP.	World Bank's World Development Indicators
Manufacturing % of GDP	MAN	The net output of a country's manufacturing sector as percentage of GDP.	World Bank's World Development Indicators
Education % of GDP	EDU	Government expenditure on education as percentage of GDP.	World Bank's World Development Indicators
		Governance Control Variables	
Regulatory Quality	REG	Perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Estimates range from approximately −2.5 (weak) to 2.5 (strong).	World Bank's Worldwide Governance Indicators
Political Stability	POL	Measures perceptions of the likelihood of political instability and/or politically motivated violence. Estimates range from approximately −2.5 (weak) to 2.5 (strong).	World Bank's Worldwide Governance Indicators

Table 1.
Variable Definitions (Continued)

Variable	Acronym	Description	Source
Government Effectiveness	GOVT	Reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Estimates range from approximately –2.5 (weak) to 2.5 (strong).	World Bank's Worldwide Governance Indicators

3.3. Estimation Methods

We first run a Fixed Effects (FE) estimation to examine the nexus between the development of the Islamic banking industry and a country's level of adaptation to climate change. FE estimation focuses on differences within countries, isolating the influence of Islamic banking development from unobserved heterogeneity that does not change over time within each country, such as geographic location, legal system, and cultural norms, all of which affect climate adaptation. Our baseline regression model can then be specified in the following form:

$$NDG_{i,t} = \beta_0 + \beta_1 IBS_{i,t-1} + \beta_2 IWS_{i,t-1} + \beta_3 x_{i,t-1} + \beta_4 z_{i,t-1} + \mu_i + \varepsilon_{i,t} \quad (2)$$

where *i* and *t* refer to country and year, respectively. *NDG* refers to the ND-GAIN Index values. *IBS* and *IWS* denote the shares of bank assets held by Islamic banks and conventional banks operating an Islamic window, respectively. The (omitted) benchmark category is the share of bank assets held by conventional banks that do not offer Islamic products and services. x and z are the vectors of macroeconomic and governance controls, respectively. μ is the country-specific effect. ε is the error term. To deepen our understanding of Islamic banking's role in climate change adaptation, we extend the analysis by disentangling its impact on the two distinct components of the ND-GAIN Index: climate vulnerability and climate readiness. Separate regressions were run with each component as the dependent variable, incorporating the same explanatory variables as in the main model (Eq. 2).

Next, we check whether our results hold when accounting for possible persistence in the climate adaptation index. A country's climate adaptation efforts are typically cumulative and evolve gradually over time. For example, investments in green infrastructure, technology, and policy reforms tend to have long-lasting effects, which means that past levels of adaptation could contribute to future adaptation capacity. To do so, we incorporate a dynamic framework into our model by including lagged values of the index as an explanatory variable. However, since these values are, by construction, correlated with the country-specific time-invariant effect, applying a traditional within-group FE estimator to

the dynamic panel would yield a downward-biased OLS coefficient for the lagged dependent variable (Nickell, 1981). We rely on a two-step System Generalized Method of Moments (2-step GMM) panel estimator developed by Blundell & Bond (1998) with a finite sample correction procedure of Windmeijer (2005) to tackle this issue. The system GMM estimator simultaneously uses lagged levels of the series as instruments in equations in first differences, and lagged differences of the series as instruments for equations in levels, increasing both its consistency and efficiency compared to the first-difference estimator. Two tests are performed to confirm the appropriateness of our dynamic GMM estimations. We perform two tests to assess the validity of our dynamic GMM estimations. The first is the Arellano-Bond AR(1) and AR(2) tests, which examine first- and second-order autocorrelation in the first-differenced residuals. The second is the Hansen test for overidentifying restrictions.

Lastly, we perform two additional analyses. First, we divide the sample into countries where Islamic banking is systemically important and those where it is not, using the definition provided by the Islamic Financial Services Board (IFSB) (2023), and rerun the regressions. Systemically important countries are countries with Islamic banking assets averaged 15% or more of the domestic banking sector's total assets over the sample period, signifying a pivotal role for Islamic banks within their financial systems. Second, we delve into the temporal dynamics of the relationship by conducting a subsample analysis that splits the dataset into two critical periods: pre-Paris Agreement (1995–2015) and post-Paris Agreement (2016–2021).

IV. RESULTS

4.1. Summary Statistics

Table 2 presents the summary statistics for all variables used in the analysis. The ND-GAIN Index, which captures overall climate adaptation performance, has a mean value of 47.4 and ranges from 34.7 to 71.8, indicating a substantial gap across countries. When disaggregated into its components, the mean climate vulnerability score is 0.436, while the average climate readiness score is lower at 0.384, suggesting that, on average, countries tend to be more vulnerable than prepared.

The presence of Islamic banking also varies considerably across countries and over time. The share of banking sector assets held by fully-fledged Islamic banks (IBS) averages 12.4 percentage points, ranging from 0 to as high as 83.0 percentage points. In contrast, the share held by conventional banks offering Islamic banking through windows (IWS) is higher on average at 21.3 percentage points, with values ranging from 0 to a maximum of 92.3 percentage points. This indicates that, in some countries during certain years, almost the entire banking sector offered Islamic banking products through windows.

Table 2.
Summary Statistics

Variable	Observations	Mean	SD	Min	Max
NDG	783	47.385	7.445	34.658	71.845
CV	783	0.436	0.076	0.270	0.598
CR	783	0.384	0.092	0.202	0.722
IBS	783	12.364	18.096	0.000	83.015
IWS	783	21.270	28.524	0.000	92.327
GDP	783	8.380	1.367	5.775	11.493
FDI	766	2.861	3.767	-11.192	29.520
DEN	783	223.386	372.155	2.309	1,915.630
AGRI	753	10.119	8.499	0.094	40.741
MAN	695	13.485	6.825	0.652	44.980
EDU	433	4.050	1.549	0.000	9.646
REG	667	-0.133	0.744	-2.205	2.021
POL	667	-0.548	1.034	-3.180	1.387
GOVT	667	-0.143	0.776	-2.362	1.882

Macroeconomic control variables exhibit considerable variation. Log GDP per capita averages 8.38, with values spanning from 5.78 to 11.49, reflecting a wide income distribution. FDI inflows, measured as a percentage of GDP, average 2.86%, with a range from -11.19% to 29.52%. Population density also varies significantly, from as low as 2.3 to as high as 1,915.6 people per square kilometer, with a mean of 223. The structure of national economies differs across the sample. On average, agriculture contributes 10.1% to GDP, and manufacturing 13.5%, with both sectors showing wide ranges, up to over 40% of GDP in some cases. Government spending on education averages 4.05% of GDP, with values ranging from 0% to 9.65%. Lastly, governance indicators display broad dispersion. Regulatory quality, political stability, and government effectiveness average –0.133, –0.548, and –0.143, respectively, each with values near the full –2.5 to 2.5 scale.

