

TRENDS AND DETERMINANTS OF SUSTAINABILITY SUKUK ISSUANCE: EVIDENCE FROM GLOBAL MARKETS

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ABSTRACT

Despite the growing prominence of sustainability sukuk in the global realm of sustainable finance, little is known about the dynamics of their issuance. This study is the first to document the evolution of sustainability sukuk issuance and explore the determinants of its size. Using a cross-country sukuk dataset comprising 11,944 issuances between 2012 (i.e., the year when the first sustainability sukuk was issued) to 2022, it highlights that sustainability sukuk remains a minuscule fraction of overall sukuk markets, and its rapid growth during the last recent years is mostly concentrated in Islamic finance-oriented countries like Indonesia, Malaysia, and Saudi Arabia, while other developing Muslim-majority nations show limited participation. Examining determinants, we find that a higher security quality, a more extended debt structure, and major international currency denominations (e.g., USD and Euro) positively influence the size of the sustainability sukuk issue. Additionally, we uncover two unique drivers of sustainability sukuk issuance. The first is second party opinion, where its increased costs reduce issue size. The second is the underlying equity-based Islamic contracts, which encourage larger issuances compared to sale-based contracts. Our results also indicate that issuances by government entities and financial institutions, and those raised for social purposes rather than green projects, tend to be larger. Lastly, we find that a higher level of economic development and greater reliance on international trade in the issuing country may lead to a larger issue size. This paper concludes by calling for policies and incentives to encourage future sustainability sukuk issuance.

Keywords: Sustainable finance, Sustainability, Sukuk, Green sukuk, Social sukuk.

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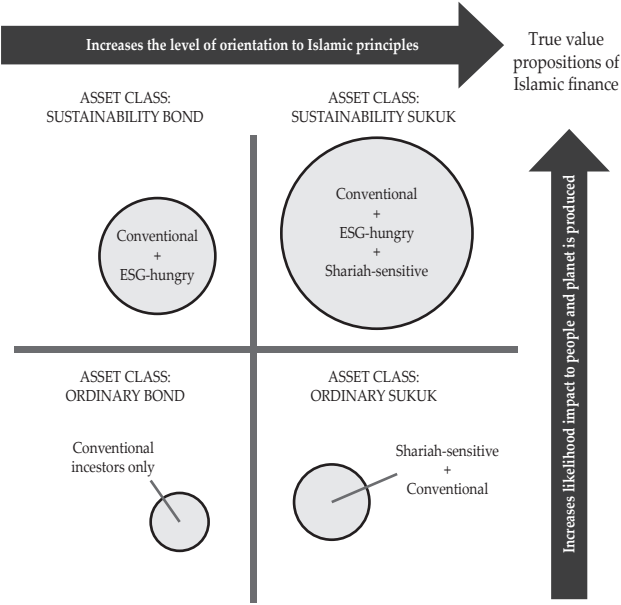
I. INTRODUCTION

Many Muslim-majority countries are among the most vulnerable to the impacts of climate change today. Their exposure stems from a continued reliance on fossil fuels, rapid urbanisation, and enduring socio-economic challenges, such as poverty and food insecurity (Diamond-Smith et al., 2011). In 2021, eight of the ten countries most exposed to climate risks and with the least adaptive capacity were Muslim-majority nations.¹ These vulnerabilities underscore the urgent need for substantial investment to enable more sustainable and resilient development pathways. Islamic finance has increasingly been recognised as a potential enabler of this transition. Development institutions such as the World Bank and the Islamic Development Bank (IsDB) have advocated leveraging Islamic finance to mobilise resources for climate and nature-related projects. Islamic finance and sustainable investing share common ethical foundations, such as ethical investing, social justice, and environmental stewardship, and both promote growth that is sustainable and inclusive. Their convergence offers a natural platform for developing innovative financial instruments capable of financing climate and social resilience in developing economies.

One such innovation is sustainability sukuk. Similar to traditional sustainability bonds, these instruments channel proceeds toward financing or refinancing climate-friendly or socially responsible projects. However, unlike conventional bonds, sustainability sukuk are structured in accordance with Islamic law, which prohibits interest and excessive speculation. This Shariah-compliant structure ensures alignment with the ethical values of Muslim investors while attracting global ESG-conscious investors seeking diversification and impact-aligned opportunities, as illustrated in Figure 1. Since the debut of the first sustainability sukuk by the International Finance Facility for Immunisation (IFFIm) in 2014 and Malaysia's landmark Sukuk Ihsan² issuance, several countries, including Indonesia, Saudi Arabia, the United Arab Emirates (UAE), and Bangladesh, have followed suit. Malaysia further demonstrated leadership with the world's first green sukuk in 2017 issued by Tadau Energy, certified by the Climate Bonds Initiative to finance solar power generation. These pioneering efforts have catalysed growing interest among policymakers, investors, and issuers in harnessing sukuk to meet sustainability goals.

1 These countries are Afghanistan, Bangladesh, Chad, Ethiopia, Mali, Nigeria, Somalia, and Senegal. The list (in alphabetical order) is provided by Notre Dame Global Adaptation Initiative (<https://gain.nd.edu/>).

2 See Noordin et al. (2018) for a more detailed review of the issuance of Sukuk Ihsan.



Source: Author's illustration.

Figure 1.
A Matrix of Islamic Finance-ESG Intersection

Despite this growth, the segment remains relatively small and geographically concentrated. Using sukuk data from Thomson Reuters Eikon covering the period between 2012 and 2022, we observe that sustainability sukuk issuances have grown steadily, doubling to nearly USD 10 billion in 2022 from USD 4.4 billion in 2019, yet still representing only around 5% of total global sukuk issuance. The market continues to be dominated by a few leading jurisdictions, namely Malaysia, Indonesia, and Saudi Arabia, while participation from other Muslim-majority countries remains limited.

Against this backdrop, this study aims to provide empirical insights into the evolving landscape of sustainability sukuk. Specifically, it pursues two objectives. First, we describe the temporal and geographical trends in sustainability sukuk issuance and compare their attributes with those of ordinary sukuk. Second, we investigate the determinants of sustainability sukuk issuance size, examining how factors related to issue characteristics, issuer type, and macroeconomic conditions influence the amount raised. This analysis extends prior research on green and social bonds (Barua & Chiesa, 2019; Chiesa & Barua, 2019; Cicchiello et al., 2022) to the context of Islamic capital markets, where empirical evidence remains scarce.

Our findings reveal that higher security quality (as reflected in coupon rate and credit rating), longer maturities, and issuance in major international currencies (USD and Euro) are associated with larger sustainability sukuk sizes. We also find evidence unique to sustainability sukuk, such as the influence of second-party opinions (SPOs) and Shariah contract types. While obtaining an SPO enhances credibility, associated costs may reduce issuance size. Moreover, equity-

based contracts are linked to larger issuances compared to sale-based contracts. Government entities and financial institutions also tend to issue larger sustainability sukuk than non-financial firms, and social-purpose sukuk generally exceed green sukuk in scale. At the macroeconomic level, countries with higher GDP per capita and greater trade openness are more likely to issue larger sustainability sukuk. Taken together, these results highlight both the opportunities and challenges in scaling sustainability sukuk.

This study makes two key contributions to the literature. First, it adds to the limited research on the development of the sustainability sukuk market. Existing studies remain few, focusing mainly on green sukuk and the Malaysian context (e.g., Keshminder et al., 2022; Liu & Lai, 2021; Noordin et al., 2018), and are largely qualitative with limited empirical analysis (e.g., Alam et al., 2016; Aassouli et al., 2018; Abdullah & Keshminder, 2022). By providing new global evidence on the determinants of green and social sukuk issuance, this study complements and extends this emerging body of work. Second, it contributes to the broader sustainable finance literature by highlighting the distinctive features of Islamic financial instruments. While prior studies on green bond issuance rarely differentiate sukuk from conventional bonds despite key structural and institutional differences (e.g., Barua & Chiesa, 2019; Chiesa & Barua, 2019; Dan & Tiron-Tudor, 2021; Russo et al., 2021; Cicchiello et al., 2022), this study addresses that gap and underscores the role of Islamic finance within the wider sustainable investing landscape.

The remainder of this paper is organised as follows. Section 2 reviews the related theories and literature. Section 3 describes the data and methodology. Section 4 presents and discusses the results on issuance trends and determinants. Section 5 concludes with policy implications and recommendations.

II. THEORETICAL FOUNDATIONS

This study draws on several theoretical perspectives to guide its analysis of the factors influencing sustainability sukuk issuance. First, the capital structure theory, which discusses how firms optimize their mix of debt and equity, is useful in understanding the issuance preferences for sukuk (Nagano, 2016; Guermazi, 2020). Decisions around tenure, credit ratings, and currency denomination may reflect issuers' efforts to manage costs, mitigate risk, and expand access to international capital markets, particularly when issuing complex instruments such as sustainability sukuk. However, critics argue that capital structure theory often assumes frictionless markets and rational decision-making, overlooking the influence of behavioural, institutional, and cultural factors (Ardalan, 2017), especially relevant in Islamic finance, where compliance with Shariah principles may supersede purely financial considerations.

Second, the signalling theory provides an important lens through which to view how issuers communicate credibility and commitment to sustainability in the face of information asymmetry (Jolink & Niesten, 2021; Friske et al., 2023; Zhu et al., 2024). In the context of sustainable finance, distinct attributes, such as high credit ratings, longer maturities, and the appointment of external verifiers, serve as signals to investors of the issuer's reliability and alignment with environmental

or social goals. These signals can play a crucial role in influencing investor perceptions and shaping market participation, particularly in relatively nascent markets such as sustainability sukuk. Nonetheless, some argue that the efficacy of signalling mechanisms in highly regulated or opaque environments, arguing that signals can be misinterpreted or manipulated, thereby failing to resolve information asymmetries effectively (Taj, 2016; Steigenberger, 2025). In addition, signalling efforts often entail additional costs, such as fees for external reviews or rating services, which may reduce the net proceeds available or deter issuers from pursuing larger issuance sizes (Moratis, 2018).

