

DO INVESTORS GET BENEFITS FROM CORPORATE GREEN SUKUK ISSUANCE

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ABSTRACT

This study evaluates whether investors benefit from green sukuk by examining the responses of stock returns to the announcements of corporate green sukuk (green Islamic bonds) issuance. Applying the standard event study methodology, it finds that stock returns respond positively and significantly to the announcements of green sukuk issuance, suggesting that investors perceive and react favorably to the announcement. This significantly positive response is observed both for the individual firm (through CARs) and for a sample of all firms (through CAARs). Thus, it can be concluded that investors benefit from the announcements of green sukuk issuance. Further, this study draws a comparative analysis of investors' response to the announcements of corporate green sukuk and corporate green bond issuance, and the findings also show that investors respond positively to the announcements of green bond issuances. However, the investors' response is slightly higher to the announcements of corporate green sukuk issuance compared to corporate green bonds, and the investors get slightly more benefit from green sukuk issuance as compared to green bond issuance. These findings inform policymakers for the formulation of strategies to attract investors by integrating green bonds with shariah principles to fund environment-friendly projects and consequently mitigate the climate change risk.

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I. INTRODUCTION

Currently, there is increasing attention given to the concepts of “sustainable finance” and “green finance” within the financial discourse. The terms typically encompass financial instruments that are specifically allocated to projects and initiatives aimed at sustainable development. The primary objectives of such instruments are to enhance environmental outcomes and facilitate the transition towards a green/low-carbon economy. The discourse about the potential harmony between green finance and Islamic finance arose in July 2017, following the issuance of the world’s inaugural green sukuk by a Malaysian solar photovoltaic firm. Malaysia’s experience with issuing SRI sukuk to fund projects in the education and green energy areas shows that it holds promise as an innovative Shariah-compliant financial tool (Khouildi & Kassim, 2018). In recent times, there has been a notable emergence of Islamic green sukuk, which can be understood as an Islamic-compliant variant of green bonds. This financial product has the potential to tackle specific critiques associated with conventional green bonds. Considering the Paris Climate Agreement and Sustainable Development Goals set by the United Nations, certain professionals recognize the potential for green finance and Islamic finance to align and support sustainability and climate objectives, particularly within Islamic finance (Ahmed et al., 2015; Bennett & Iqbal, 2013; Obaidullah, 2018; RFI, 2018; UNPRI, 2017).

It is widely known that Islamic finance prohibits certain financial practices, such as the charging of interest or the operation of businesses in industries that are forbidden by Islam (Pollard & Samers, 2007; Rethel, 2011). This prohibition is primarily motivated by the overarching purpose of increasing communities’ overall welfare and equality (Obaidullah, 2018; Visser, 2013). Consequently, financial experts, environmental think tanks, and Islamic scholars have reasoned that there is a consensus that Islamic finance aligns with green finance principles. This alignment aims to direct investments for initiatives that promote positive environmental impacts (Ahmed et al., 2015; Obaidullah, 2018; RFI, 2018; UNPRI, 2017). Notably, the *wasatiyyah* concept calls for keeping the balance of *mizan*, which is the natural state of the world. This means that waste, corruption, and extravagance should be avoided. Under Islamic beliefs, the practice of *fasad*, which can be translated as “the promotion of disorder,” as well as immoral business transactions and deals such as interest or usury (*riba*), ambiguous or fraudulent contracts (*gharar*), and gambling (*maysir*), are forbidden (RFI, 2018). Based on this system, the primary responsibility of organizations should be to satisfy the requirements of people within the parameters of an economic system that is both sustainable and productive. Therefore, any financial transactions contributing to disorder, especially the loss of natural resources, are strictly forbidden (Obaidullah, 2018; RFI, 2018). For Sharia and environmental sustainability to thrive together, Islamic finance must contribute to fighting global warming and protecting the environment (Obaidullah, 2018). The application of “Green sukuk”, which possesses distinct structural prerequisites and is grounded in the simultaneous expression of economic, environmental, and Islamic principles, holds promise in addressing specific challenges encountered in the field of green financing.

Green sukuk, like green bonds, can be used to finance projects that are good for the environment. However, it is essential to note that green sukuk differentiates

itself from green bonds by complying with Shariah principles, making it a “Shariah-compliant financial instrument”. The issuance of green sukuk is marked by incorporating two distinct designations, namely “Islamic” and “Green.” The term “Islamic” denotes that sukuk, a type of financial investment that creates returns for investors without charging interest, is based on the principles of Sharia (Islamic law). Instead of receiving interest payments, investors are given a predetermined share of the profits made by the whole portfolio of underlying assets (World Bank, 2020). These investors also have a stake in the portfolio’s overall performance.

When a sukuk is given the “Green” label, it indicates that it complies with the standards for green bonds, which are also referred to as principles and frameworks. Green bonds are issued with the purpose of using the proceeds to fund climate change adaptation initiatives, climate change mitigation projects, and other environmental projects. The term “Green” denotes that sukuk, a type of financial investment whose proceeds are used to finance environment-friendly projects (Azhgaliyeva, 2021). The green sukuk are designated as green in accordance with the Green Bond Principles (GBP) established by the International Capital Market Association (World Bank, 2020). Furthermore, alongside the green bond principles established by the International Capital Market Association, numerous green sukuk are designated in accordance with the ASEAN Green Bonds Standards set forth by the ASEAN Capital Market Forum.