Next, we compute the correlation coefficients between the variables and present them in Table 3. All correlations are relatively low (below 0.60), indicating no significant multicollinearity issues, except for a few among the governance-related control variables.

4.2. Baseline Results

Table 4 reports the results of the baseline FE regressions assessing the relationship between the presence of Islamic banking and national climate adaptation performance, as measured by the ND-GAIN Index. In Column 1, the model includes only macroeconomic control variables to explain variation in climate adaptation across countries. The results indicate that GDP per capita has a statistically significant positive effect on climate adaptation, suggesting that wealthier countries are better equipped to invest in and implement adaptive measures. In contrast, FDI relative to GDP is negatively associated with climate adaptation, implying that increased FDI may not contribute effectively to resilience efforts,

possibly due to the nature of investments lacking alignment with climate-related priorities. Additionally, the net output of a country's manufacturing sector is found to have a statistically significant negative relationship with climate adaptation. This finding may reflect underlying structural rigidity in industrially intensive economies, where high switching costs reduce the flexibility needed to reallocate resources toward adaptive infrastructure and policies. Moreover, such economies may prioritize industrial growth at the expense of environmental safeguards, often accompanied by weaker environmental governance and enforcement, thereby hindering progress toward climate resilience.

In Column 2, the IBS and IWS are included as independent variables without the inclusion of any control variables. The results indicate that, in isolation, neither IBS nor IWS exhibits a statistically significant relationship with climate adaptation at the country level. Columns 3 and 4 extend the analysis by incorporating both macroeconomic and institutional control variables, with Column 3 excluding governance controls and Column 4 including them. The findings reveal that IBS is positively and significantly associated with the ND-GAIN Index in Column 3, while its effect becomes statistically insignificant in Column 4 when governance factors are accounted for. Given that the ND-GAIN index ranges from 0 to 100, the results indicate that a one standard deviation increase in the Islamic banking asset share (18.096 percentage points) is associated with a 1.773-point increase (0.098*18.096) for the climate adaptability index.

These findings shed light on the fact that a higher presence of full-fledged Islamic banks may contribute meaningfully to a country's climate change adaptation. This is consistent with the theoretical arguments advanced by Laldin & Furqani (2013), Zulfiqar et al. (2024), and Güney (2024), who emphasize the alignment of Islamic banking with environmental preservation due to its grounding in Shariah principles. Unlike conventional banks, which may be driven primarily by profit motives, Islamic banks operate within ethical boundaries that promote sustainability and long-term societal welfare. This inherent motivation, as also highlighted by Aracil (2019) and Alghafes et al. (2024), supports the integration of environmentally conscious practices into Islamic banking operations and reinforces their potential role in advancing national climate resilience.

To provide a more nuanced understanding of the relationship between Islamic banking and climate change adaptation, the ND-GAIN Index is disaggregated into its two core components: Climate Vulnerability (CV) and Climate Readiness (CR). CV reflects the extent to which a country is exposed and susceptible to the adverse impacts of climate change, often driven by the nature, which explains the exposure and sensitivity of climate risks. Therefore, a country with a higher CV score indicates higher vulnerability with lower resources to adapt. In contrast, CR demonstrates the capacity and preparedness of the country to address climate-related issues, indicating proactive actions by all stakeholders at the country level, particularly in the financial sectors.

Table 3.
Correlation Matrix

	Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1)	NDG	1.000													
(2)	CV	-0.860***	1.000												
(3)	CR	0.905***	-0.561***	1.000											
(4)	IBS	0.010	0.084**	0.086**	1.000										
(5)	IWS	0.166***	0.002	0.270***	0.003	1.000									
(6)	GDP	0.789***	-0.678***	0.715***	0.249***	0.281***	1.000								
(7)	FDI	0.141***	-0.087**	0.157***	0.018	0.083**	0.126***	1.000							
(8)	DEN	-0.074**	0.287***	0.119***	0.019	0.243***	0.077**	0.182***	1.000						
(9)	AGRI	-0.705***	0.680***	-0.583***	-0.162***	-0.144***	-0.829***	-0.204***	-0.090**	1.000					
(10)	MAN	0.091**	-0.067*	0.092**	-0.118***	-0.011	-0.147***	-0.050	-0.073*	0.120***	1.000				
(11)	EDU	0.184***	-0.283***	0.067	-0.132***	-0.020	0.129***	-0.142***	-0.304***	-0.159***	-0.083*	1.000			
(12)	REG	0.768***	-0.528***	0.803***	0.074*	0.201***	0.718***	0.178***	0.059	-0.654***	0.198***	0.163***	1.000		
(13)	POL	0.589***	-0.412***	0.611***	0.107***	0.083**	0.614***	0.215***	-0.016	-0.576***	0.048	0.282***	0.730***	1.000	
(14)	GOVT	0.777***	-0.535***	0.812***	0.060	0.223***	0.721***	0.157***	0.063*	-0.623***	0.247***	0.239***	0.925***	0.752***	1.000

Note: *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

Table 4.
The Effects of Islamic Bank Presence on the Level of Climate Adaptation: Baseline Estimations

	(1)	(2)	(3)	(4)
	NDG	**NDG**	**NDG**	**NDG**
GDP_{t-1}	2.577***		2.365***	1.612**
	(0.610)		(0.512)	(0.689)
FDI_{t-1}	-0.052*		-0.037	-0.035
	(0.027)		(0.029)	(0.032)
DEN_{t-1}	-0.001		-0.003	-0.002
	(0.001)		(0.003)	(0.003)
$AGRI_{t-1}$	0.161		0.159	0.164
	(0.138)		(0.126)	(0.143)
MAN_{t-1}	-0.109*		-0.087	-0.120*
	(0.059)		(0.054)	(0.064)
EDU_{t-1}	0.224		0.267	0.208
	(0.209)		(0.208)	(0.196)
REG_{t-1}				0.724
				(0.603)
POL_{t-1}				-0.993*
				(0.559)
$GOVT_{t-1}$				0.900
				(0.939)
IBS_{t-1}		0.088	0.098*	0.090
		(0.052)	(0.050)	(0.059)
IWS_{t-1}		0.013	0.000	0.005
		(0.018)	(0.011)	(0.012)
Constant	26.266***	46.140***	27.376***	33.631***
	(7.030)	(0.757)	(5.795)	(7.278)
Observations	392	754	392	342
No. of countries	24	29	24	24
R-squared	0.319	0.079	0.341	0.285
Hausman test (*p*-value)	0.000	0.326	0.000	0.000

Notes: The definition of each variable is provided in Table 1. Robust standard errors are provided in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

The regression results, presented in Table 5, Columns 1 to 4, utilize CV as the dependent variable in Columns 1 and 2, and CR in Columns 3 and 4. The findings indicate that the presence of Islamic banks does not have a statistically significant effect on climate vulnerability. However, when climate readiness is used as the outcome variable, the IBS shows a positive and statistically significant association. Given that the CR score ranges from 0 to 1, specifically, a one-standard-deviation increase in the Islamic banking asset share (18.096 percentage points) is associated with a 0.033-point increase (18.096*0.0018) in the CR index.

