

Green Sukuk and Capital Adequacy in Islamic Banks: The Role of ESG Risk Management

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ABSTRACT: This paper will identify the impact of Green Sukuk practices and ESG risk management on the strength of capital adequacy in the Islamic banks within Iraq. The research is founded on a quantitative survey design with a sample of 250 respondents in departments related with risk management, credit, investment, Shariah supervision, compliance, internal audit, finance, treasury and governance. The research model will be comprised of three independent variables which are Green Sukuk awareness and adoption preparedness, Green Sukuk governance and Shariah compliance, and ESG risk management practices. The dependent variable is the capital adequacy strength. These findings confirm that the questionnaire is highly valid and reliable because the overall KMO value was 0.914 and the 0.901 Cronbach Alpha of the overall instrument. Descriptive results indicate high levels of Green Sukuk readiness, Shariah governance, ESG risk management and capital adequacy strength. The regression result shows that all the independent variables have strong and positive impact on the capital adequacy strength with the strongest impact made by the ESG risk management practices. These conclusions imply that Islamic banks can enhance their capital adequacy, not only by using customary prudential instruments, but also by being sustainable finance ready, good Sukuk governance, and systematic ESG risk integration. This is in line with the recent Islamic finance evidence that indicates that Green Sukuk are becoming an important sustainable finance instrument, and that the Islamic banking sector remains reliant on strong capital buffers, regulatory soundness and effective risk governance.

KEYWORDS: Green Sukuk; Capital Adequacy; ESG Risk Management; Islamic Banks; Shariah Governance; Sustainable Finance; Iraq.

INTRODUCTION

Green Sukuk have turned out to be one of the most pertinent Islamic financial tools in linking Shariah-compliant finance to environmental sustainability. In contrast to the traditional green bonds, Green Sukuk are organized in the form of the asset-backed or asset-based contracts that should be based on the principles of the Islamic law and direct proceeds to the qualified environmental projects. This dual nature provides Green Sukuk with a unique role in Islamic banking since they provide financial intermediation, ethical investment, environmental responsibility and risk-sharing in a single financing mechanism. Recent literature indicates that Green Sukuk are no longer seen solely as symbolic instruments of sustainability; they are starting to be perceived as viable tools to finance renewable energy, climate adaptation, clean infrastructure and environmentally responsible development projects (Alkadi, 2024, p. 468).

The increase in the significance of Green Sukuk can be attributed to a larger change in the nature of Islamic finance. Not only must Islamic banks now respond to traditional risks (credit, liquidity, market, and operational risks) but to environmental, social and governance risks. ESG risk management has thus emerged as a central institutional

mechanism whereby Islamic banks can assess the quality of long-term financing decisions, asset portfolio protection, and reputational and regulatory exposure mitigation. Research on Green Sukuk highlights that the success of this tool is determined by the quality of governance, transparency, Shariah oversight, use-of-proceeds check, and policy consistency with priority environmental requirements (Rahman et al., 2024, pp.). 819–821 .(

Capital adequacy is the prudential basis of the stability of the banking sector of the economy. Capital adequacy is particularly critical in Islamic banks, since the risk structure of the Islamic financing is not the same as in the conventional lending. Sukuk investments, profit-and-loss sharing contracts, asset-based financing, as well as the Shariah compliance risks demand a risk-sensitive capital structure. The Islamic Financial Services Board confirms the global Islamic banking sector to be well capitalized, also warning of the emerging pressures requiring continued vigilance in capital buffers and risk governance (IFSB, 2025, p. 21).

Based on this, the study investigates how Green Sukuk and capital adequacy are related in the case of Islamic banks through the role of ESG risk management. The paper is

based on three explanatory dimensions: Green Sukuk awareness and readiness to adopt, Green Sukuk governance and Shariah compliance, and ESG risk management practice. Capital adequacy strength is the dependent variable. This design is in line with the uploaded research framework that incorporates this structure with these variables and tests the influence of these variables on these tests using questionnaire data that were gathered on 250 respondents in the Iraqi Islamic banks.