Literature shows that various announcements and factors may influence stock responses. For example, Li & Hu (1998) find positive stock responses to macroeconomic announcements. Similarly, Hunjra et al. (2014) observe significant relationship between stock prices and macroeconomic variables. Moreover, national culture influences the stock responses to the announcement (Ashraf, 2021; Fernandez-Perez et al., 2021). Hence, stock responses may also be influenced by other factors/announcements like green sukuk issuance. For instance, a few studies highlight that the issuance of green bonds raises the value of a company, which could affect the stock market even more. Many researchers find that the stock responds positively to the issuance of green bonds, which shows that shareholders can gain from corporate green bond issuance (Flammer, 2021; Tang & Zhang, 2020; Wang et al., 2020; Baulkaran, 2019; Mohd Roslen et al., 2017). Still, other studies note that the stock reacts negatively to issuance announcement of green bonds (Wu, 2022; Lebelle et al., 2020). Like green bond issuance announcements, the sukuk issuance announcements may also have a positive or negative effect on the stocks; for examples, Mohamed et al. (2017) and Rahim & Ahmed (2016) find evidence supporting positive stock responses to the announcements of sukuk issuance while Godlewski et al. (2013) find the responses to be negative.

As the green sukuk bears both “Green” and “Islamic” labels, it is expected that stocks may react to the announcements of green sukuk issuance, and investors can either benefit or lose from these issuance announcements. However, to the best of the researcher’s knowledge, there is a lack of studies in this domain. Therefore, this study is first in its nature to investigate the stock’s response to the announcement of green sukuk issuance. The result of this study shows that stock responses are significantly positive to the announcement of green sukuk (green Islamic bonds) issuance both for individual firms (through CARs) and for a full sample of firms (through CAARs), suggesting that investors benefit from such announcement.

This study contributes to the green and Islamic finance (green or sustainability sukuk) literature, as this is the first study in its nature to investigate whether investors get benefit from green sukuk (green Islamic bonds) issuance announcements by examining the stock response to the announcement of green sukuk. Emphasizing green and shariah-compliance-based concepts, this study has important implications for investors who want to invest in financial instruments with ESG and shariah-compliance-based mandates. This study may help policymakers formulate strategies for attracting investors by integrating green investment with shariah principles to solve the problems of funds for environment-friendly projects to mitigate the climate change risk.

This research will also help the government create a solid plan for rewarding companies or other entities that successfully mitigate environmental issues. The government's incentive program works well to promote the issuance of green corporate Sukuk. The government can raise money to finance environmentally friendly initiatives, mitigate harmful effects on the environment, and encourage sustainable economic growth by issuing Green Sukuk. Additionally, the government employs green sukuk in state financing, which is a clear demonstration of its commitment to advancing environmentally friendly growth and protecting the environment. This strategy could raise awareness among the general population about environmental issues and the importance of programs that support environmental sustainability.

As the data on public corporate issuers of green sukuk is limited, the dataset is the main limitation of this study. Further study may be conducted by comparing the investor response to the announcement of sovereign green sukuk issuance with corporate green sukuk issuance. A comparative study on stock response to green sukuk vs issuance of conventional sukuk may be performed in the future.

II. LITERATURE REVIEW

Literature highlights that stock markets tend to react to macroeconomic and other factors. Li & Hu (1998) document positive stock responses to macroeconomic announcements. Similarly, Imran et al. (2014) observe significant relationship between stock prices and macroeconomic variables. Moreover, national culture influences the stock responses to the announcement (Ashraf, 2021; Fernandez-Perez et al., 2021). Hence, stock responses may also be influenced by other factors/announcements like green sukuk issuance announcements. Green and sustainability sukus provide new and innovative strategies for sustainable finance, and their issuance may elicit varied responses within the community of investors.

2.1. Signaling Theory

Theoretically, stock reactions to green sukuk issuance can be explained by the signaling theory. According to the theory, under information asymmetry, a party must select whether and in what way to communicate (or signal) information to the other party. In corporate world, Firms know very well about their abilities as compared to investors. It is in the enterprises' best interests to reduce their

asymmetric information by acting in a way that reliably transfers the information, or by sending a signal. In signaling theory, a signal is reliable if it is costly to imitate by companies with less desirable features (Riley, 1979; Spence, 1973).

The corporate green sukuk's issuance can be interpreted through the lens of signaling theory. Investors usually lack adequate information to assess the firm's commitment toward environment and shariah compliance principles (Lyon & Maxwell, 2011; Lyon & Montgomery, 2015; Muhamad Sori et al., 2019). From the investors' point of view, this generates a desire to credibly differentiate between those firms that are dedicated to the environment as well as shariah compliance principles versus those firms that are not.

Through corporate green sukuk issuance, firms send signal in the market about their commitment toward environment as well as shariah compliance principles. The signal is considered reliable for the following reasons. First, through corporate green sukuk issuance, firms promise significant amount of fund to environment friendly/green projects. Second, they promise compliance to shariah principles. In sum, the corporate green sukuk issuance may serve as reliable signal about the firm's dedication to environment and shariah compliance principles. Previous studies also support the application of signaling theory in justifying the concept of stocks reaction to news. Flammer (2021) recently applies the signaling theory in justifying the stock responses to corporate green bonds issuance. Similarly, Muhamad Sori et al. (2019) apply the signaling theory in their study regarding the stock market reaction to sukuk rating changes.

As the green and sustainability sukuk are new financial instruments, there is yet the literature that addresses the stock responses to green and sustainability sukuk. As the green sukuk has both "Green" and "Islamic" labels, this section presents the literature in two sections. One section reports the stock responses to green bond issuance, and the other describes the stock response to sukuk issuance. The stock response to green bonds issuance covers the "Green" label, whereas the stock response to sukuk issuance covers the "Islamic" label of green and sustainability sukuk.