Third, the institutional legitimacy theory helps explain why certain types of issuers, particularly sovereigns and financial institutions, are often more prominent in the sustainability sukuk market. This perspective suggests that organizations seek to enhance or maintain their legitimacy by conforming to social norms, values, and expectations, especially those related to environmental responsibility, social development, and ethical conduct (Tilling, 2004; Eitrem et al., 2024; Wukich et al., 2024). In this regard, issuing sustainability sukuk allows entities to demonstrate alignment with both Shariah principles and global ESG standards, thereby fulfilling their dual mandate to both domestic constituents and international stakeholders. However, critics contend that legitimacy-seeking behaviour may lead to superficial compliance rather than substantive change, raising concerns over impact-washing, where issuers adopt sustainability labels without embedding meaningful ESG practices into their operations (Bernini & La Rosa, 2024).

Fourth, the stakeholder theory expands the analysis beyond traditional investor-centric models by recognizing that issuers must also respond to the needs and concerns of a wider set of stakeholders (Jonsdottir et al., 2021; Harjoto et al., 2022). These include regulators, customers, communities, civil society, and future generations. This theory is particularly relevant for sustainability sukuk, with their structure, purpose, and disclosure requirements reflecting responses to growing stakeholder expectations for ethical, inclusive, and sustainable financial practice. For example, the use of proceeds becomes a critical mechanism through which issuers demonstrate accountability and responsiveness to stakeholder concerns, as funds are earmarked for projects with clear environmental or social value. Despite its broad appeal, the stakeholder theory has been criticized for lacking clear guidance on how to prioritize competing stakeholder interests, especially when financial and social objectives conflict (Richter & Dow, 2017; Freeman et al., 2020). In the context of Islamic finance, the challenge is further compounded by the need to reconcile Shariah compliance with the diverse and sometimes divergent expectations of ESG-focused investors.

III. METHODOLOGY

3.1. Data

The sukuk data are from Thomson Reuters Eikon's Islamic Sustainable Finance (SUSTAINIF) database. To begin with, we extract all sukuk issued between 2012 and 2022. The year 2012 marks the issuance of the first sustainability sukuk in the

market³ and the year 2022 provides the latest data available at the time of writing this paper. We yield a total of 11,944 sukuk issued between the period between January 1, 2012, and December 31, 2022. For each sukuk, we include a set of fields that contain information about the issuer, amount, issue date, maturity, coupon, principal currency, structure (i.e., underlying Shariah contract), and credit rating. To facilitate comparisons, all amounts are converted into US dollars using the exchange rate of the respective currencies on the sukuk issuance date.

Next, we use the “ESG Bond” filter, which identifies whether the sukuk is an ESG sukuk, to exclude ordinary (non-sustainability) sukuk from the list. Labelling a sukuk as an ESG sukuk takes several key criteria into consideration. Among others, the use of proceeds must be allocated to projects with clear environmental, social, and governance benefits. This includes a transparent evaluation and selection process for eligible projects, ensuring they align with the sukuk’s ESG objectives. The management of proceeds requires tracking and managing funds to ensure they are used exclusively for the intended ESG projects. Doing so yields a total of 291 sukuk issued between June 29, 2012, and December 31, 2022.

For each sustainability sukuk, we add two additional fields that provide information about the use of proceeds and the second-party opinion (SPO) providers for the sukuk. The use of proceeds field specifies how the funds raised through the sukuk issuance will be allocated. This transparency is crucial for maintaining investor confidence that the funds are directed towards projects with clear environmental or social benefits. Meanwhile, the second-party opinion (SPO) field indicates whether the sustainability credentials of the sukuk are evaluated and validated by an external reviewer. SPO providers, such as CICERO Shades of Green (covering 44.9% of sustainability sukuk issuance as of 2022) and RAM Sustainability (38.8%), assess whether the sukuk aligns with established sustainability standards and frameworks. They examine factors such as the environmental impact, social benefits, and governance practices associated with the use of proceeds. This external validation is crucial for reassuring investors of the credibility of the sustainability sukuk and helping prevent greenwashing by providing an independent review of the issuer’s claims on the sukuk’s green and social legitimacy.

Furthermore, we categorize the sustainability sukuk into green and social sukuk by applying the “Green Bond” filter that reports whether an sustainability sukuk is labelled as green. More specifically, green sukuk are sukuk for which the “ESG Bond” and “Green Bond” filters are both answered “Yes”, while social sukuk are for which the “ESG Bond” filter’s answer is “Yes” and the Green Bond” filter is “No”. Out of the 291 sustainability sukuk issued during the sample period, 235 (81%) are green sukuk.

Lastly, the data on macroeconomic conditions, including gross domestic product (GDP) per capita, inflation, and trade openness are gathered from the *World Development Indicators* (WDI) database of the World Bank.

3 According to data obtained from Thomson Reuters Eikon, the earliest known instance of a sustainability sukuk can be traced back to June 26, 2012, when Global Patrimoine Investissement SAS issued a USD 131 million asset-backed trust certificate program in the form of a sukuk to finance a real estate project in Paris. However, it is noteworthy that only a minor fraction (USD 10,660) of the total amount was directed toward a social objective.

3.2. Empirical Model

To examine the factors affecting sustainability sukuk activity, we run regression analysis of the relationship between the issue size of sustainability sukuk and a set of variables that are consistent with previous studies on the determinants of bonds and sukuk issuance (e.g., Alexander et al., 2000; Smaoui & Khawaja, 2017; Barua & Chiesa, 2019; Chiesa & Barua, 2019; Aziz et al., 2021, and others). These variables can be divided into three broad categories. The first category includes several attributes of the sukuk itself, namely coupon rate, maturity, rating, certification, principal currency, use of proceeds, and types of underlying Shariah contract. The second category covers issuer types, whether the sukuk is raised by financial institutions, non-financial companies, governments, or supranationals. The last category includes country-level determinants of sukuk issuance, including the economic development of the country of issue, their inflationary pressure, and level of trade openness. The regression equation is specified as:

$$S_{i,t} = \alpha + \beta_1 X_{i,t} + \beta_2 Y_{i,t} + \beta_3 Z_{c,t} + \mu_c + \rho_t + \varepsilon_{i,c,t} \quad (1)$$

where the subscript i refers to an individual sustainability sukuk issue, and the subscripts c and t refer to country and year, respectively. The dependent variable S is the natural logarithm of the dollar value of the sustainability sukuk issue. X denotes a vector of features of the sukuk issue. Y is a set of dummy variables for each type of sukuk issuer. Z denotes a vector of macroeconomic conditions of the country where the sukuk is raised. The definitions of these independent variables are provided in Table 1. We include country fixed effects, μ , to account for heterogeneity between countries and year fixed effects, ρ , to control for any unobservable time-varying factors that affect all sukuk issuances at the same points in time. ε is the error term. α , β_1 , β_2 , and β_3 are parameters to be estimated.

Table 1.
Variable Definitions

Variable	Definition	Justification	Expected sign	Source
<i>Dependent variable</i>				
Issue size	The natural logarithm of the dollar value of the sustainability sukuk issue			Thomson Reuters Eikon
<i>Issue characteristics</i>				
Coupon rate	The current percentage of the sukuk's par value, paid by the issuer at agreed frequency	It indicates the cost of financing and investor risk perception, both of which influence an issuer's decision on the size of sustainability sukuk to be raised.	-	Thomson Reuters Eikon
Maturity	The number of years from the sukuk's issue date until its principal amount becomes due and payable to the sukukholders	It reflects the time horizon of repayment, which influences both issuer preferences and investor appetite. Longer maturity may be associated with greater flexibility for issuers in managing cash flows and project timelines, particularly for large sustainability-related investments. At the same time, longer maturity may also signal confidence in creditworthiness and long-term commitment, potentially supporting larger issuances.	+	Thomson Reuters Eikon; Author's calculations
Rating	A categorical variable for the issue level rating assigned by rating agencies where 11 represents the highest rating and 1 not rated	It serves as a key signal of credit quality and affects both the cost of capital and investor confidence, which is particularly crucial in relatively new markets such as sustainability sukuk. Highly rated sukuk are more likely to attract a broader and more risk-averse investor base, facilitating larger issuance.	+	Thomson Reuters Eikon; Author's calculations
SPO	A dummy variable where 1 indicates the sukuk provides a second-party opinion (SPO) report and 0 otherwise	An SPO provides external validation of a sukuk's sustainability credentials, boosting transparency and investor confidence. However, its associated costs may deter larger issuances, particularly for smaller or cost-sensitive issuers.	+/-	Thomson Reuters Eikon

Table 1.
Variable Definitions (Continued)