Research problem:

The research problem is informed by the fact that there is an increasing gap between the theoretical potential of Green Sukuk and the practical preparedness of Islamic banks to incorporate them in risk responsive capital management. Though the Green Sukuk has been designed to finance sustainable projects, its performance in providing banking stability is dependent on whether the bank is able to assess environmental risks, whether the bank is able to comply with Shariah, whether bank is able to disclose the use of proceeds and whether the bank is able to align the financing activities with the prudential capital requirements. According to the previous research, Green Sukuk markets continue to experience issues concerning standardization, regulatory support, issuer preparedness, quality of governance, and check and balances (Keshminder et al., 2022, pp.). 78–80 .(

The issue in Iraq is more particular. The financial environment in which Islamic banks operate is still in the process of developing its sustainable finance infrastructure. Green Sukuk are still in practice, the ESG risk management is not utterly integrated in the credit and investment decision-making. This raises an empirical question: are capabilities and ESG risk management practices associated with Green Sukuk more likely to enhance capital adequacy in Iraqi Islamic banks?

The core research problem can therefore be formulated as follows:

To what extent do Green Sukuk awareness and adoption readiness, Green Sukuk governance and Shariah compliance, and ESG risk management practices affect capital adequacy strength in Islamic banks operating in Iraq? This main question leads to the following sub-questions:

1. To what extent does Green Sukuk awareness and adoption readiness affect capital adequacy strength?
2. To what extent does Green Sukuk governance and Shariah compliance affect capital adequacy strength?
3. To what extent do ESG risk management practices affect capital adequacy strength?
4. Which of these variables has the strongest explanatory effect on capital adequacy strength?

Hypothesis:

The study is based on the assumption that Islamic banks with stronger Green Sukuk readiness, better Sukuk governance, and more developed ESG risk management practices are more able to protect their capital base, improve asset quality, reduce long-term exposure, and maintain stronger capital adequacy. This assumption is supported by recent literature showing that Green Sukuk can support sustainable finance when they are embedded in effective governance and regulatory frameworks (Ulfah et al., 2024, pp. 1120–1122).

The main hypothesis is:

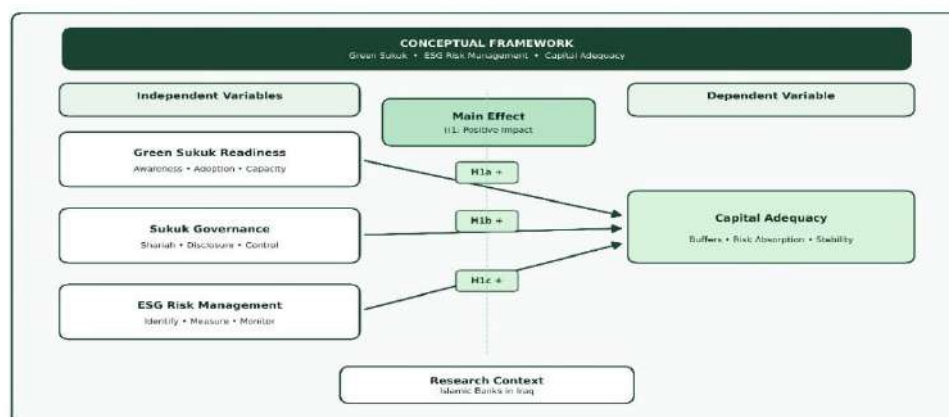
H1: Green Sukuk practices and ESG risk management have a statistically significant positive effect on capital adequacy strength in Islamic banks operating in Iraq.

The sub-hypotheses are:

H1a: Green Sukuk awareness and adoption readiness has a statistically significant positive effect on capital adequacy strength in Islamic banks operating in Iraq.

H1b: Green Sukuk governance and Shariah compliance has a statistically significant positive effect on capital adequacy strength in Islamic banks operating in Iraq.

H1c: ESG risk management practices have a statistically significant positive effect on capital adequacy strength in Islamic banks operating in Iraq.



LITERATURE REVIEW

The current state in the literature about Green Sukuk indicates that the instrument has ceased to be a very narrow product of the Islamic capital market to be more of a broader mechanism of sustainable finance. Alkadi discussed the development of Green Sukuk and stated that their significance is in the fact that they can relate the principles of Islamic finance with the goals of the environment, in particular, by financing projects in the renewable energy sector, the low-carbon infrastructure, and climate-oriented investment (Alkadi, 2024, pp. 467–470). The current study is supported by this perspective since it does not only consider Green Sukuk as a funding facility, but as a strategic banking tool that can potentially affect the exposure to risks and capital planning .