2.2. Stock Response to Green Bonds

The Green Bond, a relatively recent financial product, has sparked discussions within the financial industry regarding its effectiveness in addressing climate change. Private financial institutions have predominantly spearheaded the research on Green Bonds and the scholarly research work pertaining to Green Bonds is recent.

Whether Green Bonds create value has been the center of discussion and interest for investors and various existing studies provide an affirmative answer. For instance, Tang & Zhang (2020) provide evidence that shareholders benefit from the issuance of green bonds by demonstrating a positive response of stock prices to the issuance of green bonds. This finding is further collaborated by various studies in different context, among them include Baulkaran (2019), Flammer (2021), Verma & Bansal (2023), Mohd Roslen et al. (2017), Zhou & Cui (2019), Laborda & Sánchez-Guerra (2021), Pedersen & Thun (2019), and Glavas (2019). Moreover, green bond issuers tend to benefit from the reduction in the cost of debt, which is attributed

to increased awareness among individuals to invest in financial instruments that contribute to environmental well-being (Flammer, 2021; Tang & Zhang, 2020).

However, while considering the viewpoint of investors, it can be observed that green bonds exclusively attract funds from investors who adhere to environmental, social, and governance (ESG) requirements. Investors may perceive green bonds as a strategic approach employed by corporations to secure financing from investors who prioritize environmental, social, and governance (ESG) factors. In 2013, a majority of Electricite de France's (EDF)¹ green bonds, precisely 60 percent, were allocated to investors who demonstrate a belief in and adherence to environmental, social, and governance (ESG) principles. The primary ruling strategy for investment in organizations among these investors is not the increase of wealth. Hence, the utilization of a novel financing technique by green bond issuers may result in a negative or neutral outcome. For instance, Wu (2022) finds a decline in stock returns subsequent to the issuance of green bonds, which can be seen as a reflection of an adverse stock reaction towards such bond offerings. Similarly, Lebellet et al. (2020) observe a negative response of stocks to green bond issuance globally, which suggests that investors perceive green bonds in a similar manner as convertible or conventional bonds.

In summary, while the above literature provides evidence of both positive and negative stock responses to green bond issuance, evidence for the positive stock responses dominates.

2.3. Stock Response to Sukuk (Islamic Bonds)

While there is no literature specifically on stock market responses to green sukuk issuance, empirical research regarding stock responses to sukuk (conventional sukuk) is available. As far as the green sukuk is concerned, it carries both "Green" and "Islamic" features, and stock responses to green bonds have already been discussed in the previous section that has covered the green feature. In contrast, this section highlights the stock responses to sukuk issuance, which covers the "Islamic" feature of green sukuk.

Empirical studies provide both positive and negative stock responses to sukuk issuance; for example, Mohamed et al. (2017) reveal a statistically significant and positive response observed over a period of thirty days after the news of sukuk issuance, suggesting that investors require an extended period to fully assimilate the details sent by the announcement of sukuk release. Rahim & Ahmad (2016) note the positive stock reactions to the announcement of sukuk issuance, indicating that since sukuk are neither debt nor shares, they are committed to the mandate of Islamic finance, which means that sukuk issuance reflects the economic strength of the company and the actual financial activities. Further, the results show that sukuk with 5-10 years of maturity has shown higher positive abnormal returns as compared to 1-5- and 10-15-year tenures sukuk, which suggests that 5-10 years of sukuk tenures are considered the finest tenure for issuing sukuk. Ibrahim & Minai (2009) find notable positive stock responses to the issuance of Islamic

1 Électricité de France (EDF) S.A., is a prominent French multinational electric utility corporation that is under the ownership of the French government.

bonds, which suggests that investors are attracted to shariah-compliance bonds and getting benefits from the issuance of these bonds. By contrast, Ahmed et al. (2018) observe a negative response of stocks to the announcements of sukuk issuance, indicating that investors tend to respond negatively to firms that have weaker earning prospects, and investors perceive the issuance of sukuk from unhealthy companies as a bad signal. Moreover, researchers observed that smaller or financially unstable enterprises exhibit a higher propensity to engage in sukuk issuance. Sukuk issuance by smaller and riskier enterprises is more prevalent due to the relatively lower restrictions on market participation. In alternative terms, it can be inferred that the firm lacks confidence in the future perspective due to the risk-sharing characteristic of sukuk. Similarly, Godlewski et al. (2013) report that financially weak enterprises lacking the ability to issue traditional bonds may however take advantage of funding opportunities through sukuk. Researchers also observe that stock response to the sukuk issuance is different from conventional bonds and report that stock reacts negatively to the issuance announcements of sukuk in Malaysia.

The above literature highlights evidence of the stocks' reaction to corporate green bonds and conventional sukuk separately. As the green sukuk bears both "Green" and "Islamic" labels, it may be expected that stocks may react to the announcements of green sukuk issuance, and investors can either benefit or lose from these issuance announcements. However, to the best of the researcher's knowledge, no one has explored this domain, which this research fills in. The above literature regarding stock responses to green bonds as well as conventional sukuk highlights both positive and negative stock responses, so one could expect both positive and negative stock responses to green sukuk issuance as it bears both "Green" and "Islamic" features. Therefore, based on the discussion in the literature the following hypothesis may be postulated for this study.

H0: Stock responds positively to the announcement of green sukuk issuance, and investors benefit from this announcement.

H1: Stock responds negatively to the announcement of green sukuk issuance, and investors get a loss from this announcement.