Variable	Definition	Justification	Expected sign	Source
USD currency	A dummy variable where 1 if the principal amount of the sukuk is denominated in US dollars and 0 otherwise	USD-denominated sukuk may benefit from higher liquidity and wider investor participation, facilitating larger issuance volumes.	+	Thomson Reuters Eikon
Euro currency	A dummy variable where 1 if the principal amount of the sukuk is denominated in Euro and 0 otherwise	The Euro is a major international currency that can attract European institutional investors and support cross-border issuance. Besides, Euro-denominated sukuk may signal stronger alignment with ESG mandates in European markets, enhancing demand and enabling larger issuance.	+	Thomson Reuters Eikon
Other currency	A dummy variable where 1 if the principal amount of the sukuk is denominated in other currencies than US dollar and Euro and 0 otherwise	Local or non-major currencies may face more limited investor demand, currency risk, and lower market liquidity, particularly outside the domestic market.	-	Thomson Reuters Eikon
Social use	A dummy variable where 1 if the use(s) of the sukuk proceeds is for social projects and 0 otherwise	Social projects like affordable housing, education, and healthcare often align with development goals and attract strong investor interest, potentially enabling larger sukuk issuances.	+	Thomson Reuters Eikon
Green use	A dummy variable where 1 if the use(s) of the sukuk proceeds is for green projects and 0 otherwise	Green projects attract ESG-focused investors but may face scale limitations due to high complexity and upfront costs.	+/-	Thomson Reuters Eikon
Equity contract	A dummy variable where 1 if the sukuk is structured based on an equity-based Shariah contract either a partnership contract (e.g., <i>mudharabah</i> and <i>musharakah</i>) or agency contract (e.g., <i>wakalah bi al-istithmar</i>) and 0 otherwise	Equity-based contracts promote risk-sharing and are often favoured for impact-driven or developmental projects, which may appeal to both Islamic and ESG investors. These contracts are also flexible in structuring, supporting larger and longer-term issuances.	+	Thomson Reuters Eikon

Table 1.
Variable Definitions (Continued)

Variable	Definition	Justification	Expected sign	Source
Hybrid contract	A dummy variable where 1 if the sukuk is structured based on a hybrid contract (i.e., a combination of two or more Shariah contracts into a single issuance) and 0 otherwise	Hybrid contracts offer structural flexibility, allowing issuers to tailor terms for larger and more complex issuances.	+	Thomson Reuters Eikon
Sale contract	A dummy variable where 1 if the sukuk is structured based on a sale-based Shariah contract (e.g., <i>murabahah</i> , <i>istisna'</i> , and <i>ijarah</i>) and 0 otherwise	Sale-based contracts are the most common sukuk structures due to their simplicity and regulatory clarity. However, it may limit scalability in certain sustainability-linked projects due to their asset-dependence and fixed-return nature.	+/-	Thomson Reuters Eikon
Issuer types				
Bank	A dummy variable where 1 if the sukuk is issued by a bank or other financial institutions and 0 otherwise	Financial institutions are experienced in capital market operations and often have stronger balance sheets and regulatory familiarity, enabling them to issue sukuk at larger scales and with greater frequency.	+	Thomson Reuters Eikon
Government	A dummy variable where 1 if the sukuk is issued by a central government or a local government or their authorised agencies and 0 otherwise	Governments often issue sukuk to fund large-scale infrastructure or development projects. Their perceived low credit risk and policy-driven objectives help attract broad investor demand.	+	Thomson Reuters Eikon
Supranational	A dummy variable where 1 if the sukuk is issued by a supranational organisation and 0 otherwise	Supranational issuers often mobilize large capital amounts for cross-border development, benefiting from strong credit ratings and multi-country investor bases.	+	Thomson Reuters Eikon
Non-financial	A dummy variable where 1 if the sukuk is issued by a non-financial corporate firm and 0 otherwise	Non-financial firms may face more limited access to capital markets and smaller balance sheets, which could constrain their ability to issue large-scale sukuk.	-	Thomson Reuters Eikon

Table 1.
Variable Definitions (Continued)

Variable	Definition	Justification	Expected sign	Source
<i>Macroeconomic variables</i>				
GDP per capita	Gross domestic product divided by midyear population of the country of issuance (in US dollars)	It serves as a proxy for the level of economic development and income in a country. Higher GDP per capita indicates stronger economic capacity and investor confidence, supporting larger sustainability sukuk issuance.	+	World Bank's WDI database
Inflation	Consumer price index of the country of issuance	It represents macroeconomic instability and erodes the real value of returns, increasing uncertainty for both issuers and investors. Higher inflation may raise borrowing costs and reduce investor appetite for long-term fixed-return instruments like sustainability sukuk, thus discouraging large-scale issuance.	-	World Bank's WDI database
Trade openness	Exports of goods and services (% of GDP) of the country of issuance	It reflects the degree of a country's integration into global markets. Economies that are more open to trade tend to attract more foreign capital and enjoy broader investor access, which can facilitate larger sukuk issuances. Additionally, open economies may be more responsive to global ESG trends and market standards, further enhancing the appeal of sustainability sukuk.	+	World Bank's WDI database

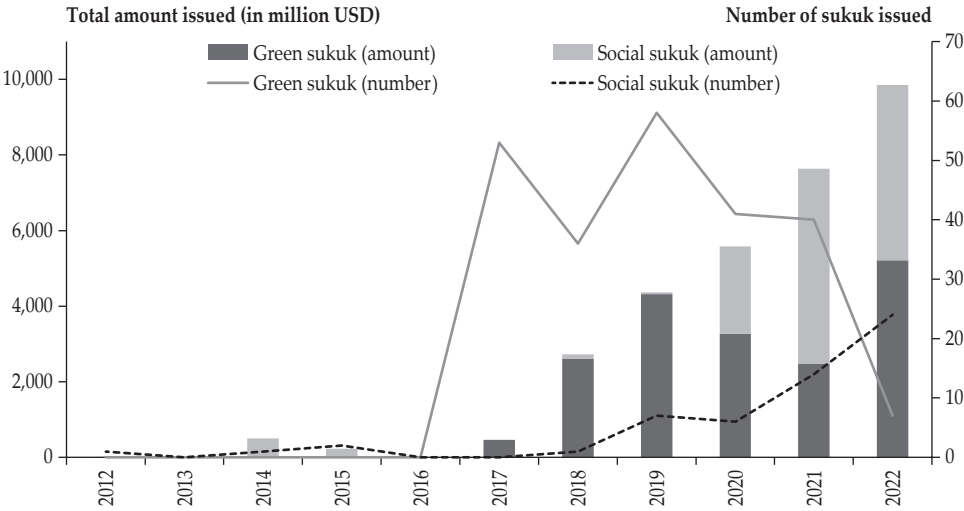
The parameters in Eq. (1) are estimated using the ordinary least squares (OLS) method with standard errors that are robust to arbitrary heteroskedasticity and autocorrelation. We expect the reverse causality from sustainability sukuk issuance size to its determinants to be weak. Let us imagine a scenario where a company decides to issue green sukuk to fund a renewable energy project. The company determines the issuance amount based on the project's funding requirements, such as the cost of equipment, installation, and maintenance. In other words, this issuance amount is relatively highly dependent on the project's needs rather than external factors. The coupon rate, on the other hand, is the periodic profit rate that the issuer pays to the sukukholders. The rate is often influenced by the investors' perceived risk of the investment, the issuer's creditworthiness, and market interest rates, less depending on the sukuk's issuance size. Similarly, the reverse causality from issue size to macroeconomic factors such as GDP is expected to be weak, given the relatively small size of the green and social sectors. Therefore, as done in previous studies, e.g., Barua & Chiesa (2019), Chiesa & Barua (2019), Dan & Tiron-Tudor (2021), Eyraud et al. (2013), and Russo et al. (2019), we resort to OLS, which offers a balance of simplicity, interpretability, and efficiency, making it an appropriate and sufficient estimation method for analysing the determinants of sustainability sukuk issuance.

IV. RESULTS

4.1. Trends in Sustainability Sukuk Issuance

4.1.1. Sustainability Sukuk Issuance Over Time

Table 2 reports the evolution of sustainability sukuk market over the years. It can be seen in the first column of the table that the sustainability sukuk issuance has been on an upward trajectory since 2017 (see also Figure 2), coinciding with the worldwide trend dubbed the "green bond boom" (Morgan Stanley, 2017). In the span of five years, the value of sustainability sukuk issuance rose by about 20 times from USD 0.46 billion in 2017 to USD 9.86 billion in 2022. The second and third columns of the table demonstrate that, in most years, the sustainability sukuk market is characterised by a predominance of green sukuk issuance, except since the year 2021. The shift persisted amidst a substantial decline in the quantity of green sukuk issued in the market, plummeting from 40 in 2021 to 7 in 2022, as shown in the fifth column of the table, despite the fact that its total amount in dollar remained relatively higher. Refinitiv (2023) in its Green and Sustainability Sukuk Report 2022 also reports a comparable trend, attributing it to the IsDB's commitment to raising USD 4 billion to address the health and economic ramifications of the COVID-19 outbreak and stimulate recovery in its member nations in the aftermath of the pandemic.



Source: Thomson Reuters Eikon; author's calculations.

Figure 2.
Evolution of Sustainability Sukuk Issuance, 2012-2022

The last two columns show that although the sustainability sukuk market has experienced a surge in its market share, with a nearly fifteenfold increase from only 0.33% in 2017 to an unprecedented peak of 5.41% in 2022, it remains a comparatively small segment of the entire sukuk market. For a comparison, the amount of sustainability sukuk issued in 2022 was USD 9.86 billion, while that of ordinary sukuk was USD 172.40 billion, illustrating a large disparity in the relative market sizes of the two sukuk types.