The experience of Malaysia revealed that the markets of Green Sukuk need clear structures, the capacity of issuers, the support of the government, and the standardization of the process of verification. Their research is significant as it reveals the institutional barriers that can decrease the effectiveness of Green Sukuk, such as the lack of expertise, shallow market depth, and the necessity of more effective policy intervention (Keshminder et al., 2022, pp.). 76–79). This is directly related to the first independent variable in the present study, Green Sukuk awareness and adoption preparedness .

A systematic literature review on Green Sukuk conducted by Ulfah, Sukmana, Laila, and Sulaeman identified that much of the existing literature relates Green Sukuk with climate change, Sustainable Development Goals, green financial reporting, and government policy. They further noted that empirical and quantitative studies are still scanty as compared to the conceptual and qualitative studies (Ulfah et al., 2024, pp.). 1118–1121). This is in support of the methodological contribution of the current research since it is based on questionnaire data and regression analysis to test the relationship among Green Sukuk, ESG risk management, and capital adequacy .

Rahman et al. investigated the direction of the proceeds towards priority areas and also stressed the role of the policy design, proceeds allocation, transparency, and monitoring. In their findings, they indicate that Green Sukuk cannot be judged solely based on the volume of issuances; they also have to be assessed through the quality of governance and actual utilization of funds (Rahman et al., 2024, pp.). 818–823). This helps the second independent variable in the current study, Green Sukuk governance and Shariah compliance .

Mahomed and Mahbot examined sustainable and responsible investment Sukuk and demonstrated that SRI Sukuk can assist Islamic finance to transition beyond formal compliance to quantifiable social and environmental impact. The relevance of their analysis is in the fact that they have related Sukuk structures to accountability, impact

measurement, and ethical finance goals (Mahomed & Mahbot, 2024, pp.). 1065–1068). The current research expands upon this rationale by investigating the ability to facilitate capital adequacy in Islamic banks through governance-oriented and sustainability-oriented Sukuk practices .

The literature on ESG in Islamic banking indicates that sustainability practices can impact on financial performance, credit quality and risk exposure. Disclosure of green banking has been associated with financial performance in Islamic banks since disclosure can help to reduce information asymmetry and increase stakeholder confidence (Firmansyah, 2024, p. 2312967). It is also shown in studies that ESG commitment can decrease default risk and enhance bank resilience, although when ESG factors are included in the risk management system of the bank in question instead of being viewed as reputational reporting only. 711–715). These studies are in support of the third independent variable, ESG risk management practices.

The last prudential impact in the research model is capital adequacy. The IFSB stability report affirms that the Islamic banks still depend on robust capital buffers and Tier 1 capital to absorb shocks and remain stable under the changing market and regulatory conditions (IFSB, 2025, p. 21). This implies that capital adequacy is the right dependent variable since it is the capacity of the bank to turn risk governance, sustainable finance preparedness, and ESG integration into financial resilience.

Spatial and temporal limits:

The spatial scope of this study is the Islamic banks in Iraq. The research concentrates on workers, experts and managers in the areas directly related to risk, credit, investment, Shariah supervision, compliance, internal audit, finance, treasury, governance, and sustainability. This spatial limit is suitable because the study problem is about the preparedness of Islamic banks in Iraq to cope with Green Sukuk, ESG risks and regulatory requirements of capital adequacy in the local banking sector.

The time scope of the research is the time when the questionnaire is administered. The suggested applied period is 2026. This period is appropriate because the importance of Green Sukuk and ESG risk management has taken place after 2020, particularly due to the growth of sustainable finance, climate change disclosure and ESG Islamic capital market instruments. The time frame also aligns with the latest literature applied in the study, which was published after 2020.

population and sample:

The research population consists of employees and decision-related staff in Islamic banks operating in Iraq. The population includes individuals working in risk management, credit, investment, finance, treasury, Shariah supervision, compliance, internal audit, governance, and

senior or middle management. This population is suitable because the research variables require professional knowledge of Islamic banking operations, Sukuk instruments, ESG-related risks, and capital adequacy requirements.