III. METHODOLOGY

3.1. Data and Sample

To investigate the responses of stocks to green sukuk issuance, this study gathers data on green sukuk and announcement date of green sukuk issuance from various sources, namely, Refinitive, an LSEG business², Gulf Capital Market Association (GCMA)³, Securities Commission Malaysia⁴, Ministry of Finance, Republic of

2 "Refinitiv, an LSEG (London Stock Exchange Group) business", is the main global source of financial markets data and infrastructure. <https://www.refinitiv.com/en/search-results?q=green+sukuk>

3 The "Gulf Capital Market group (GCMA)" is a prominent financial sector group that serves as a unified representative for the expanding capital market in the gulf region. <https://www.gulfcapitalmarket.org/#>

4 "The Securities Commission Malaysia (SCM)" is an official Malaysian institution tasked with the regulation and development of the capital markets inside the nation. <https://www.sc.com.my/ask-aliss#search/green%20sukuk>

Indonesia⁵. The green sukuk cover those issued by the government (state), private firms and publicly listed firms. The majority of the green sukuk issuance is made by the government, followed by private firms, and publicly listed firms. As this study seeks to identify investors' benefits from green sukuk issuance by examining the stock responses to corporate green sukuk issuance announcements, it employs the data on green sukuk issuance from corporations (corporate green sukuk) only. Further, this study only selects those firms that announce green sukuk issuance and are listed in the stock markets. Table 1 provides the details of corporate green sukuk issuers. As the green sukuk is a very recent financial instrument, the corporate green sukuk issuers listed in stock exchanges are very limited. This study considers all the publicly listed corporate green issuers globally who issue green sukuk. The literature also indicates that previous studies, such as the research conducted by Verma & Bansal (2023), have examined the stock market response to corporate green bond issuance in India using a sample size similar to that of this study, which justifies the sample size of this study. Table 1 also shows only the first-time green sukuk issuance from issuers rather than the subsequent issuance because the literature highlights that the first-time issuance only tends to receive a response from investors rather than subsequent issuance (Flammer, 2021; Tang & Zhang, 2020). Further, this study uses the announcement date of green sukuk issuance as an event day (the day on which green sukuk issuer announces that it is going to issue green sukuk) because the date of the announcement, as distinct from the date of issuance, is the pertinent date for conducting an event study as it signifies the specific day on which information is disclosed into the market (Flammer, 2021). Further, the stock prices and index data around the event day are gathered from Datastream.

Table 1.
Corporate Green Sukuk Issuers

Sr. No	Issuer Name	Country	Year	Amount	Sukuk Type
1	Mudajaya Group Bhd.	Malaysia	2017	RM 245 million	Corporate green SRI sukuk
2	Saudi Electricity Company	Saudia Arabia	2020	USD1.3 billion	Corporate green sukuk
3	Bangladesh Export Import Company (BEXIMCO)Ltd	Bangladesh	2021	USD 351 million	Corporate green sukuk
4	Riyad Bank	Saudi Arabia	2022	USD 750 million	Corporate green sukuk
5	Saudi National Bank	Saudi Arabia	2022	USD 750 million	Corporate green sukuk
6	Dubai Islamic Bank (DISB)	UAE	2022	USD 750 million	Corporate green sustainable sukuk

Source: authors' processing using data from Refinitive, GCMA, SCM

⁵ <https://www.undp.org/sites/g/files/zskgke326/files/migration/id/Green-Sukuk-Handbook-2021.pdf>

To compare the investors' response to green sukuk issuance announcements with green bonds issuance announcements, this study takes a sample of corporate green bonds issuers from the same country where the corporate green sukuk are issued except Bangladesh due to the unavailability of corporate green bonds issuers in the database. The corporate green bonds' data are from the International Capital Market Association's (ICMA)⁶ green and sustainable bond database. Table 2 provides the details of corporate green bonds' issuers.

Table 2.
Corporate Green Bond Issuers

Sr. No	Issuer Name	Country	Year	Amount	Sukuk Type
1	Commercial Bank of Dubai (CBD)	UAE	2023	USD 500 million	Corporate green bond
2	Saudi Electricity Company	Saudi Arabia	2023	USD 2 billion	Corporate green bond
3	CIMB Group Holdings Bhd. (CIMB)	Malaysia	2022	USD 500 million	Corporate green / sustainability bond
4	Abu Dhabi Commercial Bank	UAE	2022	USD 500 million	Corporate green bond
5	Emirates NBD	UAE	2023	USD 750 million	Corporate green bond

Source: authors' processing using data from Refinitive, GCMA, SCM

3.2. Research Model

This study uses the event study approach to investigate the investors' response to corporate green sukuk issuance. The approach captures the reaction through the measurement of abnormal returns, which is generally the difference between actual and expected returns. The estimation of the abnormal returns (AR) is based on MacKinlay (1997):

$$AR_{it} = R_{it} - E(R_{it})$$

where

R_{it} = Actual returns of security i at time t

$E(R_{it})$ = Expected returns of security i at time t

The expected returns are estimated using Sharpe's (1964) market model:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}$$

where

α_i = intercept

β_i = slope coefficient known as market beta

R_{mt} = actual market returns at time t

ε_{it} = error term

⁶ <https://www.icmagroup.org/sustainable-finance/sustainable-bonds-database/>

The market model is measured using OLS based on 272 days (working days in a year) of the estimation window. Following the calculation of abnormal returns, CAR is estimated. The ARs are summed up over the event window as cumulative abnormal returns (CAR) as follows.

$$CAR_{it} = \sum AR_{it}$$

Cumulative average abnormal returns are then calculated as follows.