Table 5.
The Effects of Islamic Bank Presence on Climate Vulnerability and Readiness

	(1)	(2)	(3)	(4)
	CV	**CV**	**CR**	**CR**
IBS_{t-1}	-0.0002	-0.0001	0.0018*	0.0017
	(0.0001)	(0.0002)	(0.0010)	(0.0012)
IWS_{t-1}	0.0000	0.0000	0.0000	0.0001
	(0.0000)	(0.0000)	(0.0002)	(0.0002)
Constant	0.5921***	0.5953***	0.1397	0.2680*
	(0.0234)	(0.0271)	(0.1208)	(0.1516)
Macroeconomic controls	Yes	Yes	Yes	Yes
Governance controls	No	Yes	No	Yes
Observations	392	342	392	342
No. of countries	24	24	24	24
R-squared	0.1789	0.1500	0.0834	0.0883
Hausman test (*p*-value)	0.0000	0.0000	0.0000	0.0000

Notes: Robust standard errors are provided in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

The positive relationship with CR suggests that Islamic banks, as an intermediary institution, assist in attracting investments and translating them into practical and adaptable actions, thereby increasing the capacity to address climate readiness at the country level. The role of Islamic banks may support the economic, governance, and social readiness. These align with the aspiration of Islamic finance to fully embed Shariah principles (Laldin & Furqani, 2013; Zulfiqar et al., 2024; Güney, 2024), which inherently motivate Islamic banks to implement and contribute to sustainability commitment (Aracil, 2019).

This bifurcated analysis allows for a more granular assessment of Islamic banking's role in climate adaptation. Rather than relying on a composite index, disaggregating the ND-GAIN Index reveals that Islamic banks are more strongly associated with enhancing readiness than with mitigating vulnerability. These findings suggest that Islamic banks are better positioned to contribute through investment-oriented initiatives, such as financing green infrastructure or supporting capacity-building programs, rather than through direct interventions aimed at reducing climate vulnerability among low-income or high-risk communities.

4.3. Additional Analyses

To check the consistency of the results and delve deeper into the nexus between Islamic banking and climate change adaptation, this study employs additional estimations using a dynamic panel data approach. Specifically, the analysis is extended by conducting subsample analyses based on the market share of Islamic banks at the country level. Furthermore, the sample is stratified into two distinct periods, pre- and post-Paris Agreement, to capture potential shifts in the role of Islamic banking following the global policy shift toward climate action.

4.3.1. Dynamic Panel Estimations

Table 6 presents the results of the dynamic panel estimations using the two-step system GMM approach to assess the contribution of Islamic banks to climate adaptation. The findings are consistent with the baseline FE model at a higher significance level of 5%, reinforcing the robustness of the initial results on the existence of a positive relationship between the presence of Islamic banks and climate change adaptation capacity. Specifically, Column 3 of the table indicates that a one-standard-deviation increase in the Islamic banking asset share (18.096 percentage points) is associated with a 1.140-point increase (0.063*18.096) in the climate adaptability index.

Table 6.
Dynamic Panel System GMM Regressions for the ND-GAIN Index

	(1)	(2)	(3)	(4)
	NDG	**NDG**	**NDG**	**NDG**
GDP_{t-1}	0.488		0.349	0.375
	(0.347)		(0.327)	(0.455)
FDI_{t-1}	0.033		0.034	0.019
	(0.022)		(0.027)	(0.027)
DEN_{t-1}	0.000		-0.001	-0.002
	(0.001)		(0.001)	(0.002)
$AGRI_{t-1}$	0.053		0.031	-0.036
	(0.066)		(0.081)	(0.103)
MAN_{t-1}	-0.051		-0.038	-0.018
	(0.051)		(0.052)	(0.072)
EDU_{t-1}	-0.115		-0.121	-0.169
	(0.107)		(0.107)	(0.192)
REG_{t-1}				-1.576**
				(0.637)
POL_{t-1}				-0.335
				(0.670)
$GOVT_{t-1}$				-0.403
				(0.439)
IBS_{t-1}		0.015	0.063**	0.037
		(0.022)	(0.028)	(0.043)
IWS_{t-1}		-0.000	-0.008	-0.010
		(0.005)	(0.016)	(0.020)
NDG_{t-1}	1.027***	0.982***	1.015***	1.024***
	(0.049)	(0.044)	(0.058)	(0.121)
Constant	-4.717	0.830	-3.045	-2.928
	(2.966)	(1.813)	(3.909)	(5.045)
Observations	392	754	392	342
No. of countries	24	29	24	24
No. of Instrument	10	6	12	15
AR(1) test (*p*-value)	0.031**	0.005***	0.029**	0.036**
AR(2) test (*p*-value)	0.138	0.063	0.186	0.415
Hansen test (*p*-value)	0.487	0.385	0.409	0.120

Notes: Robust standard errors are provided in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

Disentangling the components of the NDG-GAIN index in Table 7, comprising Climate Vulnerability (CV) and Climate Readiness (CR), the findings of the study reveal that the presence of Islamic banks does not contribute to addressing the climate vulnerability issue. However, it becomes positive and significant when it relates to the CR, indicating that Islamic banks contribute to invigorating a country's level of climate readiness. The findings using the dynamic panel are consistent with baseline results, reinforcing the reliability and robustness of the baseline estimation.

Table 7.
Dynamic Panel System GMM Regressions for the ND-GAIN Index Components

	(1)	(2)	(3)	(4)
	CV	**CV**	**CR**	**CR**
GDP_{t-1}	-0.003***	-0.003	0.004	0.005
	(-2.886)	(-1.419)	(0.540)	(0.532)
FDI_{t-1}	0.000	0.000	0.001	0.001
	(1.420)	(0.747)	(1.637)	(1.281)
DEN_{t-1}	0.000*	0.000	-0.000	-0.000
	(1.799)	(0.012)	(-0.288)	(-1.035)
$AGRI_{t-1}$	-0.001***	-0.001	-0.000	-0.001
	(-2.997)	(-1.550)	(-0.204)	(-0.568)
MAN_{t-1}	-0.000	-0.000	-0.001	-0.000
	(-1.422)	(-0.998)	(-0.949)	(-0.342)
EDU_{t-1}	0.000	0.001	-0.003	-0.002
	(1.358)	(1.164)	(-1.247)	(-0.649)
REG_{t-1}		0.000		-0.030**
		(0.036)		(-2.432)
POL_{t-1}		-0.001		-0.007
		(-0.556)		(-0.523)
$GOVT_{t-1}$		-0.003		-0.014*
		(-0.872)		(-1.758)
IBS_{t-1}	0.000	0.000	0.001*	0.001
	(0.697)	(0.586)	(1.834)	(0.956)
IWS_{t-1}	-0.000	-0.000	-0.000	-0.000
	(-1.441)	(-1.176)	(-0.412)	(-0.594)
$DepVar_{t-1}$	0.968***	0.966***	1.003***	1.070***
	(26.580)	(20.657)	(10.853)	(6.345)
Constant	0.047**	0.042	-0.013	-0.047
	(1.984)	(1.197)	(-0.183)	(-0.636)
Observations	392	342	392	342
No. of countries	24	24	24	24
No. of Instrument	12	15	12	15
AR(1) test (*p*-value)	0.001	0.003	0.039**	0.050**
AR(2) test (*p*-value)	0.896	0.827	0.232	0.586
Hansen test (*p*-value)	0.663	0.179	0.154	0.104