Table 2.
Sustainability Sukuk Issuance Over Time

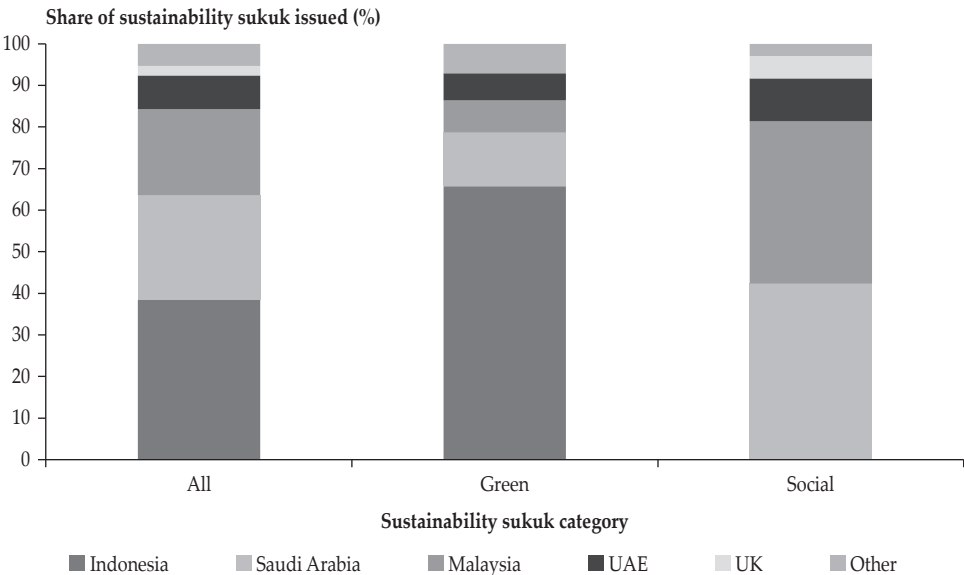
Year	Amount of sustainability sukuk (in million USD)			Number of sustainability sukuk		Amount of ordinary sukuk (in million USD)		Number of ordinary sukuk		Share of sustainability sukuk (amount) (%)		Share of sustainability sukuk (number) (%)	
	All	Green	Social	All	Green	Social		All	Green				
2022	9,855.04	5,217.03	4,638.01	31	7	24	172,402.47	1,482		5.41		2.05	
2021	7,638.62	2,483.48	5,155.14	54	40	14	195,111.23	1,371		3.77		3.79	
2020	5,580.85	3,271.40	2,309.45	47	41	6	162,814.88	1,315		3.31		3.45	
2019	4,367.94	4,322.72	45.22	65	58	7	194,482.34	1,388		2.20		4.47	
2018	2,726.58	2,610.22	116.36	37	36	1	134,365.40	1,185		1.99		3.03	
2017	459.31	459.31	0.00	53	53	0	138,421.74	968		0.33		5.19	
2016	0.00	0.00	0.00	0	0	0	98,192.04	885		0.00		0.00	
2015	231.45	0.00	231.45	2	0	2	79,067.75	719		0.29		0.28	
2014	500.00	0.00	500.00	1	0	1	101,721.48	670		0.49		0.15	
2013	0.00	0.00	0.00	0	0	0	113,380.83	864		0.00		0.00	
2012	0.01	0.00	0.01	1	0	1	126,391.27	806		0.00		0.12	
Total	31,359.79	18,364.16	12,995.63	291	235	56	1,516,351.44	11,653		1.62		2.05	

Notes: This table reports the amount issued in millions of US dollars and the number of sukuk issued for the global sample of 11,944 sukuk on a year-by-year basis spanning from 2012 to 2022, categorised into different sukuk types (i.e., sustainability, green, social, and ordinary sukuk). Green sukuk are sukuk whose proceeds are exclusively utilised to finance green or environmental projects. Whereas social sukuk are sukuk whose proceeds are utilised to finance social programs and ordinary sukuk are traditional non-sustainability sukuk. Source: Thomson Reuters Eikon; author's calculations.

4.1.2. Sustainability Sukuk Issuance Across Countries

Table 3 reports the issuance of sustainability sukuk across countries. In total, there are eleven countries that have issued sustainability sukuk to date. The leading issuers in terms of dollar amount are Indonesia (USD 12.08 billion), Saudi Arabia (USD 7.87 billion), Malaysia (USD 6.48 billion), and the UAE (USD 2.55 billion). However, as illustrated in Figure 3, these countries have championed the issuance of different types of sustainability sukuk. Specifically, Indonesia has dominated the green sukuk market, accounting for 65.78% of all issuances over the years, while the majority of social sukuk has been issued by Saudi Arabia (42.32%) and Malaysia (38.99%).

Similar to the aggregate global data presented in Table 2, it is evident in the final two columns of Table 3 that sustainability sukuk represents a minor fraction of the sukuk market at the national level, with an average share of 4.56% in terms of the amount issued.



Source: Thomson Reuters Eikon; author's calculations.

Figure 3.
Share of Amount of Sustainability Sukuk Issued by Country

Table 3.
Sustainability Sukuk Issuance Across Countries

	Amount of sustainability sukuk (in million USD)			Number of sustainability sukuk			Amount of ordinary sukuk (in million USD)	Number of ordinary sukuk	Share of sustainability sukuk	
	All	Green	Social	All	Green	Social			(amount) (%)	(number) (%)
Indonesia	12,079.93	12,079.93	0.00	15	15	0	184,892.09	966	6.13	1.53
Saudi Arabia	7,870.90	2,370.90	5,500.00	7	3	4	285,805.88	238	2.68	2.86
Malaysia	6,478.17	1,410.69	5,067.47	255	210	45	659,769.18	6,607	0.97	3.72
UAE	2,550.00	1,200.00	1,350.00	4	2	2	80,882.97	150	3.06	2.60
Bahrain	900.00	900.00	0.00	1	1	0	43,084.73	295	2.05	0.34
UK	700.00	0.00	700.00	2	0	2	1,396.62	8	33.39	20.00
Bangladesh	387.10	387.10	0.00	1	1	0	32,346.39	432	1.18	0.23
Turkey	363.29	13.29	350.00	3	2	1	82,560.56	1,212	0.44	0.25
South Africa	28.14	0.00	28.14	1	0	1	1,000.00	2	2.74	33.33
Nigeria	2.25	2.25	0.00	1	1	0	1,891.95	13	0.12	7.14
France	0.01	0.00	0.01	1	0	1	0.54	1	1.93	50.00
Others	0.00	0.00	0.00	0	0	0	142,720.55	1,729	0.00	0.00
Total	31,359.79	18,364.16	12,995.63	291	235	56	1,516,351.44	11,653	4.56	16.21

Notes: This table reports the amount issued in millions of US dollars and the number of sukuk issued for the global sample of 11,944 sukuk by country of issue, categorised into different sukuk types (i.e., sustainability, green, social, and ordinary sukuk). Green sukuk are sukuk whose proceeds are exclusively utilised to finance green or environmental projects. Whereas social sukuk are sukuk whose proceeds are utilised to finance social programs and ordinary sukuk are traditional non-sustainability sukuk. Source: Thomson Reuters Eikon; author's calculations.

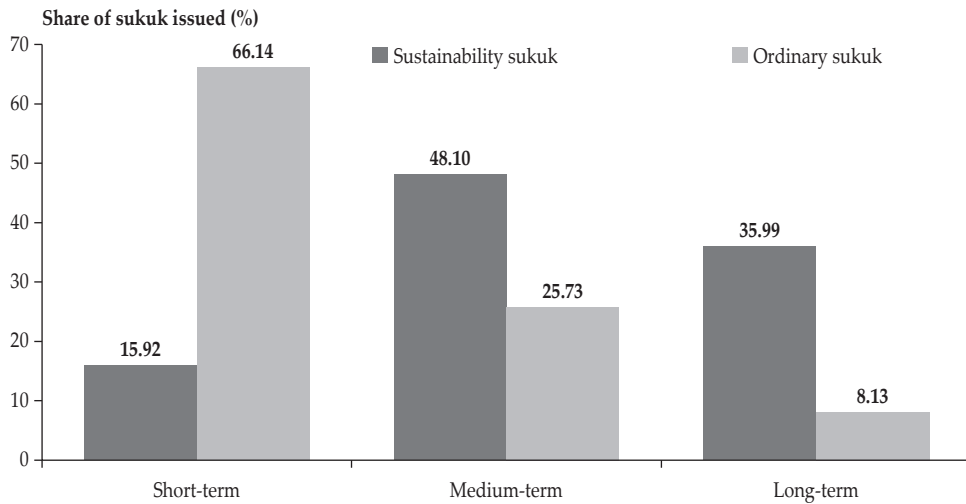
4.1.3. Sustainability Versus Ordinary Sukuk

From Tables 2 and 3, it can be seen that sustainability sukuk issue size tends to be smaller. On average, their issuance amounts to USD 107.77 million, which is 20% lower than the average issuance of USD 130.27 million for ordinary sukuk. This is in contrast to conventional green bonds, where their issuance exceeds that of their non-green counterparts (Flammer, 2020). The lower issuance amount of sustainability sukuk in comparison to ordinary sukuk could be attributed to limited supply of eligible projects that meet both ESG and Islamic criteria required for sustainability sukuk issuance. At first glance, it may appear perplexing that governments or firms opt for sustainability sukuk over traditional sukuk or even conventional sustainability bonds despite the higher constraints on investment options. Under sustainability sukuk, the eligible green and social programs are further earmarked, excluding those that are not aligned with Islamic teachings, such as investments in companies that promote lesbian, gay, bisexual, and transgender (LGBT) rights, atheism, and polytheism. As a result, this would shrink the pool of projects available for funding. Besides, meeting the various requirements including obtaining second-party opinion and Shariah certification can add to the already high costs of issuing ESG debt instruments, which may limit the size of sustainability sukuk issuances.

As regard to maturity, sustainability sukuk are due in a longer period of 9.1 years compared to only 3.6 years for ordinary sukuk. As shown in Figure 4, the proportion of sustainability sukuk with a medium-term and long-term maturity is higher than those with a short-term maturity, while vice versa for ordinary sukuk. This corresponds with the fact that sustainability sukuk are often issued by companies or organizations that have a long-term commitment to environmental and social stewardship. As such, they may seek to match the maturity of their debt with the expected life cycle of their environmental and social projects, which could be longer than traditional projects. Similarly, investors may prefer to invest in longer-term sustainability sukuk to match their investment strategies with their own prolonged environmental and social goals.