$$CAAR_t = \sum CAR_t$$

IV. RESULTS AND DISCUSSION

This study investigates the investors' response to the announcements of green sukuk issuance. To accomplish this, this study calculates cumulative abnormal returns (CARs) of firms for announcement day and one day after (0+1), one day before and after (-1+1), two days before and five days after (-2+5), five days before and after (-5+5), five days before and ten days after (-5+10) the announcement of green sukuk issuance. Cumulative abnormal returns (CARs) represent the stock responses to green sukuk issuance announcements. Table 3 reports the results of cumulative abnormal returns (CARs) for various event windows. The result shows that Mudajaya Group Bhd. has significantly positive CARs for three (-1+1), eight (-2+5), thirteen (-2+10), eleven (-5+5)-, and sixteen-days (-5+10) event windows. CARs of Mudajaya Group Bhd are 7.3 %, 8.1 %, 14.1 %, 7.0 %, and 13.0 % for three (-1+1), eight (-2+5), thirteen (-2+10), eleven (-5+5)-, and sixteen-days (-5+10) event windows, respectively. Saudi Electricity Company has significantly positive CARs for thirteen (-2+10), eleven (-5+5), and sixteen-days (-5+10) event windows. CARs of Saudi Electricity Company are 3.3%, 5.7 %, and 7.4 % for thirteen (-2+10), eleven (-5+5)-, and sixteen-days (-5+10) event windows, respectively. Bangladesh Export Import Company (BEXIMCO) Ltd has significantly positive CARs for eight (-2+5) and thirteen-days (-2+10) event windows. CARs of Bangladesh Export Import Company (BEXIMCO)Ltd are 10.1 % and 6.4 % for eight days (-2+5) and thirteen days (-2+10) event windows, respectively. Riyadh Bank has significantly positive CARs for thirteen days (-2+10) even window. CARs of Riyadh Bank are 2.3 % for thirteen days (-2+10) event windows. Saudi National Bank has significantly positive CARs for thirteen and sixteen-day event windows, respectively. CARs of Saudi National Bank are 2.0 % and 2.2 % for thirteen days (-2+10) and sixteen days (-5+10) event windows, respectively. Dubai Islamic Bank has significantly positive CARs for eight, and thirteen-day event windows. CARs for Dubai Islamic Bank are 2.4 % and 2.7 % for eight days (-2+5) and thirteen days (-2+10) event windows, respectively. These positive CARs indicate that after the announcements of green sukuk issuance, the stock prices rise and investors received higher actual returns compared to expected returns. Findings reveal that close to the announcement of green sukuk issuance, the response is not as significant. In contrast, the response is significant for the later days and remains till ten days after the announcement. These results show that the stocks of all issuers respond positively in the form of

higher CARs to the announcements of green sukuk issuance, demonstrating that investors perceive the announcements of green sukuk issuance as a positive signal in the market. Consequently, investors benefit from this issuance in the form of higher CARs. The result supports hypothesis 1 of the study. Positive signals in the market also show that these green sukuk issuers are dedicated to the environment and are trying to integrate their ESG practices with the principles of shariah.

Table 3.
Cumulative Abnormal Returns of Corporate Green Sukuk Issuers

Companies	Cumulative abnormal returns					
	CAR [0+1]	CAR [-1+1]	CAR [-2+5]	CAR [-2+10]	CAR[- 5+5]	CAR[- 5+10]
Mudajaya Group Bhd.	0.011883 (0.416)	0.073681 (2.583)***	0.081124 (2.844)***	0.141300 (4.953)***	0.070518 (2.472)***	0.130694 (4.581)***
Saudi Electricity Company	0.004902 (0.304)	0.009499 (0.589)	0.016719 (1.036)	0.033943 (2.104)***	0.057263 (3.550)***	0.074486 (4.618)***
Bangladesh Export Import Company (BEXIMCO)Ltd	0.033447 (0.841)	0.049679 (1.249)	0.101858 (2.561)***	0.064525 (2.014)***	0.063023 (1.585)	0.025689 (0.505)
Riyad Bank	0.005965 (0.496)	0.005784 (0.481)	0.013889 (1.156)	0.023207 (1.993)***	0.009327 (0.776)	0.018645 (1.553)
Saudi National Bank	0.002731 (0.261)	0.009370 (0.127)	0.006435 (0.615)	0.02055 (1.986)***	0.008764 (0.838)	0.022879 (2.189)***
Dubai Islamic Bank (DISB)	0.002921 (0.225)	0.004311 (0.333)	0.024777 (1.996)***	0.027735 (2.142)***	0.005479 (0.423)	0.008437 (0.651)

Source: Authors' calculation

T-statistics in parenthesis

*** p<0.01, significant at 1%, p<0.05, significant at 5%, * p<0.1, significant at 10%

Table 4 shows the results of cumulative average abnormal returns (CAARs) for all firms in the sample. The results find that CAARs for eight (-2+5), thirteen (-2+10), and sixteen (-5+10) days event windows are positively significant for the whole sample, suggesting that overall stock prices respond positively to the green sukuk issuance announcement and thus hypothesis 1 is supported. Additionally, it is observed that mostly long event windows (e.g., [-2,+5], [-2,+10], [-5,+5], [-5,+10]) show significant effect as compared to short-event windows (e.g., [0,+1], [-1,+1]). It seems that the stock markets need more time to adjust to the new information about the announcement of green sukuk issuance, which may be the potential reason for significant long-event windows compared to short-event windows. Similarly, it is also observed in the results that the responses to the announcement of corporate green sukuk issuance are delayed, indicating that the stocks react slowly after the announcement and respond with a delayed effect. Stock markets may take time to adjust to the announcement of corporate green sukuk issuance, which may be a potential reason for the delayed effect.