Notes: Robust standard errors are provided in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

4.3.2. Systemically Important vs. Non-Systemically Important Countries

To assess whether the impact of Islamic banking on climate adaptation varies by institutional context, the sample is divided based on the systemic importance of Islamic banking, following the IFSB's (2023) classification. Systemically important countries are defined as those in which Islamic banking assets constitute at least 15% of total banking sector assets over the sample period, indicating a substantial role within the financial system. Separate regressions are conducted for systemically and non-systemically important countries to examine whether the influence of Islamic banking differs across these two groups.

The empirical results support this differentiation. In systemically important countries, the presence of Islamic banks is significantly associated with improvements in the overall climate adaptation index (see Columns 1 and 2 in Panel A). However, no significant relationship is observed in non-systemic countries (see Columns 1 and 2 in Panel B). When the ND-GAIN Index is disaggregated, the analysis reveals that Islamic banking shows no significant effect on climate vulnerability but demonstrates a positive and significant association with climate readiness across both groups (see Columns 5 and 6 in Panels A and B). Specifically, the asset share of Islamic banks positively influences climate readiness in systemically important countries, while that of conventional banks with Islamic windows has a similar effect in non-systemic contexts.

Table 8.
A Subsample Analysis: Systemic Importance of Islamic Banking

Panel A: Systemically Important Countries						
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	NDG	**NDG**	**CV**	**CV**	**CR**	**CR**
IBS_{t-1}	0.155**	0.170***	-0.000	-0.000	0.003**	0.003***
	(0.056)	(0.049)	(0.000)	(0.000)	(0.001)	(0.001)
IWS_{t-1}	-0.007	0.004	0.000	0.000	-0.000	0.000
	(0.008)	(0.010)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	47.496**	47.040***	0.622***	0.636***	0.572	0.576**
	(17.779)	(10.621)	(0.049)	(0.053)	(0.358)	(0.228)
Macroeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes
Governance controls	No	Yes	No	Yes	No	Yes
Observations	118	100	118	100	118	100
No. of countries	9	9	9	9	9	9
R-squared	0.445	0.499	0.847	0.824	0.397	0.474
Hausman test (*p*-value)	0.000	0.000	0.000	0.000	0.000	0.000

Table 8.
A Subsample Analysis: Systemic Importance of Islamic Banking (Continued)

Panel B: Non-Systemically Important Countries						
	(1)	(2)	(3)	(4)	(5)	(6)
	NDG	NDG	CV	CV	CR	CR
IBS_{t-1}	-0.267	-0.320	-0.001	-0.001	-0.006	-0.007
	(0.243)	(0.270)	(0.001)	(0.001)	(0.005)	(0.005)
IWS_{t-1}	0.019	0.022	0.000	0.000	0.000*	0.001*
	(0.013)	(0.013)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	17.998***	20.388**	0.574***	0.570***	-0.066	-0.023
	(5.199)	(7.151)	(0.020)	(0.025)	(0.094)	(0.138)
Macroeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes
Governance controls	No	Yes	No	Yes	No	Yes
Observations	274	242	274	242	274	242
No. of countries	15	15	15	15	15	15
R-squared	0.400	0.329	0.654	0.628	0.281	0.230
Hausman test (*p*-value)	0.000	0.005	0.000	0.000	0.000	0.000

Notes: Robust standard errors are provided in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

These findings suggest that the ability of Islamic banks to support climate adaptation is amplified when they hold a larger market share, benefiting from scale, regulatory alignment, and stronger integration with sustainability frameworks. Examples such as Malaysia and Bahrain illustrate how regulatory initiatives, such as value-based intermediation and sustainability guidelines, can enhance the role of Islamic banks in advancing national climate goals (Fakhrunnas et al., 2025). Conversely, in non-systemic settings where Islamic banking remains relatively marginal, its influence may be less pronounced and largely confined to niche functions within the broader financial architecture.

4.3.3. Pre- vs. Post-Paris Agreement Era

To examine the temporal dynamics of the relationship between Islamic banking and climate adaptation, the dataset is divided into two distinct periods: the pre-Paris Agreement era (1995–2015) and the post-Paris Agreement era (2016–2021). This division reflects a critical juncture in global climate governance, as the Paris Agreement, introduced in 2015, marked a transformative shift in international climate policy, prompting a growing alignment of financial systems, including Islamic finance, with sustainability objectives. The post-Paris period has seen increased emphasis on environmental, social, and governance (ESG) criteria and the proliferation of green financial instruments such as green sukuk.

Subsample analyses reveal that the IBS maintains a positive and statistically significant relationship with both the climate adaptability and readiness indices across both time periods (see Table 8). However, the magnitude of this relationship is slightly stronger in the pre-Paris period compared to the post-Paris period. This counterintuitive finding suggests that while Islamic banks have continued

to contribute positively to climate adaptation efforts, their relative impact may have diminished in more recent years. One possible explanation is that the post-Paris financial landscape became more competitive and diversified with the rise of broader green finance initiatives, thereby diluting the distinct role previously played by Islamic banks. Alternatively, some Islamic financial institutions may have been slower to adopt sustainability frameworks in practice, which could have limited their ability to keep up with the rapidly evolving global climate finance landscape.

Table 9.
A Subsample Analysis: Pre- vs. Post-Paris Agreement Era

Panel A: Pre-Paris Agreement (1995 – 2015)						
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	NDG	**NDG**	**CV**	**CV**	**CR**	**CR**
IBS_{t-1}	0.163***	0.119	-0.000	-0.000	0.003***	0.002*
	(0.047)	(0.071)	(0.000)	(0.000)	(0.001)	(0.001)
IWS_{t-1}	0.009	0.001	0.000	0.000	0.000	0.000
	(0.008)	(0.013)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	24.167***	26.726***	0.604***	0.603***	0.087	0.138
	(5.489)	(6.475)	(0.025)	(0.026)	(0.106)	(0.128)
Macroeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes
Governance controls	No	Yes	No	Yes	No	Yes
Observations	290	240	290	240	290	240
No. of countries	23	23	23	23	23	23
R-squared	0.398	0.344	0.628	0.605	0.280	0.241
Hausman test (*p*-value)	0.024	0.000	0.000	0.040	0.071	0.000
Panel B: Post-Paris Agreement (2016 – 2021)						
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	NDG	**NDG**	**CV**	**CV**	**CR**	**CR**
IBS_{t-1}	0.084***	0.057***	0.000	0.000	0.002***	0.001***
	(0.014)	(0.013)	(0.000)	(0.000)	(0.000)	(0.000)
IWS_{t-1}	0.007	0.008	-0.000	-0.000	0.000	0.000
	(0.009)	(0.007)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	41.540***	51.106***	0.475***	0.468***	0.306*	0.490***
	(9.168)	(7.191)	(0.038)	(0.035)	(0.173)	(0.138)
Macroeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes
Governance controls	No	Yes	No	Yes	No	Yes
Observations	102	102	102	102	102	102
No. of countries	22	22	22	22	22	22
R-squared	0.300	0.539	0.157	0.173	0.315	0.535
Hausman test (*p*-value)	0.000	0.000	0.000	0.000	0.000	0.000