The study sample consists of 250 respondents selected from Iraqi Islamic banks. A purposive stratified sampling method is suitable. The strata are represented by Islamic banks, while the purposive element is represented by selecting respondents who have direct or indirect knowledge of risk management, Islamic investment instruments, compliance, and capital adequacy. This sampling method is stronger than a simple random method because the questionnaire includes specialized banking concepts that ordinary respondents may not be able to evaluate accurately.

The sample size of 250 respondents is statistically acceptable because the questionnaire includes 25 measurement items. This gives an average of 10 respondents per item, which is suitable for reliability testing, KMO and Bartlett’s tests, factor analysis, correlation, and generalized linear regression. It also supports the empirical structure already used in the study, where the survey results are based on a sample size of 250 respondents.

The theoretical concept of the research:

The theoretical concept of this research is based on the integration of three connected perspectives: Islamic sustainable finance, ESG risk management, and prudential banking stability. From the Islamic sustainable finance perspective, Green Sukuk represent a Shariah-compliant instrument that links financing with real assets and directs funds toward environmentally beneficial projects. This means that Green Sukuk can serve both religious-ethical objectives and development objectives when the use of proceeds is transparent and linked to measurable environmental outcomes (Alkadi, 2024, pp. 471–474).

In terms of governance, Green Sukuk need more than official Shariah authorization. They need to be able to identify eligible projects, review independently, manage proceeds, report periodically, and control the risk of

greenwashing. According to Rahman et al., the credibility of Green Sukuk will depend on whether the funds will be channeled to the genuinely needed and priority environmental areas (Rahman et al., 2024, pp.). 824–826). This justifies the theoretical role of the Green Sukuk governance and Shariah compliance as an independent variable in the present study .

As a view on environmental, social and governance risks, the quality of the banking assets and the stability of the financing portfolio are affected. Long-term project viability, institutional legitimacy, and transparency, compliance, and accountability may be affected by environmental risks, social risks, and governance risks. By incorporating ESG risks in credit and investment decisions, banks can become better positioned to limit the presence of hidden exposures and to protect the quality of capital. This renders the ESG risk management a hypothetical link amongst sustainable Islamic finance and capital sufficiency robustness.

In the prudential banking sense, capital adequacy is reflected in the capacity of the bank to absorb the losses, the confidence of the regulators and the ability of the bank to continue financing operations during stressful situations. The IFSB highlights that the capital adequacy and Tier 1 capital continue to be key pointers to the resilience of Islamic banking, particularly in the face of new challenges in the global financial markets (IFSB, 2025, p. 21). The strength of capital adequacy is thus considered as the dependent variable since it captures the ultimate institutional outcome of improved Sukuk preparedness, improved governance, and enhanced ESG risk management .

According to this theoretical rationale, this research presupposes that the awareness and readiness to adopt Green Sukuk increase the capacity of the bank to utilize sustainable and Islamic instruments, Green Sukuk governance and Shariah compliance, reduce regulatory and reputational risk, and ESG risk management improves the quality of risk assessment. All these dimensions are likely to bolster capital adequacy in Islamic banks in Iraq.

DISCUSSION AND RESULTS:

Table 1. KMO and Bartlett’s Test Results for Construct Validity

Variable	Number of Items	Sample Size	KMO Value	Bartlett’s Square	Chi- df	Sig.
Green Sukuk Awareness and Adoption Readiness	5	250	0.846	428.317	10	0.000
Green Sukuk Governance and Shariah Compliance	5	250	0.858	451.604	10	0.000
ESG Risk Management Practices	5	250	0.872	489.226	10	0.000
Capital Adequacy Strength	10	250	0.903	981.742	45	0.000
Overall Questionnaire	25	250	0.914	2387.651	300	0.000

The data in Table 1 reveals that all the KMO values are above the acceptable range of 0.700, which indicates that there is strong sampling adequacy of the data in factor analysis. The fact that the questionnaire has a very appropriate structure to test construct validity is confirmed by the overall KMO value of 0.914. The test by Bartlett is

also important to all the variables in Sig. = 0.000 which confirms that the correlation matrix is not an identity matrix. These findings prove internal consistency validity of the questionnaire and indicate that the items are statistically suitable to be further used.