This significantly positive response indicates that firms issuing green sukuk experience a statistical increase in abnormal return on investment by 30.5 %, 51.26%, and 54.6% for eight (-2+5), thirteen (-2+10), and sixteen (-5+10) days event windows respectively.

Table 4.
Cumulative Average Abnormal Returns for Whole Sample of Corporate Green Sukuk

Event windows	CAAR	T-statistics
[0+1]	0.091072456	0.424
[-1+1]	0.081524612	1.022
[-2+5]	0.305421843***	1.988
[-2+10]	0.512609677***	2.453
[-5+5]	0.338980293	1.607
[-5+10]	0.546168127***	2.373

Source: Authors' calculation

T-statistics in parenthesis

*** p<0.01, significant at 1%, p<0.05, significant at 5%, * p<0.1, significant at 10%

The results in table 4 show that cumulative average abnormal returns (CAAR) of firms that announce green sukuk issuance are positive for 8 days [-2+5] and 13 days [-2+10] event windows as the cumulative average abnormal return (CAAR) are 0.305421843*** and 0.512609677*** respectively. It shows that after the announcement of green sukuk issuance, the stock prices of green sukuk issuers increase. This provides benefit to shareholders in the form of higher abnormal returns. Overall, the result of this study shows that green sukuk issuance announcement has a significantly positive effect on the stock returns of issuing firms. The stock of green sukuk issuing firms responds positively to the announcement in the form of higher abnormal returns. These results are consistent with signaling theory, which describes that investors perceive green sukuk issuance announcement as a positive signal and respond positively in this regard. Therefore, it can be concluded that investors benefit from the announcement of green sukuk issuance. These results are also consistent with Mohamed et al. (2017) and Rahim & Ahmad (2016) who find significant positive stock response to sukuk issuance.

The study's findings also corroborate earlier research indicating that nations with greater concern about climate change make greater investments in green initiatives (Wang et al., 2022), because green investments are used to mitigate the climate change risk by investing in environment friendly projects (Fatica & Panzica, 2021). Investors' responses to green and conventional investment are also different. Flammer (2021) show that stocks respond positively to green bonds issuance announcements. Similarly, Tang & Zhang (2020) find positive stock market reaction to corporate green bonds issuance announcements. Moreover, Dann & Mikkelson (1984) observe that common stockholders respond negatively to the convertible bond offering announcements. Ammann et al. (2006) also find negative association between the announcements of convertible bonds issuance and abnormal returns.

4.1. Further Analysis

Further analysis is conducted to compare the investor's response to corporate green sukuk issuance with corporate green and sustainability bonds. Table 5 shows the results in this regard.

Table 5.
Cumulative Abnormal Returns of Corporate Green & Sustainability Bonds' Issuers

Companies	Cumulative abnormal returns (CAR)					
	CAR [0+1]	CAR [-1+1]	CAR [-2+5]	CAR [-2+10]	CAR[-5+5]	CAR[-5+10]
Commercial Bank of Dubai (CBD)	0.017257583 (0.115)	0.031984746 (0.528)	0.07591087 (2.06972)***	0.099878178 (2.00619)***	0.102367264 (1.9108)***	0.152587 (0.9746)
Saudi Electricity Company	0.016814 (0.202)	0.082571 (0.83692)	0.011221 (2.06972)***	0.132751 (2.00619)***	0.090471 (0.9108)	0.152587 (0.9746)
CIMB Group Holdings Bhd. (CIMB)	0.01737 (0.310)	0.02298 (0.747)	0.06719 (1.039)	0.08041 (1.989)***	0.06207 (2.063)***	0.08165 (2.114)***
Abu Dhabi Commercial Bank	0.05452 (0.496)	0.05525 (0.481)	0.07251 (1.986)***	0.08945 (2.093)***	0.14025 (2.176)***	0.01325 (1.553)
Emirates NBD	0.104055 (1.451)	0.13538 (0.023)	0.280084 (1.023)	0.414082 (2.928)***	0.459247 (3.786)***	0.593244 (4.691)***

Source: Authors' calculation

T-statistics in parenthesis

*** p<0.01, significant at 1%, p<0.05, significant at 5%, * p<0.1, significant at 10%

Table 5 reports the results of cumulative abnormal returns (CARs) for various event windows. The results show that Commercial Bank of Dubai (CBD) has significantly positive CARs for seven (-2+5), thirteen (-2+10), and eleven (-5+5) days event windows. CARs of Commercial Bank of Dubai (CBD) are 7.5 %, 9.9 %, and 10.2 % for eight (-2+5), thirteen (-2+10), and eleven (-5+5) days event windows, respectively. Saudi Electricity Company has significantly positive CARs for eight (-2+5) and thirteen (-2+10) days event windows. CARs of Saudi Electricity Company are 1.1% and 1.3% for eight (-2+5) and thirteen (-2+10) days event windows, respectively. CIMB Group Holdings Bhd (CIMB) has significantly positive CARs for eleven (-5+5), thirteen (-2+10) and sixteen (-5+10) days event windows. CARs of CIMB Group Holdings Bhd (CIMB) are 8.04 %, 6.2 %, and 8.1% for eleven (-5+5), thirteen (-2+10) and sixteen (-5+10) days event windows, respectively. Abu Dhabi Commercial Bank has significantly positive CARs for eight (-2+5), thirteen (-2+10), and eleven (-5+5) days event window. CARs of Abu Dhabi Commercial Bank are 7.2 %, 8.9%, and 14% for eight (-2+5), thirteen (-2+10), and eleven (-5+5) days event windows, respectively. Emirates NBD has significantly positive CARs for thirteen days (-2+10), eleven days (-5+5), and sixteen days (-5+10) event windows, respectively. CARs of Emirates NBD are 41.4 %, 45.9%, and 59.3 % for thirteen days (-2+10), eleven (-5+5), and sixteen days (-5+10) event windows, respectively.