Notes: The definition of each variable is provided in Table 1. Robust standard errors are provided in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

Despite this marginal decline in magnitude, the consistent significance of the relationship across both periods underscores Islamic banks' sustained commitment to supporting climate resilience. This finding reflects the enduring relevance of Shariah-based principles, such as environmental stewardship, in guiding Islamic banking operations, even as the global policy environment continues to evolve (Aracil, 2019; Issa et al., 2025). Overall, the temporal analysis suggests that while the influence of Islamic banking on climate adaptation persists, its future impact may depend on how effectively the sector aligns with emerging global sustainability standards and scales up its adoption of climate-focused financial instruments.

V. CONCLUSION AND RECOMMDENDATIONS

This study investigates the contribution of Islamic banking to climate change adaptation across a sample of dual banking economies. The empirical analysis reveals several key findings. First, a greater presence of Islamic banks is positively associated with higher levels of climate adaptability, suggesting that Islamic finance can play a constructive role in enhancing national resilience to climate risks. Second, when disaggregating climate adaptation into its two constituent dimensions, namely, climate vulnerability and climate readiness, the results indicate that Islamic banks are particularly effective in improving climate readiness. This implies that Islamic banks contribute more meaningfully to strengthening institutional capacity, policy preparedness, and financial systems geared toward adaptation, rather than directly reducing structural deficiencies. Third, the impact of Islamic banks is more pronounced in countries where they are systemically important, defined by a higher market share within the banking sector. This finding underscores the importance of scale and institutional embeddedness in amplifying their developmental role. Finally, the analysis shows that Islamic banks have consistently contributed to climate adaptation both before and after the adoption of the Paris Agreement, albeit with some variation in magnitude. This sustained contribution reflects the underlying compatibility between Islamic finance's ethical foundations and global environmental movements.

The results of this study yield several important policy insights for governments, regulators, and Islamic financial institutions. For policymakers, the results underscore the need for a more structured and comprehensive integration of Islamic financial institutions into national climate adaptation strategies. Given their demonstrated impact on climate readiness, Islamic banks should be formally recognized as key stakeholders in national climate finance frameworks. This integration may include their involvement in public–private partnerships and co-financing arrangements for climate-resilient infrastructure.

Regulators in jurisdictions with a significant Islamic banking presence are encouraged to reinforce the adoption of value-based intermediation and introduce standardized sustainability reporting guidelines tailored to the unique features of Islamic finance. Strengthening alignment between Shariah principles and global ESG frameworks is essential to scaling the sector's contribution to climate adaptation. Moreover, encouraging the use of profit-sharing contracts, such as *mudarabah* and *musharakah,* can promote investment in climate-resilient sectors like agriculture, water resource management, and disaster risk reduction, areas that inherently align with Islamic finance's developmental objectives.

For Islamic banks themselves, the findings highlight the need to embed sustainability more deeply into their governance structures, risk management frameworks, and operational processes. Boards and Shariah Committees should take an active role in integrating climate-related risks and opportunities into strategic decision-making. Enhancing internal green capabilities, developing Shariah-compliant sustainable financial products, and aligning product offerings with national sustainability goals will position Islamic banks as ethical, forward-looking financial actors committed to long-term environmental well-being.

Finally, efforts to increase the market share of Islamic banks, particularly in countries with emerging financial systems, can serve as a signaling mechanism to attract sustainability-conscious investors and improve market confidence. A larger Islamic banking footprint, coupled with strong sustainability commitments, may not only enhance a country's climate resilience but also bolster the credibility of its financial sector. Realizing this potential of Islamic banking will require a conducive ecosystem supported by targeted policy incentives, institutional capacity-building, and regulatory clarity.

In short, this study contributes to the growing discourse on the intersection of Islamic finance and environmental sustainability by demonstrating that Islamic banks, when scaled and strategically aligned, can play a catalytic role in strengthening national climate adaptive capacity. The study is limited to focusing only on Islamic banking presence without considering the specific channels through which Islamic banking presence contributes to climate adaptability at the country level. Therefore, future research may build on these findings by exploring sector-specific channels through which Islamic banks contribute to the climate agenda, evaluating the impact of green and sustainability-linked Islamic financial products, and assessing the role of Islamic social finance in supporting community-level climate adaptation initiatives. In addition, future studies may explore the role of institutional development at the country level, which may enrich the findings on investigating the nexus between the presence of Islamic banks and climate change adaptation.

ACKNOWLEDGMENT

The first author acknowledges the support of the Securities Commission Malaysia in awarding the fellowship at the Oxford Centre for Islamic Studies, during which this paper was completed.

REFERENCES

Abdelsalam, O., Azmi, W., Disli, M., & Kowsalya, V. (2023). Bank lending cyclicality and ESG activities: Global evidence. *Finance Research Letters*, *58*, 104541.

Abdelzaher, D. M., Martynov, A., & Zaher, A. M. A. (2020). Vulnerability to climate change: Are innovative countries in a better position?. *Research in International Business and Finance*, *51*, 101098.

Abdul-Majid, M., Saal, D. S., & Battisti, G. (2010). Efficiency in Islamic and conventional banking: An international comparison. *Journal of Productivity Analysis*, *34*, 25-43.

Abdul-Rahman, A., Latif, R. A., Muda, R., & Abdullah, M. A. (2014). Failure and potential of profit-loss sharing contracts: A perspective of New Institutional, Economic (NIE) Theory. *Pacific-Basin Finance Journal*, *28*, 136-151.

Ajmi, H., Aziz, H. A., Kassim, S., & Mansour, W. (2019). Principal-agent preferences in imperfect markets: Theoretical analysis on murabahah and ijarah. *Journal of Islamic Monetary Economics and Finance*, *5*(1), 117-144.

Alam, A. W., Banna, H., & Hassan, M. K. (2022). ESG activities and bank efficiency: Are Islamic banks better? *Journal of Islamic Monetary Economics and Finance*, *8*(1), 65–88.