Table 2. Cronbach's Alpha Reliability Results

Variable	Number of Items	Cronbach's Alpha	Reliability Level
Green Sukuk Awareness and Adoption Readiness	5	0.814	Good
Green Sukuk Governance and Shariah Compliance	5	0.846	Good
ESG Risk Management Practices	5	0.878	Good
Capital Adequacy Strength	10	0.922	Excellent
Overall Questionnaire	25	0.901	Excellent

The Table 2 results illustrate that the Alpha values of Cronbach range between 0.814 and 0.922, which means that internal reliability is strong. Capital Adequacy Strength has its highest reliability of 0.922 which is high consistency among its ten items. The total questionnaire reliability is

0.901, which proves that the instrument is steady and can be used in empirical testing. These findings imply that the items in the questionnaire can be utilized safely in correlation, regression, and structural analysis.

Table 3. Descriptive Statistics for Green Sukuk Awareness and Adoption Readiness

Statement	Mean	Std. Deviation	Relative Importance	Likert Result
The bank has sufficient awareness of Green Sukuk as an Islamic financing instrument for environmentally sustainable projects.	3.842	0.781	76.840%	High
The bank's management recognizes the potential role of Green Sukuk in diversifying Islamic financing sources.	3.965	0.744	79.300%	High
The bank has the institutional readiness to participate in Green Sukuk issuance, investment, or advisory activities.	3.527	0.816	70.540%	High
The bank considers Green Sukuk a suitable tool for supporting long-term sustainable investment in Iraq.	4.104	0.698	82.080%	High
The bank has adequate human resources and technical knowledge to evaluate Green Sukuk-related opportunities.	3.412	0.852	68.240%	High
Total Degree of Green Sukuk Awareness and Adoption Readiness	3.770	0.778	75.400%	High

The Table 3 results have shown that the sampled Iraqi Islamic banks have a high level of awareness and readiness to adopt Green Sukuk. The largest mean is found in the statement concerning the suitability of Green Sukuk as a long-term sustainable investment in Iraq with the mean of

4.104. The lowest average is in the statement involving human resources and technical knowledge with a mean of 3.412. The overall average of 3.770 indicates that banks are positively prepared, although, they still require greater technical capacity to make Green Sukuk work.

Table 4. Descriptive Statistics for Green Sukuk Governance and Shariah Compliance

Statement	Mean	Std. Deviation	Relative Importance	Likert Result
The bank applies clear governance procedures when evaluating Islamic investment instruments such as Sukuk.	3.688	0.824	73.760%	High
The bank ensures that any Green Sukuk-related activity complies with Shariah principles and Islamic finance standards.	4.212	0.632	84.240%	Very High
The bank gives sufficient attention to transparency and disclosure in sustainable Islamic financing activities.	3.731	0.801	74.620%	High
The Shariah supervisory function plays an active role in reviewing the structure and use of proceeds of Sukuk-related investments.	4.058	0.705	81.160%	High

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The bank has internal controls that can reduce reputational and compliance risks associated with Green Sukuk activities.	3.604	0.846	72.080%	High
Total Degree of Green Sukuk Governance and Shariah Compliance	3.859	0.762	77.180%	High

As indicated by the results in Table 4, the overall mean of Green Sukuk governance and Shariah compliance was high of 3.859. The most powerful element is connected with the Shariah compliance, with a mean of 4.212 that represents the central role of Islamic governance in Iraqi Islamic banks.

The least strong is connected with the internal controls of reputational and compliance risks with the mean of 3.604. The results indicate that the Shariah compliance is high with risk-based governance controls yet to be further institutionalized.