These positive CARs indicate that after the announcements of green bonds' issuance, the stock prices start to rise, and investors receive higher actual returns than expected returns. Findings reveal that close to the announcement of green bonds' issuance, the response is not significant, whereas the response is significant for the later days and remains till ten days after the announcement. These results show that the stocks of all issuers respond positively in the form of higher CARs to the announcements of green bonds' issuance, demonstrating that investors perceive the announcements of green bonds' issuance as a positive signal in the market. Consequently, investors benefit from this issuance in the form of higher

CARs. The positive signal in the market also shows that these green bonds' issuers are dedicated to the environment.

Furthermore, Table 6 shows the results of cumulative average abnormal returns (CAARs) for all the firms in the sample. The results find that CAARs for eight (-2+5), thirteen (-2+10), eleven (-5+5), and sixteen (-5+10) days event windows are positively significant for the whole sample, suggesting that overall stocks respond positively to the green sukuk issuance announcement. This significantly positive response indicates that firms issuing green bonds experience an increase in abnormal return on investment by 28.3 %, 46.1%, 33.5 %, and 44.8 % for eight (-2+5), thirteen (-2+10), eleven (-5+5) and sixteen (-5+10) days event windows.

Table 6.
Cumulative Average Abnormal Returns for the Whole Sample of Corporate Green Bonds

Event windows	CAAR	T-statistics
[0+1]	0.0746152	0.345
[-1+1]	0.073254	0.931
[-2+5]	0.2831564***	2.245
[-2+10]	0.4614256***	2.647
[-5+5]	0.3354286***	1.967
[-5+10]	0.4489452***	2.373

Source: Authors' calculation

T-statistics in parenthesis

*** p<0.01, significant at 1%, p<0.05, significant at 5%, * p<0.1, significant at 10%

The comparative analysis of investors' response to corporate green bonds and corporate green sukuk shows that investors respond positively to the announcements of both green bonds and green sukuk. Still, the cumulative average abnormal returns (CAARs) of firms that issue green sukuk are slightly higher than the CAARs of firms that issue green bonds. Table 7 reports the comparison of CAARs for corporate green bonds and green sukuk issuers.

Table 7.
Comparison of CAARs for Corporate Green Bonds and Green Sukuk Issuers

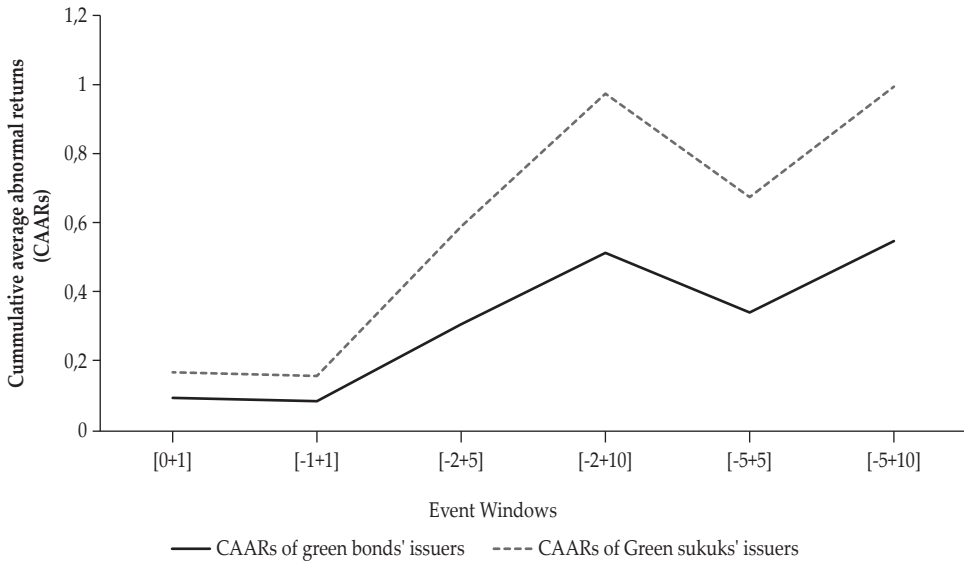
Event windows	CAARs of Green Sukuk's issuers	CAARs of green bonds' issuers
[0+1]	0.091072456	0.0746152
[-1+1]	0.081524612	0.073254
[-2+5]	0.305421843***	0.2831564***
[-2+10]	0.512609677***	0.4614256***
[-5+5]	0.338980293	0.3354286***
[-5+10]	0.546168127***	0.4489452***