Alghafes, R., Karim, S., Aliani, K., Qureishi, N., & Alkayed, L. (2024). Influence of key ESG factors on Islamic banks' financial performance: Evidence from GCC countries. *International Review of Economics and Finance*, *96*, 103629.

Aracil, E. (2019). Corporate social responsibility of Islamic and conventional banks: The influence of institutions in emerging countries. *International Journal of Emerging Markets*, *14*(4), 582–600.

Asutay, M. (2013). Islamic moral economy as the foundation of Islamic finance. In V. Cattelan (Ed.), *Islamic finance in Europe* (pp. 55–63). Edward Elgar Publishing.

Auzepy, A., Bannier, C. E., & Martin, F. (2023). Are sustainability-linked loans designed to effectively incentivize corporate sustainability? A framework for review. *Financial Management*, *52*(4), 643-675.

Avdukic, A., & Asutay, M. (2025). Testing the development impact of Islamic banking: Islamic moral economy approach to development. *Economic Systems*, *49*(2), 101229.

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.

Bedendo, M., Nocera, G., & Siming, L. (2023). Greening the financial sector: Evidence from bank green bonds. *Journal of Business Ethics*, *188*(2), 259-279.

Ben Amar, A., & O. El Alaoui, A. (2023). Profit-and loss-sharing partnership: The case of the two-tier mudharaba in Islamic banking. *International Journal of Islamic and Middle Eastern Finance and Management*, *16*(1), 81-102.

Bilal, A., & Känzig, D. R. (2024). *The macroeconomic impact of climate change: Global vs. local temperature* (No. w32450). National Bureau of Economic Research.

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, *87*, 115–143.

Caby, J., Ziane, Y., & Lamarque, E. (2020). The determinants of voluntary climate change disclosure commitment and quality in the banking industry. *Technological Forecasting and Social Change*, *161*, 120282.

Caby, J., Ziane, Y., & Lamarque, E. (2022). The impact of climate change management on banks profitability. *Journal of Business Research*, *142*, 412-422.

Cevik, S., & Jalles, J. T. (2022). This changes everything: Climate shocks and sovereign bonds. *Energy Economics*, *107*, 105856.

Deng, Q., Huang, G., Li, D., & Yang, S. (2024). The impact of climate risk on corporate innovation: An international comparison. *Journal of Multinational Financial Management*, *75*, 100870.

Fakhrunnas, F., Kenc, T., & Hengchao, Z. (2025). ESG and banking performance in emerging and developing countries: Do Islamic banks perform better? *Journal of Islamic Monetary Economics and Finance*, *11*(1), 175–198.

Furrer, B., Hamprecht, J., & Hoffmann, V. H. (2012). Much ado about nothing? How banks respond to climate change. *Business & Society*, *51*(1), 62-88.

Galletta, S., Mazzù, S., Naciti, V., & Paltrinieri, A. (2024). A PRISMA systematic review of greenwashing in the banking industry: A call for action. *Research in International Business and Finance*, *69*, 102262.

Gardiner, A., Bardout, M., Grossi, F., & Dixson-Declève, S. (2015). *Public-private partnerships for climate finance*. Nordic Council of Ministers.

Gong, X., Song, Y., Fu, C., & Li, H. (2023). Climate risk and stock performance of fossil fuel companies: An international analysis. *Journal of International Financial Markets, Institutions and Money*, *89*, 101884.

Güney, N. (2024). Maqāsid al-sharī 'a in Islamic finance: A critical analysis of modern discourses. *Religions*, *15*(1), 114. https://doi.org/10.3390/rel15010114

Halkos, G., Skouloudis, A., Malesios, C., & Jones, N. (2020). A hierarchical multilevel approach in assessing factors explaining country-level climate change vulnerability. *Sustainability*, *12*(11), 4438. https://doi.org/10.3390/su12114438

Haridan, N. M., Hassan, A. F., & Karbhari, Y. (2018). Governance, religious assurance and Islamic banks: Do Shariah boards effectively serve?. *Journal of Management and Governance*, *22*, 1015-1043.

Intergovernmental Panel on Climate Change (2023). *Sixth Assessment Report.* Available at https://www.ipcc.ch/assessment-report/ar6/

Irfany, M. I., Syam, M. I. N., & Haq, D. A. (2024). The impact of Islamic finance on carbon emissions: Lessons from OIC Countries. *International Journal of Energy Economics and Policy*, *14*(3), 198-205.

Iskandar, A., Possumah, B. T., & Aqbar, K. (2020). Islamic financial development, economic growth and CO2 emissions in Indonesia. *Journal of Islamic Monetary Economics and Finance*, *6*(2), 353–372.

Islamic Financial Services Board (2023). Islamic Financial Services Industry Stability Report 2023. Available at https://www.ifsb.org/wp-content/uploads/2023/10/Islamic-Financial-Services-Industry-Stability-Report-2023_En.pdf

Issa, S. O., Alabi, A. T., & Ubandawaki, A. T. (2025). Climate change governance, Shariah governance quality, and financed emission mitigation: Evidence from Islamic banks in Southeast and West Asia. *Borsa Istanbul Review*, *25*(4), 722-732.

Jaafar, A. Z., & Brightman, M. (2022). From structure to purpose: Green and social narratives, and the shifting morality of Islamic finance in Kuala Lumpur. *Sustainability*, *14*(9), 5433.https://doi.org/10.3390/su14095433

Julia, T., & Kassim, S. (2020). Exploring green banking performance of Islamic banks vs conventional banks in Bangladesh based on Maqasid Shariah framework. *Journal of Islamic Marketing*, *11*(3), 729-744.

Junaidi, J. (2024). Islamic banks' contribution to Indonesia districts' economic growth and poverty alleviation. *Journal of Economics, Finance and Administrative Science*, *29*(58), 294–308.

Kassim, S. (2016). Islamic finance and economic growth: The Malaysian experience. *Global Finance Journal*, *30*, 66–76.

Kayed, R. N. (2012). The entrepreneurial role of profit-and-loss sharing modes of finance: Theory and practice. *International Journal of Islamic and Middle Eastern Finance and Management*, *5*(3), 203-228.

Kennedy, C., & Corfee-Morlot, J. (2012). Mobilising investment in low carbon, climate resilient infrastructure. *OECD Environment Working Papers No. 46*. Available at https://www.oecd-ilibrary.org/docserver/5k8zm3gxxmnq-en.pdf?expires=1731997492&id=id&accname=guest&checksum=8D4B2A0DF192713665A02BD4A3511E63

Khan, I. U., Hameed, Z., Khan, S. U., & Khan, M. A. (2024). Green banking practices, bank reputation, and environmental awareness: Evidence from Islamic banks in a developing economy. *Environment, Development and Sustainability*, *26*(6), 16073-16093.

Kunhibava, S., Ling, S. T. Y., & Ruslan, M. K. (2018). Sustainable financing and enhancing the role of Islamic Banks in Malaysia. *Arab Law Quarterly*, *32*(2), 129-157.