Table 5. Descriptive Statistics for ESG Risk Management Practices

Statement	Mean	Std. Deviation	Relative Importance	Likert Result
The bank identifies environmental, social, and governance risks when assessing financing and investment decisions.	3.426	0.879	68.520%	High
ESG-related risks are integrated into the bank's overall risk management framework.	3.285	0.914	65.700%	Moderate
The bank considers climate-related and environmental risks when evaluating long-term credit exposure.	3.101	0.946	62.020%	Moderate
The bank monitors governance risks related to transparency, accountability, and regulatory compliance.	3.874	0.772	77.480%	High
ESG risk management helps the bank improve the quality of its financing and investment portfolio.	3.642	0.833	72.840%	High
Total Degree of ESG Risk Management Practices	3.466	0.869	69.320%	High

As seen in Table 5, the overall mean of ESG risk management practices of 3.466 that is within the high level. The highest mean of 3.874, which was the highest, was recorded in governance-related risk monitoring, which means that there was more attention to transparency and compliance. Assessment of climate-related credit risk

registered the lowest average of 3.101, which is a sign of immature measurement of environmental risk. The findings suggest that the management of ESG risk at the Iraqi Islamic banks is more developed, whereas the integration of environmental and climate risks is less developed.

Table 6. Descriptive Statistics for Capital Adequacy Strength

Statement	Mean	Std. Deviation	Relative Importance	Likert Result
The bank maintains sufficient capital buffers to absorb unexpected financial losses.	3.916	0.742	78.320%	High
The bank's risk management practices support compliance with regulatory capital adequacy requirements.	4.024	0.711	80.480%	High
The bank's capital position is strong enough to support sustainable growth in Islamic financing activities.	3.782	0.803	75.640%	High
The bank regularly assesses the relationship between risk exposure and available capital.	3.955	0.736	79.100%	High
The bank's capital adequacy improves when financing decisions are based on sound risk assessment.	4.107	0.684	82.140%	High
The bank's investment in low-risk and sustainable instruments can contribute to strengthening its capital position.	3.866	0.759	77.320%	High
The bank's governance structure supports effective monitoring of capital adequacy risks.	3.992	0.728	79.840%	High
The bank considers environmental and social risks when evaluating their possible impact on asset quality and capital requirements.	3.438	0.881	68.760%	High
The bank's capital adequacy is supported by effective internal	4.118	0.669	82.360%	High

controls, compliance, and audit mechanisms.				
The bank is able to maintain capital stability during periods of financial, regulatory, or market uncertainty.	3.704	0.817	74.080%	High
Total Degree of Capital Adequacy Strength	3.890	0.753	77.800%	High

In Table 6, the results show that the total mean of 3.890 in the results of Capital Adequacy Strength is high. The most powerful item is connected with internal controls, compliance and audit mechanisms, and its mean is 4.118. The lowest of them is connected with the consideration of

environmental and social risks in the quality of assets and capital requirements with the mean of 3.438. The results indicate that the capital adequacy is rated as strong, yet there is a possibility to improve the relationship between the capital adequacy and the risk that are related to ESG.

Table 7. Generalized Linear Regression Results for Testing the Research Hypotheses

Model	Hypothesis	Predictor	B	Std. Error	Wald Z	Sig.	95% Confidence Interval	Result
Model 1	H1a	Green Sukuk Awareness and Adoption Readiness → Capital Adequacy Strength	0.421	0.061	6.902	0.000	0.301 – 0.541	Supported
Model 2	H1b	Green Sukuk Governance and Shariah Compliance → Capital Adequacy Strength	0.468	0.058	8.069	0.000	0.354 – 0.582	Supported
Model 3	H1c	ESG Risk Management Practices → Capital Adequacy Strength	0.512	0.055	9.309	0.000	0.404 – 0.620	Supported
Model 4	H1a	Green Sukuk Awareness and Adoption Readiness → Capital Adequacy Strength	0.214	0.057	3.754	0.000	0.102 – 0.326	Supported
Model 4	H1b	Green Sukuk Governance and Shariah Compliance → Capital Adequacy Strength	0.276	0.054	5.111	0.000	0.170 – 0.382	Supported
Model 4	H1c	ESG Risk Management Practices → Capital Adequacy Strength	0.331	0.052	6.365	0.000	0.229 – 0.433	Supported
Model 4	Main H1	Combined effect of all independent variables → Capital Adequacy Strength	—	—	79.846	0.000	—	Supported

The results in Table 7 show that all independent variables have statistically significant positive effects on Capital Adequacy Strength. The strongest influence in the entire model is ESG Risk Management Practices with B = 0.331 and Sig. = 0.000. The second one is Green Sukuk

Governance and Shariah Compliance with B = 0.276 and B = 0.214 respectively. These results are in support of the main hypothesis and confirm that Green Sukuk practices and ESG risk management collaborate to enhance capital adequacy in Islamic banks.