Despite its longer maturity, the data show that the coupon rate of sustainability sukuk is on average slightly lower, which is 4.98% compared to 5.20% for ordinary sukuk. This indicates that investors are willing to accept a lower return on their investment for a higher risk⁴, as long as it aligns with their sustainability and religious values. Besides, the issuance of sustainability sukuk may be incentivised by government incentives, including tax breaks, subsidies, credit guarantee, and credit enhancements that help improve the issuers' credit rating by improving their ability to meet their debt obligations and enhancing their overall financial health. This, in turn, would lower their cost of capital, resulting in lower coupon rates. Flammer (2020) similarly reports a lower coupon rate in the case of green bonds.

4 Generally, bonds with longer maturities tend to have higher coupon rates than bonds with shorter maturities. This is because they are exposed to greater uncertainty, which makes them riskier to investors. A higher coupon rate is needed to compensate investors for taking on this additional risk.

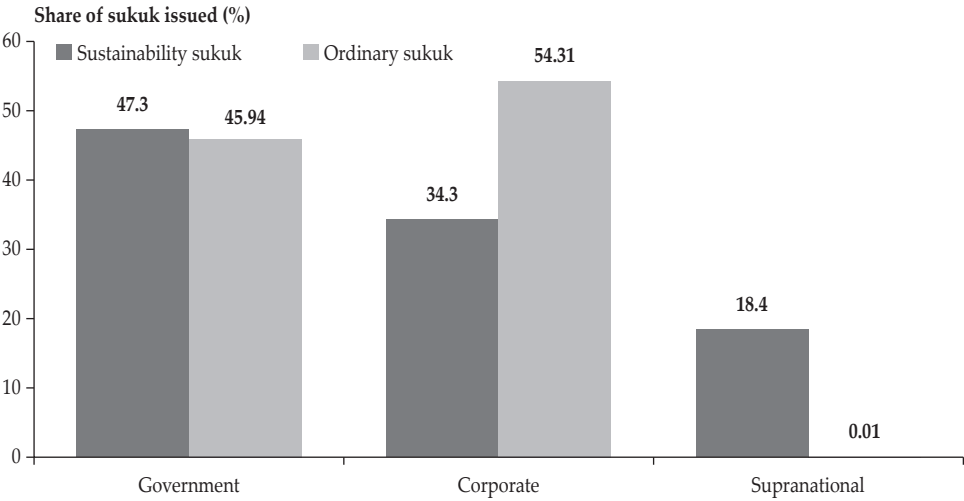


Note: The maturity of a sukuk is classified according to the US Securities and Exchange Commission's definition: short-term (less than 4 years), medium-term (4 to 10 years), or long-term (more than 10 years).

Source: Thomson Reuters Eikon; author's calculations.

Figure 4.
Share of Number of Sustainability and Ordinary Sukuk Issued by Maturity Type

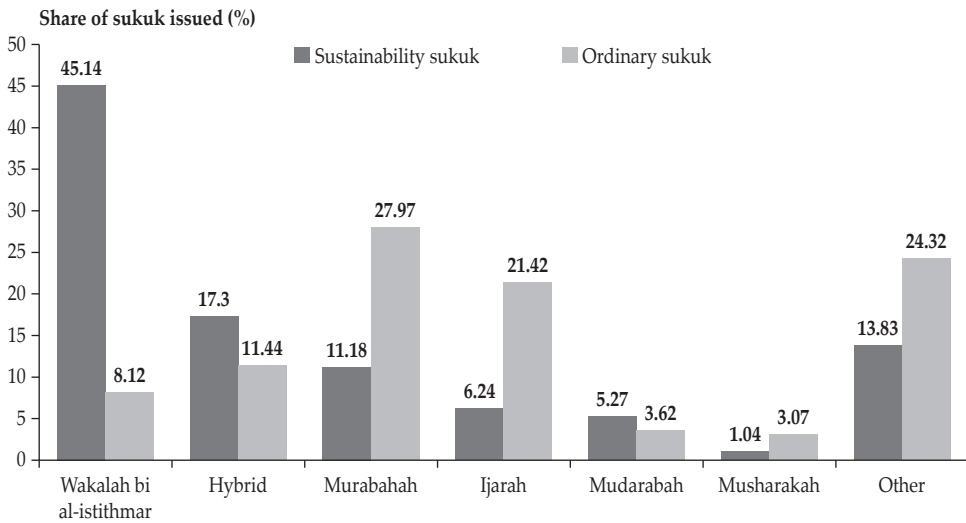
Contrary to ordinary sukuk, which are dominated by private issuances, sustainability sukuk are primarily issued by government entities. In total, governments have raised USD 14.83 billion (47.30%) during the sample period, followed by USD 10.76 billion (34.30%) issued by corporates, as shown in Figure 5. Governments are turning to sustainability sukuk as a means not just to fund sustainable projects, but also to signal their commitment to their national carbon neutrality agenda with the hope of inspiring other issuers to follow suit. It is also noteworthy that there has been a significantly larger participation from supranational organisations in sustainability sukuk issuance (18.40%) compared to ordinary sukuk (0.01%). In the past, sustainability sukuk has proved to be an important financing tool for these supranationals in achieving their missions of eradicating poverty, eliminating hunger and malnutrition, expanding vaccination and immunisation coverage, and building climate resilience especially in poor Muslim-majority countries (Noordin et al., 2018).



Source: Thomson Reuters Eikon; author's calculations.

Figure 5.
Share of Amount of Sustainability and Ordinary Sukuk Issued by Issuer Type

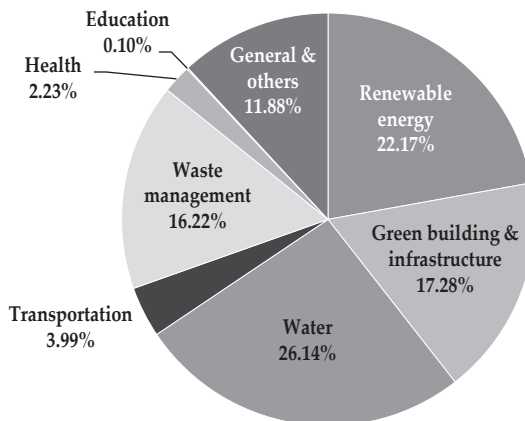
According to Figure 6, the predominant Shariah contract used when structuring sustainability sukuk is *wakalah bi al-istithmar* or agency contract, as opposed to sale-based contracts such as *murabahah* and *ijarah* contracts, which are commonly employed in ordinary sukuk issuance. The issuer may prefer an agency-based structure as it allows for greater flexibility in managing the sukuk proceeds and assets. This can be specifically important in the case of sustainability sukuk, where the proceeds are often dedicated to specific environmentally sustainable projects. The investment agent appointed by the sukuk issuer can exercise their discretion to manage the assets in a manner that best supports the attainment of the green and social objectives of the sukuk. Moreover, agency contracts may include specific provisions that ensure compliance with environmental and social standards. For example, the sukuk may require the agent to invest only in environmentally sustainable projects or to provide regular reporting on the environmental impact of the projects being financed. This can provide a level of assurance to issuers and investors that the funds are being used for the intended purpose and in a responsible manner.



Source: Thomson Reuters Eikon; author's calculations.

Figure 6.
Share of Amount of Sustainability and Ordinary Sukuk Issued by Shariah Contracts

Lastly, Figure 7 shows that sustainability sukuk proceeds are mostly utilised to finance water-related projects (26.14%) and renewable energy and energy efficiency investments (22.17%), followed by green building and infrastructure (17.28), and waste management (16.22%).



Source: Thomson Reuters Eikon; author's calculations.

Figure 7.
Uses of Sustainability Sukuk Proceeds

4.2. Determinants of Sustainability Sukuk Issue Size

Summary statistics of the variables included in our model is provided in Table 4. We also compute the pairwise correlation coefficients, as presented in Table 5. All correlations are relatively low (below 0.60) and thus suggest no indication of multicollinearity problem. Additionally, we calculate the variance inflation factor (VIF) scores for each predictor in the models and find that none of them exceeds the value of 5, a threshold suggested by Studenmund (2016).

Table 6 reports the results of estimating Eq. (1) using OLS regression method. The drivers of sustainability sukuk issuance are added in the regressions progressively. First, we allow the variation in the issue size to be explained by sukuk issue characteristics only in the regressions in the first three columns of the table. Next, we add issuer type dummies as independent variables in the regression in Column (4). Lastly, the result of estimating the full model, which includes several macroeconomic factors, is presented in Column (5). The full model runs on 260 observations after merging sukuk-level data with country-level macroeconomic indicators. The reduction from 291 observations reflects the non-availability of certain macroeconomic variables (i.e., GDP per capita, inflation, and trade openness) for specific country-year pairs, rather than missing issuance-level information. Overall, R-squared values range from approximately 75% to 80%, suggesting a strong explanatory power of the model.