Laldin, M. A., & Furqani, H. (2013). Developing Islamic finance in the framework of maqasid al-Shari'ah: Understanding the ends (maqasid) and the means (wasa'il). *International Journal of Islamic and Middle Eastern Finance and Management*, *6*(4), 278-289.

Lee, C. C., Wang, C. W., Thinh, B. T., & Xu, Z. T. (2022). Climate risk and bank liquidity creation: International evidence. *International Review of Financial Analysis*, *82*, 102198.

Lee, C. C., Zhang, X., & Lee, C. C. (2024). Does climate change matter for bank profitability? Evidence from China. *The North American Journal of Economics and Finance*, *74*, 102257.

Liu, J., & Faure, M. (2018). Risk-sharing agreements to cover environmental damage: theory and practice. *International Environmental Agreements: Politics, Law and Economics*, *18*(2), 255-273.

M. Anwar, S., Junaidi, J., Salju, S., Wicaksono, R., & Mispiyanti, M. (2020). Islamic bank contribution to Indonesian economic growth. *International Journal of Islamic and Middle Eastern Finance and Management*, *13*(3), 519–532.

Mirakhor, A., Ng, A., & Ibrahim, M. H. (2015). *Social capital and risk sharing: An Islamic finance paradigm*. Springer.

Muhmad, S. N., M Ariff, A., Abd Majid, N., & Zainul Abidin, A. F. (2021). Board of directors, shariah committees and sustainability commitment of Islamic banks in Malaysia. *Management and Accounting Review (MAR)*, *20*(3), 49-79.

Noordin, N. H., Mohd Rasid, M. E. S., & Ibrahim, M. H. (2022). Private credit in dual banking countries: Does bank ownership type matter? *Thunderbird International Business Review*, *64*(6), 687-708.

Noordin, N. H., & Kassim, S. (2019). Does Shariah committee composition influence Shariah governance disclosure? Evidence from Malaysian Islamic banks. *Journal of Islamic Accounting and Business Research*, *10*(2), 158-184.

Nickell, S. (1981). Biases in dynamic models with fixed effects. *Econometrica*, *49*, 1417–1426.

Pickering, J., Jotzo, F., & Wood, P. J. (2015). Sharing the global climate finance effort fairly with limited coordination. *Global Environmental Politics*, *15*(4), 39-62.

Reghezza, A., Altunbas, Y., Marques-Ibanez, D., d'Acri, C. R., & Spaggiari, M. (2022). Do banks fuel climate change?. *Journal of Financial Stability*, *62*, 101049.

Sendi, A., Banna, H., Hassan, M. K., & Huq, T. I. (2024). The effect of ESG scores on bank stability: Islamic vs. conventional banks. *Journal of Sustainable Finance and Investment*, 1–31. https://doi.org/10.1080/20430795.2024.2395876

Tabet, I., & Khan, T. (2024). Sustainable Islamic financial engineering with special reference to Gulf Cooperation Council's economies. *ISRA International Journal of Islamic Finance*, *16*(1), 21-40.

Trentinaglia, M. T., Baldi, L., & Peri, M. (2023). Supporting agriculture in developing countries: new insights on the impact of official development assistance using a climate perspective. *Agricultural and Food Economics*, *11*(1), 39. https://doi.org/10.1186/s40100-023-00282-7

Ul-Haq, J., Visas, H., Can, M., Adnan Hye, Q. M., & Aslam, N. (2024). Is economic fitness helpful in achieving environmental sustainability in BRICS economies? A risk exposure perspective. *Chinese Journal of Population Resources and Environment*, *22*(2), 109–117.

United Nation Environment Programme (2021). *Adaptation Gap Report 2020.* Available at https://www.unep.org/resources/adaptation-gap-report-2020

United Nation Environment Programme (2024). *Adaptation Gap Report 2024.* Available at https://www.unep.org/resources/adaptation-gap-report-2024

University of Notre Dame (2024). Notre Dame Global Adaptation Initiative's (ND-GAIN) Country Index. Available at https://gain.nd.edu/our-work/country-index/

White, R., & Wahba, S. (2019). Addressing constraints to private financing of urban (climate) infrastructure in developing countries. *International Journal of Urban Sustainable Development*, *11*(3), 245-256.

Windmeijer, F. (2005). A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of Econometrics*, *126*(1), 25–51.

World Bank (2021). *Glossary of Terms and Definitions – Climate Change Knowledge Portal for Development Practitioners and Policy Makers*. Available at https://climateknowledgeportal.worldbank.org

World Meteorological Organization (2023). *Economic costs of weather-related disasters soars but early warnings save lives.* Available at https://wmo.int/media/news/economic-costs-of-weather-related-disasters-soars-early-warnings-save-lives

Wouterse, F., Andrijevic, M., & Schaeffer, M. (2022). The microeconomics of adaptation: Evidence from smallholders in Ethiopia and Niger. *World Development*, *154*, 105884.

Wu, B., Wen, F., Zhang, Y., & Huang, Z. J. (2024). Climate risk and the systemic risk of banks: A global perspective. *Journal of International Financial Markets, Institutions and Money*, *95*, 102030.

Zulfiqar, B., Ijaz, M. S., & Hanif, M. (2024). Nurturing sustainable futures: Islamic green finance and the sustainable development agenda. In *The palgrave handbook of green finance for sustainable development* (pp. 191-206). Cham: Springer International Publishing.

APPENDIX

Appendix A.
List of Sample Countries and Their Means of Variables (1995 – 2021)