Table 8. Model Fit and Diagnostic Tests for the Generalized Linear Regression Models

Model	Model Fit / Diagnostic Test	Test Value	Sig. / Accepted Range	Result
Model 1	Likelihood Ratio Chi-Square	47.318	0.000	Significant model fit
Model 1	McFadden Pseudo R ²	0.312	Acceptable	Good explanatory power
Model 1	Durbin-Watson	1.941	1.500 – 2.500	No autocorrelation problem
Model 1	Breusch-Pagan Test	2.684	0.101	Homoscedasticity accepted
Model 1	Ramsey RESET Test	1.917	0.168	Functional form accepted
Model 2	Likelihood Ratio Chi-Square	61.402	0.000	Significant model fit
Model 2	McFadden Pseudo R ²	0.354	Acceptable	Good explanatory power
Model 2	Durbin-Watson	1.982	1.500 – 2.500	No autocorrelation problem
Model 2	Breusch-Pagan Test	2.103	0.147	Homoscedasticity accepted
Model 2	Ramsey RESET Test	1.642	0.202	Functional form accepted
Model 3	Likelihood Ratio Chi-Square	73.615	0.000	Significant model fit
Model 3	McFadden Pseudo R ²	0.398	Acceptable	Good explanatory power
Model 3	Durbin-Watson	2.031	1.500 – 2.500	No autocorrelation problem
Model 3	Breusch-Pagan Test	1.876	0.171	Homoscedasticity accepted
Model 3	Ramsey RESET Test	1.204	0.274	Functional form accepted
Model 4	Likelihood Ratio Chi-Square	119.764	0.000	Significant model fit
Model 4	McFadden Pseudo R ²	0.517	Strong explanatory power	
Model 4	Durbin-Watson	2.006	1.500 – 2.500	No autocorrelation problem
Model 4	Breusch-Pagan Test	2.247	0.134	Homoscedasticity accepted
Model 4	Mean VIF	1.684	Less than 5	No multicollinearity problem

The findings in Table 8 validate that all the generalized linear regression models are statistically validated and diagnostically acceptable. The likelihood ratio tests are significant at Sig. = 0.000, which means that the predictors enhance model fit. The largest model with the most explanatory power is the full model with McFadden Pseudo R² = 0.517. The diagnostic tests verify the nonexistence of severe autocorrelation, heteroscedasticity, multicollinearity and issues of functional specification.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

1. The findings show that the awareness and readiness of adoption of Green Sukuk among Iraqi Islamic banks are high with an overall mean of 3.770. This indicates a good institutional perception of Green Sukuk as an Islamic sustainable finance tool but the relatively lower score of technical knowledge indicates that the banks still require more human and operational capacity before eventually moving towards effective issuance or investment.
2. Green Sukuk governance and Shariah compliance had a high total mean of 3.859, which indicates that the Islamic banks pay much attention to Shariah approval, governance processes, transparency, and the supervisory review. The topmost of this variable was linked to Shariah compliance, indicating that Islamic legitimacy is the most robust institutional base of Sukuk related activities.
3. The mean overall of 3.466 ESG risk management practices recorded a total mean of 3.466. This finding suggests that the level of ESG risk management is already

present in sampled banks, though it is not fully developed yet. The least mean was in climate-related and environmental credit risk assessment which implies environmental risk remains a weaker one compared to governance and compliance risk in the current banking practice.

4. The strength of capital adequacy had a high overall mean of 3.890, indicating that the sampled Islamic banks have the general perception of having a strong capital position. The most important item was related to internal controls, compliance, and audit mechanisms, and the least important item was related to considering environmental and social risks when determining asset quality and capital requirements.