Table 4.
Summary Statistics

Variable	Obs.	Mean	Std. dev.	Min.	Max.
Issue size	291	16.15	1.94	9.27	21.64
Coupon rate	291	4.98	2.24	0.00	28.00
Maturity	291	9.07	5.22	1.00	30.00
Rating	291	6.30	3.69	0.00	11.00
SPO	291	0.75	0.44	0.00	1.00
USD currency	291	0.09	0.29	0.00	1.00
Euro currency	291	0.01	0.08	0.00	1.00
Other currency	291	0.90	0.30	0.00	1.00
Social use	291	0.19	0.39	0.00	1.00
Green use	291	0.81	0.39	0.00	1.00
Equity contract	291	0.08	0.27	0.00	1.00
Hybrid contract	291	0.42	0.49	0.00	1.00
Sale contract	291	0.50	0.50	0.00	1.00
Bank	291	0.25	0.43	0.00	1.00
Government	291	0.07	0.25	0.00	1.00
Supranational	291	0.02	0.13	0.00	1.00
Non-financial	291	0.667	0.472	0.000	1.000
GDP per capita	260	11,295.04	5,451.46	2,065.75	47,447.60
Inflation	260	1.64	2.27	-2.09	19.60
Trade openness	260	63.56	13.22	10.66	96.66

Table 5.
Correlation Matrix

	VIF	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) Sukuk amount	1.00																
(2) Coupon rate	2.65	-0.18	1.00														
(3) Maturity	1.91	0.00	0.09	1.00													
(4) Bond rating	2.14	0.17	-0.20	0.35	1.00												
(5) SPO	1.87	-0.06	-0.08	0.24	0.42	1.00											
(6) USD currency	3.57	0.70	-0.23	-0.04	0.07	-0.20	1.00										
(7) Euro currency	1.69	-0.05	-0.05	0.05	-0.02	-0.05	-0.03	1.00									
(8) Social use	1.58	0.42	-0.21	-0.11	0.20	0.10	0.18	0.06	1.00								
(9) Equity contract	2.14	0.50	-0.09	-0.17	-0.02	-0.12	0.44	-0.02	0.18	1.00							
(10) Hybrid contract	1.61	-0.01	-0.07	-0.02	-0.08	0.18	-0.05	0.01	0.06	-0.25	1.00						
(11) Bank	2.24	0.20	0.05	-0.07	-0.07	0.25	0.10	-0.05	0.30	0.01	0.40	1.00					
(12) Government	3.93	0.56	-0.08	-0.01	-0.04	-0.23	0.50	-0.02	0.01	0.54	-0.09	-0.15	1.00				
(13) Supranational	2.74	0.30	-0.22	-0.12	0.01	-0.04	0.33	0.31	0.20	0.16	-0.06	-0.08	-0.03	1.00			
(14) GDP per capita	4.21	0.16	-0.24	-0.03	-0.02	-0.08	0.37	0.33	0.29	-0.10	0.02	0.13	-0.25	0.52	1.00		
(15) Inflation	1.48	0.14	0.07	-0.05	-0.12	-0.05	0.13	-0.07	0.04	0.01	-0.13	-0.18	0.08	-0.02	-0.20	1.00	
(16) Trade openness	3.04	-0.48	0.31	0.07	0.08	0.27	-0.53	-0.21	-0.08	-0.42	0.09	0.04	-0.61	-0.35	0.11	-0.18	1.00
Mean VIF	2.45																

Notes: This table provides a pairwise correlation matrix of the variables used in the analysis. The definition of each variable is provided in Table 1. *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

Table 6.
Sustainability Sukuk Issuance Determinants

	(1)	(2)	(3)	(4)	(5)
Coupon rate	-0.227*** (0.079)	-0.027 (0.061)	-0.062 (0.060)	-0.176*** (0.064)	-0.325 (0.357)
Maturity	0.045** (0.018)	0.052*** (0.016)	0.061*** (0.015)	0.061*** (0.012)	0.079** (0.033)
Rating	0.065* (0.035)	0.020 (0.033)	0.031 (0.034)	0.082*** (0.025)	0.060** (0.027)
SPO	-0.036 (0.230)	0.019 (0.203)	-0.094 (0.208)	-0.409** (0.176)	-0.309 (0.207)
USD currency	1.278 (1.083)	1.474** (0.685)	1.044* (0.577)	-0.507 (0.544)	-0.301 (1.242)
Euro currency	1.161 (1.319)	2.867*** (0.936)	2.500*** (0.847)	0.234 (0.713)	0.681 (2.299)
Social use		1.897*** (0.271)	1.616*** (0.257)	1.038*** (0.262)	1.089** (0.419)
Equity contract			0.986*** (0.290)	0.704*** (0.250)	1.022*** (0.349)
Hybrid contract			0.206 (0.134)	0.042 (0.136)	0.085 (0.152)
Bank				0.768*** (0.199)	0.606*** (0.209)
Government				3.231*** (0.661)	2.226*** (0.695)
Supranational				0.510 (0.602)	-0.953 (0.607)
GDP per capita					0.000*** (0.000)
Inflation					0.202 (0.164)
Trade openness					0.166* (0.093)
Constant	8.796*** (1.675)	3.655*** (1.388)	4.361*** (1.259)	8.011*** (1.230)	-4.700 (5.641)
Country fixed-effect	Yes	Yes	Yes	Yes	Yes
Year fixed-effect	Yes	Yes	Yes	Yes	Yes
R-squared	0.749	0.810	0.820	0.850	0.830
Prob > F	0.000	0.000	0.000	0.000	0.000
Observations	291	291	291	291	260

Notes: This table shows regression results estimating Eq. (1) using OLS. The dependent variable is the natural logarithm of the dollar value of the sustainability sukuk issue. The definitions of all independent variables are provided in Table 1. Issue country and year fixed effects are included in all specifications. Robust standard errors clustered at the issuer level are in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

4.2.1. Sukuk Issue Characteristics

As shown in Column (1) of Table 6, the coefficient of the coupon rate variable is negative and statistically significant at the 1% level, which indicates that sustainability sukuk issues with higher coupon rates are likely to be smaller in size. From an issuer's viewpoint, a higher coupon implies a higher payment commitment to sukukholders over the life of the sustainability sukuk, which can result in greater overall cost of financing and a lower issuance amount.⁵ The result is consistent with Barua & Chiesa (2019), Chiesa & Barua (2019), and Cicchiello et al. (2022) on conventional green bonds. This finding also aligns with the capital structure theory, which posits that issuers are sensitive to the cost of capital when determining the scale of external financing.

Interestingly, with respect to maturity, we find that sustainability sukuk with a more extended debt structure tend to have a larger issue size. This contradicts with the abovementioned studies, which document a weak and negative effect for green bonds, as well as that of Aziz et al. (2021) concerning ordinary sukuk. Substantial upfront investment and uncertain payoff associated with long-term green and social projects often prompt issuers to opt for larger issuances of sustainability sukuk to meet their funding needs. This is because they are not sure to be able to keep borrowing in the future (Diamond, 1991). Moreover, long-term maturity reduces the pressure of market monitoring from sukukholders. Viewed from a demand-pull perspective, sustainability sukuk with longer maturities are more likely to be issued at larger amounts as they hold greater appeal for institutional investors like pension funds and *takaful* (Islamic insurance) companies, which bear long-term liabilities and require the matching of their assets with their liabilities. Consequently, these entities tend to favour investments that offer stable and predictable returns in a long run, making sustainability sukuk with longer maturities a more attractive investment option (Zerbib, 2019). This finding is broadly consistent with the signalling theory and stakeholder theory, as issuers may use long-term sukuk structures to signal long-term commitment to sustainable outcomes while meeting the duration needs of environmentally and socially conscious investors.

Sukuk rating appears to positively influence issue size. Higher-rated sustainability sukuk are considered safer investments, attracting larger capital from investors, who seeks to meet their regulatory standards (Dan & Tiron-Tudor, 2021). Furthermore, with higher ratings, issuers of sustainability sukuk may be able to negotiate more favourable terms, such as longer maturities or lower yields, as investors may be willing to accept lower returns in exchange for lower credit risk (i.e., the issuer is less likely to default on its obligations to pay interest and principal to investors). As a result, this enables issuers to raise higher amounts of capital at a lower cost (Wang et al., 2019). This finding can be interpreted through the lens of the capital structure theory, where a higher credit rating functions as a credible signal of creditworthiness, reducing information asymmetry and enhancing investor confidence, thereby enabling issuers to scale up their sustainability sukuk offerings.

⁵ The return rate is based on the actual profits generated by the underlying assets or projects that the sukuk are financing, rather than a fixed interest rate in the case of conventional bonds.

The effect of obtaining a second party opinion (SPO) on sustainability sukuk issuance is subject to mixed interpretations and less discussed in the literature. SPO is an independent assessment on the green or social credentials of the sukuk provided by either ESG rating agencies, scientific experts, or environmental consultants (Climate Bonds Initiative, 2023). The assessment covers the evaluation of the issuer's sustainability sukuk framework, which includes the selection criteria for the projects to be financed, the use and management of the proceeds, and the reporting and verification requirements. On the one hand, SPO can exert a positive influence on the size of a sustainability sukuk issuance by reducing the perceived non-compliance risk for investors and boosting their confidence about the credibility of the sukuk (World Bank, 2020). Besides, increased visibility of the sustainability sukuk issue by means of an SPO (i.e., reported in the media and included in sustainability indices) can help lower the cost of financing for the issuer and lead to a higher issue amount (Abdullah & Keshminder, 2022).

On the other hand, carrying out an SPO may entail substantial costs, particularly for smaller issuers, which may need to be factored into the sukuk issuance expenses, thereby potentially inflating the overall cost of financing. Apart from that, in the event that the SPO yields an unfavourable evaluation of the environmental or social merits of the sukuk, the market reputation of the sukuk issuer is at stake. Issuers rely heavily on positive SPOs to build and maintain their credibility in the sustainability sukuk market. Negative SPO results can tarnish this reputation, making it more challenging to attract investors for both current and future issuances. A damaged reputation can lead to lower subscription rates and, consequently, smaller issuance amounts, as the market confidence in the issuer's green and social credentials is eroded. Financial aspects, such as pricing, also come into play. Sustainability sukuk with negative SPOs may face higher yields, as investors demand a risk premium to compensate for the perceived lack of environmental and social credibility. This increase in the cost of borrowing can deter issuers from raising larger amounts, as the financial attractiveness of issuing green or social sukuk diminishes. Higher yields mean higher costs for the issuer, which can lead to a strategic decision to limit the issuance size to manage financial and reputational risk exposure.