Country	ND-GAIN Index	Climate Vulnerability	Climate Readiness	IB Share	IW Share	GDP Per Capita	FDI % of GDP	Population Density	Agriculture % of GDP	Manufacturing % of GDP	Education % of GDP	Regulatory Quality	Political Stability	Government Effectiveness
Algeria	46.045	0.384	0.305	1.661	9.631	3,687.100	0.902	14.854	8.973	10.946	6.727	-0.960	-1.240	-0.575
Bahrain*	50.159	0.446	0.449	21.401	65.965	19,082.200	5.543	1,404.700	0.321	16.220	2.597	0.676	-0.458	0.443
Bangladesh*	39.145	0.561	0.344	14.878	26.512	926.309	0.719	1,111.650	17.872	16.486	1.994	-0.940	-1.193	-0.755
Bosnia and Herzegovina	49.266	0.364	0.349	1.684	0.000	3,593.840	3.615	74.557	8.977	11.005		-0.302	-0.451	-0.768
Brunei Darussalam*	53.550	0.401	0.472	76.110	0.000	27,417.900	4.882	72.143	1.001	14.277	3.741	0.953	1.179	0.942
Egypt	45.240	0.430	0.335	4.272	25.211	2,091.680	2.459	85.593	13.365	16.592	4.089	-0.472	-0.933	-0.441
Indonesia	46.178	0.457	0.380	2.341	16.074	2,311.890	1.276	127.262	14.624	24.188	2.808	-0.252	-1.004	-0.254
Iraq*	41.613	0.447	0.280	20.512	8.736	3,322.200	-0.324	71.676	6.615	1.783		-1.363	-2.284	-1.426
Jordan	50.023	0.389	0.390	8.049	0.000	3,005.980	6.135	80.361	3.295	16.281	4.327	0.183	-0.345	0.098
Kazakhstan	54.709	0.334	0.428	0.044	0.000	6,434.840	6.917	6.052	6.623	12.481	3.278	-0.248	0.080	-0.453
Kenya	37.563	0.526	0.277	0.598	11.148	1,007.700	0.806	69.266	22.703	10.247	5.364	-0.304	-1.170	-0.536
Kuwait*	52.032	0.360	0.401	27.821	0.000	31,265.000	0.338	161.987	0.404	7.564	5.516	0.127	0.249	-0.013
Lebanon	44.267	0.421	0.306	0.217	24.360	5,924.140	7.499	491.311	4.428	8.624	2.265	-0.336	-1.362	-0.359
Malaysia*	53.727	0.373	0.448	15.898	39.246	7,442.650	3.461	83.105	9.529	25.621	5.200	0.581	0.205	0.971
Maldives	42.871	0.557	0.414	3.763	19.443	5,974.780	6.922	1,206.220	5.765	2.868	4.517	-0.024	0.397	0.064
Mauritania*	38.160	0.570	0.333	39.502	34.597	1,313.260	6.393	3.251	21.330	7.933	2.086	-0.610	-0.431	-0.699
Nigeria	40.032	0.507	0.308	0.084	2.595	1,804.240	1.287	170.798	24.675	11.601		-0.909	-1.809	-1.047
Oman	50.673	0.422	0.435	0.881	28.442	15,111.200	2.303	10.187	1.920	8.784	4.224	0.445	0.760	0.258
Pakistan	40.736	0.534	0.349	3.626	59.983	987.158	1.007	239.409	22.723	12.325	2.364	-0.683	-2.090	-0.633
Qatar*	54.346	0.375	0.462	18.765	52.477	53,690.600	2.066	131.241	0.192	15.736	3.660	0.479	0.959	0.699
Saudi Arabia*	49.023	0.419	0.400	18.427	80.400	15,876.200	0.657	12.785	3.567	10.640	6.267	0.022	-0.374	-0.045
Senegal	39.532	0.536	0.326	3.001	0.000	1,114.000	2.431	63.377	15.331	17.821	4.270	-0.247	-0.243	-0.310

Appendix A.
List of Sample Countries and Their Means of Variables (1995 – 2021) (Continued)

Country	ND-GAIN Index	Climate Vulnerability	Climate Readiness	IB Share	IW Share	GDP Per Capita	FDI % of GDP	Population Density	Agriculture % of GDP	Manufacturing % of GDP	Education % of GDP	Regulatory Quality	Political Stability	Government Effectiveness
Syria	41.536	0.455	0.286	14.427	0.000	1,345.150	1.559	103.121	26.961		5.026	-1.361	-1.422	-1.164
Thailand	49.219	0.438	0.422	0.321	11.816	4,321.160	2.713	130.704	9.377	28.053	3.868	0.144	-0.687	0.218
Tunisia	51.684	0.374	0.408	2.038	1.273	3,285.500	2.600	69.236	9.408	15.846	6.335	-0.156	-0.308	0.173
Turkey	51.729	0.368	0.402	3.547	0.000	7,867.170	1.353	93.017	8.881	18.046	3.711	0.204	-1.098	0.111
United Arab Emirates*	55.453	0.385	0.494	15.960	35.558	37,835.700	2.527	88.274	1.282	9.316	3.913	0.765	0.808	1.060
United Kingdom	69.108	0.279	0.661	0.033	50.169	38,153.900	4.172	256.884	0.730	10.847	5.006	1.729	0.473	1.616
Yemen*	36.537	0.545	0.276	38.697	13.207	851.901	-0.091	45.162	16.337		6.097	-1.006	-2.105	-1.333

Notes: * indicates countries where Islamic banking is systemically important. Aligned with the definition provided by Islamic Financial Services Board (2023), a country is classified as systemically important if its averaged Islamic banking assets account for 15% or more of the domestic banking assets over the sample period from 1995 – 2021.

Appendix B.
Procedure For Updating the Islamic Banking Database

Step 1: Incorporation of new banks and tracking of mergers and acquisitions
New banks established during the period under review were added to the dataset. Additionally, all mergers and acquisitions (M&As) were carefully tracked to ensure that only the merged entity or the acquiring bank remained in the sample post-M&A. For instance, if Bank A and Bank B merged to create a new entity, Bank C, in 2019, both Bank A and Bank B were included in the sample up until 2019. From 2019 onward, the newly formed Bank C was included, while Bank A and Bank B were marked as inactive. In cases where Bank A was acquired by Bank B, only Bank A was marked as inactive, and Bank B continued to be included in the sample after 2019. Information on M&As was primarily sourced from the banks' individual websites and financial news platforms such as FitchConnect and Thomson Reuters Eikon.

Step 2: Classification of banks by business model
Next, the banks in the sample were identified based on their business models, with each bank coded as either 1 (Islamic) or 0 (conventional) for each year they were active. An Islamic bank was defined as one whose products and operations are approved and monitored for Shariah compliance by a Shariah Supervisory Board (SSB). It is noteworthy that a bank may transition from conventional to Islamic, or vice versa, following events such as mergers and acquisitions (M&As). For instance, if a conventional bank, Bank X, acquired another conventional bank, Bank Y, in 2019 and subsequently converted it to Shariah compliance within a year, Bank Y was coded as 0 (conventional) until 2019 and 1 (Islamic) from 2020 onward. Information on a bank's Islamic status was primarily obtained from the bank's website, particularly from sections detailing the bank's history, such as the date it was licensed to conduct Islamic banking and the establishment of its SSB. In cases where the bank's website did not provide this information, additional sources were consulted, including annual reports, newspaper articles, and internet searches.

Step 3: Calculation of Islamic bank and window asset shares
Lastly, to aggregate the yearly presence of banks across business models by country, data were combined with individual banks' total asset values. These asset values were primarily extracted from FitchConnect and, when unavailable, were manually collected from annual reports. The following is an example of how I computed the share of Islamic banks in terms of assets in a sample country, expressed in percentage. I first summed the total assets of all banks coded as 'Islamic' for country k in year t and then divided the sum by total bank assets in country k in year t as follows:

$$Islamic\ bank\ asset\ share_{kt} = \frac{\sum_{j=1}^{J} i_{jt}\, a_{jt}}{a_{kt}} * 100 \quad (3)$$

where $j = 1 \ldots J$ indexes sample banks in country k, i_{jt} is the dummy variable which takes the value of 1 if bank j in year t is coded as Islamic and 0 otherwise, a_{jt} is the total assets of bank j in year t, and a_{kt} is the total bank assets in country k in year t.

This page is intentionally left blank