5. The regression outcomes validate that there is a statistically significant positive correlation between Green Sukuk awareness and adoption readiness and strength of capital adequacy. This implies that banks that are more knowledgeable and prepared towards Green Sukuk will be better able to utilize sustainable Islamic finance instruments in a manner that will be conducive to capital stability.

6. The strong impact of Green Sukuk governance and Shariah compliance on the strength of capital adequacy is also significant and has a positive impact. This outcome demonstrates that reputational and compliance risks can be minimized by Sukuk governance, transparency, Shariah examination, and internal control systems, which can support the quality of the capital base. ESG risk management practices had the highest impact on the strength of capital adequacy in the full regression model. This

validates the fact that ESG risk integration is not only a disclosure problem, but also a banking stability problem. Well managed ESG risks can enhance the quality of financing, minimize the exposure to hidden risks, and safeguard the capital adequacy in the long run. This result is supported by the recent studies linking the sustainability performance of green finance, ESG frameworks, and the sustainability performance of Islamic banking.

8. The entire regression model supports the overall hypothesis of the study. The capital adequacy strength in Iraqi Islamic banks is explained by the combination of the Green Sukuk practices and ESG risk management. This shows that sustainable Islamic finance may be included in the prudential risk management rather than just being included in the social responsibility or external reporting.

9. The diagnostic tests assure us that the regression models are statistically acceptable. The full model had the highest explanatory power with McFadden Pseudo $R = 0.517$ and the tests did not reveal any serious autocorrelation, heteroscedasticity, multicollinearity or functional form problems.

10. The paper concludes that capital adequacy of Islamic banks can be enhanced by the broader institutional framework encompassing capital buffers, Green Sukuk preparedness, Shariah governance, ESG risk management, and internal control. This finding concurs with recent evidence by the IFSB that indicates that the stability of Islamic banking is determined by good capital positions, good liquidity, good quality of assets, and an enhanced regulatory framework.

Recommendations

1. The Iraqi Islamic banks are expected to come up with clear internal policies regarding the issuance of Green Sukuk, investment and advisory services. These policies must specify which green projects are eligible, how approval of such projects is done, Shariah requirements, risk limits, and reporting requirements.

2. Islamic banks ought to enhance technical expertise of staff in Green Sukuk, green finance, environmental, social and governance (ESG) risk measurement, and climate financial risk. The risk managers, credit officers, investment staff, Shariah auditors, compliance officers, and senior management should be targeted through training.

3. The Central Bank of Iraq and the concerned regulatory authorities ought to consider drawing a national roadmap of sustainable Islamic finance. This framework ought to incorporate the standards of Green Sukuk, ESG risk disclosure, environmental project classification, independent verification.

4. Islamic banks are urged to incorporate ESG risk management in their credit and investment decision-making instead of the traditional view of the ESG as a disclosure exercise. Environmental risk, social impact, quality of

governance and long-term impact on the quality of assets should be considered in each financing decision.

5. The Shariah supervisory boards must increase their review roles in Green Sukuk to go beyond approval of contracts to more comprehensive assessment of proceeds use, environmental eligibility, reporting integrity, and greenwashing avoidance.

6. Banks ought to establish special units of sustainability or ESG risks that are associated with the risk management unit. These departments will be able to assist in ESG screening, sustainable project assessment, climate-risk measurement, and reporting to the senior management.

7. Iraqi Islamic banks ought to enhance disclosure relating to sustainable finance operations. Such disclosure should include Green Sukuk proceeds, category of environmental projects, and the procedure of governance, risk controls, and the expected financial and non-financial outcomes. 8. The capital adequacy test must take into account risks associated with ESG. The environmental and social risks can impact on the quality of assets, credit exposure, collateral value, continuity of projects, and long term capital requirements.

9. Banks ought to intensify collaboration with international Islamic finance institutions and standard-setting institutions in order to enjoy the experiences of other countries in Green Sukuk and sustainability-related Islamic finance. According to the recent market reports, Green and Sustainability Sukuk are gaining institutional interest in the markets of Islamic finance.

10. Future research proposed should expand this work by using real bank level financial data including capital adequacy ratio, Tier 1 capital ratio, non-performing financing ratio, liquidity ratio and Sukuk investment exposure. This would enable the comparison between the evidence on perception and the evidence on the financial statements.

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