To test this relationship, we include a dummy variable that is equal to unity when the sustainability sukuk issue obtains an SPO in the regressions. The results are suggestive of a negative association between obtaining an SPO and the issue size of the sustainability sukuk, supporting the latter view. This finding is consistent with the reputational risk component of the signaling theory, where the potential downside of an adverse signal can have long-term consequences for issuer credibility and future fundraising capacity. It also reflects a cost-benefit tension within the stakeholder theory, as meeting stakeholder expectations through independent verification may come at a financial cost that not all issuers are willing or able to bear.

According to prior studies, green bonds denominated in widely accepted global currencies such as the USD and Euro tend to attract a larger investor base with greater investor confidence on a global scale compared to those issued in less widely recognized currencies (Barua & Chiesa, 2019; Chiesa & Barua, 2019). Moreover, the USD and Euro bond markets provide issuers with favorable pricing

and high liquidity, which can help reduce the cost of capital for issuers, thereby facilitating the possibility of larger green bond issuances. To confirm whether a similar hypothesis is also true for sustainability sukuk, we include a set of dummy variables indicating whether the principal amount of the sukuk is denominated in USD, Euro, or other currencies. Note that the omitted dummy variable in the regressions is the other currencies dummy. The results in Columns (2) and (3) reveal that sustainability sukuk with USD and Euro denomination are more likely to have a larger issue size relative to other currencies. However, this effect loses its significance when issuer types and the macroeconomic conditions of the issuing country are controlled.

There is strong evidence that sukuk proceeds raised for social programs tend to be larger than those mobilised for green projects. One possible reason is that social sukuk may have a wider scope than green sukuk, which focus primarily on environmental conservation. Social sukuk, on the other hand, may contribute towards addressing broader issues related to poverty alleviation, healthcare, education, affordable housing, and job creation, which are better understood by investors. Given this, there may be more potential issuers and investors interested in social sukuk, leading to higher demand and larger issuances.

The regressions in Columns (3)-(5) include dummy variables that split the sukuk issues according to their underlying Shariah contracts or structures: (i) equity-based, which include either a partnership contract (e.g., *mudarabah* and *musharakah*) or agency contract (e.g., *wakalah bi al-istithmar*); (ii) hybrid (i.e., a combination of two or more Shariah contracts into a single issuance); and (iii) debt-based, which utilises a cost-plus contract (e.g., *murabahah*, *istisna'*, and *ijarah*). Note that the omitted dummy variable in the regressions is the sale contract dummy. The statistically significant positive coefficients of the equity contract dummy imply that sustainability sukuk structured using equity-based contracts are more likely to be larger in their issue size relative to debt-based contracts. This is because equity contracts offer issuers a more flexible financing structure by allowing them to share ownership of green or social projects with investors, rather than being bound by fixed debt obligations that come with a traditional debt-based sukuk (Salah, 2010; Alswaidan et al., 2017). This can be particularly advantageous for issuers, especially in cases where cash flows from such projects may be delayed or uncertain. Furthermore, equity contracts may attract a more diverse pool of investors that include those with stronger incentives to actively monitor and ensure the success of the projects, as their returns are directly linked to the projects' profitability. For issuers seeking to raise larger amounts of capital, this can be a valuable choice, as it reduces their reliance on a small group of debt-focused investors.

4.2.2. Issuer Types

The coefficients on the issuer type dummies in the regression in Column (4) indicate that the size of the sustainability sukuk issued by banks and other financial institutions tends to be larger when compared to that of non-financial corporations. The explanation for this is that banks have strong brand reputation and long-standing relationships with investors, rendering them capable of

marketing and selling sustainability sukuk with larger issuances (Cao et al., 2021; Fatica et al., 2021). Besides, the regulatory pressure, which includes the setting of specific targets and incentives to integrate sustainability considerations into the operations and activities of banks may have contributed to the increased issuance of sustainability sukuk. Our findings are broadly in line with the results of Barua & Chiesa's (2019) year-wise analysis on green bonds issuance in 2015 and 2016, but contradicts the negative result obtained by Chiesa & Barua (2019) for advanced economies. Similarly, the government issuer dummy shows a significant positive effect on issue size. This result implies governments often possess a greater capacity to finance environmentally sustainable and socially responsible initiatives on a larger scale, which may be challenging for private firms to undertake. They are also perceived as low-risk borrowers, making them as a preferred issuer among investors, who seek out the security and stability that sustainable fixed instruments offer.

These findings can be understood through the lens of institutional legitimacy theory, which posits that organizations, especially those operating in public or highly regulated domains, issue sustainability-oriented instruments in part to maintain or enhance their legitimacy in the eyes of stakeholders. Banks and governments face greater societal expectations to demonstrate alignment with public interest, environmental goals, and ethical standards. By issuing sustainability sukuk, these entities respond to external pressures and norms that shape what is considered appropriate financial behavior. Large-scale issuances serve not only economic functions but also signal conformity with evolving regulatory, social, and environmental expectations, thereby reinforcing the issuers' legitimacy.

4.2.3. Macroeconomic Factors

Considering the macroeconomic characteristics of the issuing countries, only GDP per capita and trade openness enter the regression in Column (5) significantly. Consistent with Eyraud et al. (2013) concerning the determinants of green investments, the result suggests that a higher level of income tends to boost sustainability sukuk issuance. Higher income countries often have more developed financial markets with more sophisticated investors, resulting in greater demand for sustainability sukuk. Additionally, companies in such countries may have more resources and expertise to embark on green and social initiatives, which can boost the supply of sustainability sukuk (Liu et al., 2022). Next, the result also indicates that countries that are more open to international trade may be better positioned to issue larger amounts of sustainability sukuk. This is because trade openness can promote the transfer of technology and know-how related to sustainable development, which is crucial for catalysing investment in green and social projects and ultimately, the issuance of sustainability sukuk (Tolliver et al., 2020). Moreover, trade agreements and regulations that are climate friendly and socially conscious may create a supportive environment for issuing sustainability sukuk.

V. CONCLUSION AND RECOMMENDATIONS

Sustainability sukuk, an emerging fixed-income instrument that aligns with both sustainability objectives and Islamic principles, have garnered considerable attention in recent years as a promising, though still underexplored, vehicle for financing green and social enterprises to bridge critical funding gaps. This study first traces the development of the sustainability sukuk market across countries and over time since its inception in 2012. Despite recording new highs in recent years, the market remains largely concentrated in a few countries with more mature Islamic finance systems. A broader participation from low-income Muslim-majority nations is therefore desirable to ensure more inclusive and balanced market growth. Consistent with the findings of the World Bank (2020), our analysis shows that most sustainability sukuk issuances have so far focused on typical green sectors such as renewable energy and infrastructure. While these are essential for achieving net-zero goals, there is an urgent need to expand issuance into sectors with stronger social impact, such as affordable housing, healthcare, education, and community empowerment, to advance sustainable and inclusive growth in Muslim countries.

In the second part of our analysis, we examine the determinants of sustainability sukuk issuance size. The results reveal that higher security quality, longer maturity, and denomination in major international currencies (e.g., USD and Euro) are associated with larger issuances. Two unique drivers are identified, namely, higher costs of second-party opinions, which reduce issue size, and the use of equity-based Islamic contracts, which encourage larger issuances compared to sale-based structures. Moreover, we document that issuances by government entities and financial institutions, and those raised for social rather than green purposes, tend to be larger. At the macroeconomic level, higher economic development and greater trade openness are also linked with larger sustainability sukuk issues.

The findings carry several policy implications amid global efforts to leverage Islamic finance for net-zero goals. They highlight the need to expand sustainability sukuk issuance, especially by private and non-financial firms in developing and non-Muslim countries. First, comprehensive regulatory frameworks are vital to clarify eligible projects, Shariah compliance, utilisation of proceeds, and external reviews, aligned with both local and international standards. Malaysia's SRI Sukuk Framework (2014) and ASEAN Green Bond Standards (2018) exemplify such efforts. Regulatory clarity and streamlined procedures can lower complexity and perceived risk, encouraging private participation. Second, developing a global sustainability sukuk taxonomy and harmonising disclosure standards can strengthen transparency, credibility, and comparability while reducing greenwashing concerns. Third, incentives and market measures are crucial to reduce issuance costs. Governments can offer tax deductions, guarantees, or profit rate subsidies, as seen in Malaysia's SRI Sukuk tax incentives (2016–2023), GTFS 2.0 (2018) with full Danajamin guarantees and 2% rebates, and Bank Pembangunan's guarantee for Econas Resource's sukuk (2023). Grants such as the SC's SRI Sukuk Grant Scheme (2022) can offset costs of external reviews, while fee waivers and listing subsidies further encourage participation. Fourth, awareness campaigns, workshops, and case studies can enhance private issuers' understanding of

sustainability sukuk benefits and processes. Finally, developing supportive ecosystems, linking firms with financial institutions, advisors, and marketplaces for best practice exchange, can facilitate broader adoption.

For issuers, several lessons emerge. Strengthening credit quality through sound governance and transparency boosts investor confidence and issuance size. Offering longer maturities attracts stable, long-term investors, while tapping USD or Euro markets broadens reach. Equity-based sukuk structures are preferable for sustainability projects as they align incentives, support long-term perspectives, and allow flexibility. Finally, issuers should focus on impactful community projects, such as affordable housing, healthcare, and education, supported by strong narratives and impact measurement to attract ethical investors and scale up sukuk issuances.

Several limitations of the paper provide opportunities for future research. First, the geographical concentration of the sustainability sukuk issuance may limit the generalisability of the findings to countries with less developed Islamic finance ecosystems. As the sukuk market expands, future studies could extend the observation period and include new jurisdictions to assess whether the identified relationships hold across different institutional and regulatory settings. Country-level comparisons could further clarify how regulatory frameworks, Shariah governance, and market infrastructure shape issuance patterns. Moreover, in the event of policy changes, future research could employ quasi-experimental approaches to assess the effects of regulatory reforms and issuance incentives, provided that credible data are available.

Second, the focus on issuance size provides only a partial assessment of sustainability sukuk development and its societal impact. To complement this analysis, future studies could granularly investigate the decision to issue, financing costs, investor demand, and secondary-market liquidity to develop a holistic understanding of sustainability sukuk issuance. Linking issuance data with post-issuance reporting and project-level outcomes would also help establish whether larger issuances translate into measurable environmental and social benefits. Further research could examine whether the costs of second-party opinions are offset by improvements in credibility and financing conditions, and whether equity-based structures deliver stronger sustainability outcomes. Complementing quantitative analysis with interviews involving issuers, investors, and external reviewers could illuminate the practical barriers and motivations underlying these relationships.

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REFERENCES

- Aassouli, D., Asutay, M., Mohieldin, M., & Chiara Nwokike, T. (2018). *Green Sukuk, Energy Poverty, and Climate Change A Roadmap for Sub-Saharan Africa*. <http://www.worldbank.org/>
- Abdullah, M. S., & Keshminder, J. S. (2022). What drives green sukuk? A leader's perspective. *Journal of Sustainable Finance and Investment*, 12(3), 985–1005.
- Alam, N., Duygun, M., & Ariss, R. T. (2016). Green sukuk: An innovation in Islamic capital markets. In *Energy and finance: Sustainability in the energy industry* (pp. 167-185). Cham: Springer International Publishing.
- Alexander, G. J., Edwards, A. K., & Ferri, M. G. (2000). The determinants of trading volume of high-yield corporate bonds. *Journal of Financial Markets*, 3(2), 177-204.
- Alswaidan, M. W., Daynes, A., & Pasgas, P. (2017). Understanding and evaluation of risk in Sukuk structures. *Journal of Islamic Accounting and Business Research*, 8(4), 389–405.
- Ardalan, K. (2017). Capital structure theory: Reconsidered. *Research in International Business and Finance*, 39, 696-710.
- Aziz, S., Ashraf, D., & El-Khatib, R. (2021). Societal trust and Sukuk activity. *Journal of International Financial Markets, Institutions and Money*, 74, 101384.
- Barua, S., & Chiesa, M. (2019). Sustainable financing practices through green bonds: What affects the funding size? *Business Strategy and the Environment*, 28(6), 1131–1147.
- Bernini, F., & La Rosa, F. (2024). Research in the greenwashing field: Concepts, theories, and potential impacts on economic and social value. *Journal of Management and Governance*, 28(2), 405-444.
- Cao, X., Jin, C., & Ma, W. (2021). Motivation of Chinese commercial banks to issue green bonds: financing costs or regulatory arbitrage? *China Economic Review*, 66, 101582.
- Chiesa, M., & Barua, S. (2019). The surge of impact borrowing: The magnitude and determinants of green bond supply and its heterogeneity across markets. *Journal of Sustainable Finance and Investment*, 9(2), 138–161.
- Cicchiello, A. F., Cotugno, M., Monferrà, S., & Perdichizzi, S. (2022). Which are the factors influencing green bonds issuance? Evidence from the European bonds market. *Finance Research Letters*, 50, 103190.
- Climate Bonds Initiative. (2023). *The Climate Bonds expanded Standard and Certification Scheme*. Accessible at <https://www.climatebonds.net/certification>
- Dan, A., & Tiron-Tudor, A. (2021). The determinants of green bond issuance in the European Union. *Journal of Risk and Financial Management*, 14(9), 446. <https://doi.org/10.3390/jrfm14090446>.
- Diamond, D. W. (1991). Debt maturity structure and liquidity risk. *The Quarterly Journal of Economics*, 106(3), 709–737.
- Diamond-Smith, N., Smith, K. R., & Hodoglugil, N. N. S. (2011). Climate change and population in the Muslim world. *International Journal of Environmental Studies*, 68(1), 1–8.
- Eitrem, A., Meidell, A., & Modell, S. (2024). The use of institutional theory in social and environmental accounting research: A critical review. *Accounting and Business Research*, 54(7), 775-810.

- Eyraud, L., Clements, B., & Wane, A. (2013). Green investment: Trends and determinants. *Energy Policy*, 60, 852–865.
- Fatica, S., Panzica, R., & Rancan, M. (2021). The pricing of green bonds: Are financial institutions special? *Journal of Financial Stability*, 54, 100873.
- Flammer, C. (2020). Green bonds: Effectiveness and implications for public policy. *Environmental and Energy Policy and the Economy*, 1(1), 95–128.
- Freeman, R. E., Phillips, R., & Sisodia, R. (2020). Tensions in stakeholder theory. *Business & Society*, 59(2), 213–231.
- Friske, W., Hoelscher, S. A., & Nikolov, A. N. (2023). The impact of voluntary sustainability reporting on firm value: Insights from signaling theory. *Journal of the Academy of Marketing Science*, 51(2), 372–392.
- Guermazi, I. (2020). The determinants of sukuk issuance in GCC countries. *Islamic Economic Studies*, 28(1), 25–45.
- Harjoto, M. A., Hoepner, A. G., & Nilsson, M. A. (2022). Bondholders' returns and stakeholders' interests. *Review of Quantitative Finance and Accounting*, 59(4), 1271–1301.
- Jolink, A., & Niesten, E. (2021). Credibly reducing information asymmetry: Signaling on economic or environmental value by environmental alliances. *Long Range Planning*, 54(4), 101996.
- Jonsdottir, G. E., Sigurjonsson, T. O., Alavi, A. R., & Mitchell, J. (2021). Applying responsible ownership to advance SDGs and the ESG framework, resulting in the issuance of green bonds. *Sustainability*, 13(13), 7331.
- Keshminder, J. S., Abdullah, M. S., & Mardi, M. (2022). Green sukuk – Malaysia surviving the bumpy road: Performance, challenges and reconciled issuance framework. *Qualitative Research in Financial Markets*, 14(1), 76–94.
- Liu, F. H., & Lai, K. P. (2021). Ecologies of green finance: Green sukuk and development of green Islamic finance in Malaysia. *Environment and Planning A: Economy and Space*, 53(8), 1896–1914.
- Liu, S., Qi, H., & Wan, Y. (2022). Driving factors behind the development of China's green bond market. *Journal of Cleaner Production*, 354, 131705.
- Moratis, L. (2018). Signalling responsibility? Applying signalling theory to the ISO 26000 standard for social responsibility. *Sustainability*, 10(11), 4172.
- Morgan Stanley (2017). *Behind the Green Bond Boom*. Accessible at <https://www.morganstanley.com/ideas/green-bond-boom>
- Nagano, M. (2016). Who issues Sukuk and when?: An analysis of the determinants of Islamic bond issuance. *Review of Financial Economics*, 31, 45–55.
- Noordin, N. H., Haron, S. N., Hasan, A., & Hassan, R. (2018). Complying with the requirements for issuance of SRI sukuk: The case of Khazanah's Sukuk Ihsan. *Journal of Islamic Accounting and Business Research*, 9(3), 415–433.
- Refinitiv (2023). *Green and Sustainability Sukuk Report 2022: Financing a Sustainable Future*. Accessible at <https://www-ams1.qa.refinitiv.com/en/resources/special-report/green-sustainability-sukuk-2022-financing-future>
- Richter, U. H., & Dow, K. E. (2017). Stakeholder theory: A deliberative perspective. *Business Ethics: A European Review*, 26(4), 428–442.
- Russo, A., Mariani, M., & Caragnano, A. (2021). Exploring the determinants of green bond issuance: Going beyond the long-lasting debate on performance consequences. *Business Strategy and the Environment*, 30(1), 38–59.

- Salah, O. (2010). Islamic finance: The impact of the AAOIFI resolution on equity-based sukuk structures. *Law and Financial Markets Review*, 4(5), 507–517.
- Smaoui, H., & Khawaja, M. (2017). The determinants of sukuk market development. *Emerging Markets Finance and Trade*, 53(7), 1501–1518.
- Steigenberger, N. (2025). Deceptive signalling: Causes, consequences and remedies. *International Journal of Management Reviews*, 27(2), 283–305.
- Studenmund, A. H. (2016). Using econometrics: A practical guide (6th International Ed.). In *Pearson education*. Upper Saddle River, New Jersey: Pearson Education.
- Taj, S. A. (2016). Application of signaling theory in management research: Addressing major gaps in theory. *European Management Journal*, 34(4), 338–348.
- Tilling, M. V. (2004). Some thoughts on legitimacy theory in social and environmental accounting. *Social and Environmental Accountability Journal*, 24(2), 3–7.
- Tolliver, C., Keeley, A. R., & Managi, S. (2020). Drivers of green bond market growth: The importance of Nationally Determined Contributions to the Paris Agreement and implications for sustainability. *Journal of Cleaner Production*, 244, 118643.
- Wang, Q., Zhou, Y., Luo, L., & Ji, J. (2019). Research on the factors affecting the risk premium of China's green bond issuance. *Sustainability*, 11(22), 6394.
- World Bank (2020). *Pioneering the Green Sukuk: Three Years On*. Accessible at <https://www.worldbank.org/en/country/malaysia/publication/pioneering-the-green-sukuk-three-years-on>
- Wukich, J. J., Neuman, E. L., & Fogarty, T. J. (2024). Show me? Inspire me? Make me? An institutional theory exploration of social and environmental reporting practices. *Journal of Accounting & Organizational Change*, 20(4), 673–701.
- Zerbib, O. D. (2019). The effect of pro-environmental preferences on bond prices: Evidence from green bonds. *Journal of Banking & Finance*, 98, 39–60. <https://doi.org/10.1016/j.jbankfin.2018.10.012>
- Zhu, Q., Zhao, X., & Wu, M. (2024). Third-party certification: How to effectively prevent greenwash in green bond market? – analysis based on signalling game. *Environment, Development and Sustainability*, 26(6), 16173–16199.