Source: Authors' calculation

T-statistics in parenthesis

*** p<0.01, significant at 1%, p<0.05, significant at 5%, * p<0.1, significant at 10%

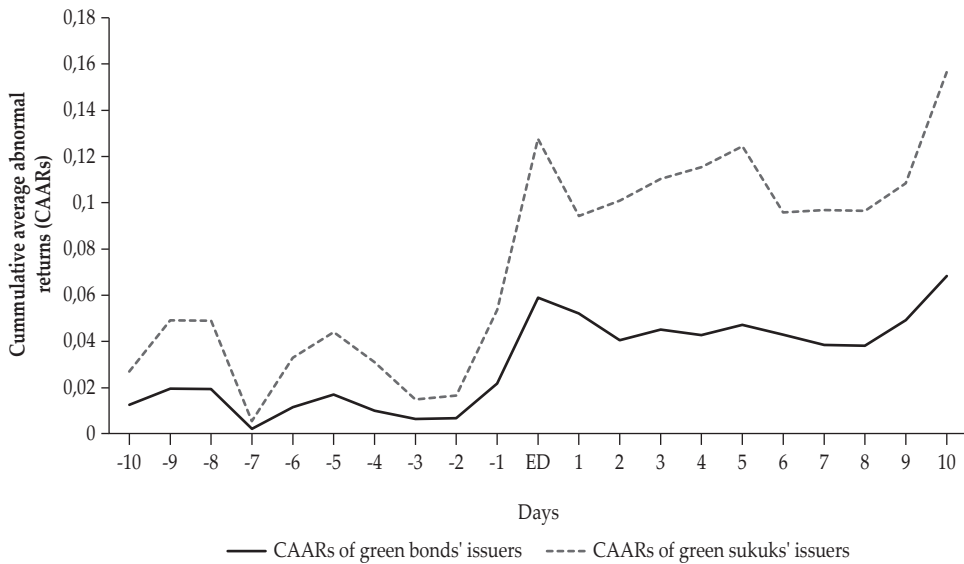
Further, Figure 1 depicts the graphical representation of cumulative average abnormal returns (CAARs) of green sukuk's issuers and green bonds' issuers across various event windows. It shows that the CAARs of both green sukuk and green bond issuers move together across various event windows, but the CAARs of green sukuk' issuers are slightly higher than those of green bonds issuers.



Source: Authors' processing

Figure 1.
CAARs of Green Sukuk and Green Bond Issuers Around the Various Event Windows

Similarly, Figure 2 highlights the graphical representation of cumulative average abnormal returns (CAARs) of green sukuk issuers and green bonds issuers across various days. It shows that on the announcement day of corporate green sukuk and green bond, there is a rise in cumulative average abnormal returns (CAARs). However, the rise in CAARs is slightly more for the announcement of green sukuk's issuance compared to the announcement of green bonds' issuance. Days after the announcements of green sukuk and green bonds also show an overall increasing trend in CAARs.



Source: Authors' processing

Figure 2.
Caars of Green Sukuk and Green Bond Issuers Around the Various Days

The reason behind the higher CAARs of firms that issue green sukuk compared to green bonds is the dual characteristics of green sukuk, as it bears both the features of green and shariah compliance principles. This indicates that issuance announcements of both green bonds and green sukuk send positive signals in the market, and investors are getting benefits from these issuance announcements in the form of higher abnormal returns. The investor receives slightly more benefit from green sukuk issuers as compared to green bond issuers.

Investors benefit and attraction can also be observed from the stock prices of green sukuk issuers. Figures A1, A2, A3, A4, A5 and A6 in the appendix highlight the increasing trend in the stock prices after the green sukuk issuance announcements. Further, given the pressing need for funding for eco-friendly projects along with Shariah principles, green Sukuk might be more appealing than conventional green bonds. This can encourage investors to contribute to the betterment of the planet while still receiving a return on their investment.

V. CONCLUSION, RECOMMENDATIONS AND FUTURE RESEARCH

The objective of this study is to ascertain whether investors benefit from green sukuk issuance by investigating the stock price response to the announcement of green sukuk issuance. Applying the event study methodology, we find that stocks respond significantly and positively to the announcement of green sukuk issuance, suggesting that investors get benefit from this announcement in the form of higher abnormal returns. This significantly positive response is observed both for the individual firm (through CARs) and for a sample of whole firms

(through CAARs). This positive response is mainly due to the nature of green sukuk features, as green sukuk has both “green” and “sukuk” features. These features send a positive signal to the market that green sukuk is an environmental-friendly and shariah-compliance financial instrument, and investors perceive this signal in a positive way and respond positively to the announcement of green sukuk issuance. Investors with ESG and shariah-compliance mandates are willing to invest in green sukuk. The green sukuk issuance also sends a positive signal about green sukuk issuers that they are environmentally committed and shariah-compliance-based firms.

Emphasizing the green and shariah-compliance-based concept, this study has important implications for investors who want to invest in financial instruments with ESG and shariah-compliance-based mandates. This study may help policymakers formulate strategies for attracting investors by integrating green bonds with shariah principles to solve the problems of funds for environment-friendly projects to mitigate the climate change risk. This study also provides insight to practitioners regarding the ways to expand the range of projects that green sukuk supports beyond energy-related ones, such as waste management, clean water projects, and sustainable agriculture. The practitioners may also establish thorough reporting procedures to give investors comprehensive details about the environmental impact of projects financed by green sukuk. Increased investor interest and trust can result from this transparency. Through this study regulators may also educate the market players about the advantages and prerequisites of green sukuk to promote a broader comprehension and acceptance of sustainable finance concepts. Regulators may also design a frame to provide monetary rewards, including tax exemptions or subsidies, to encourage issuers and investors to join the green sukuk market.

The main limitation of this study is the limited amount of data pertaining to public corporate issuers of green sukuk, which can be attributed to the novelty of this financial instrument. Further investigation may be conducted by comparing the investor response to the announcement of sovereign green sukuk issuance with corporate green sukuk issuance. A comparative study on stock response to green sukuk vs conventional sukuk issuance may be performed in the future. Future research may also be conducted regarding the evaluation of risk associated with green sukuk investment such as market, regulatory, and environmental risks. Similarly, research may be conducted to investigate the variables affecting the supply and demand of green sukuk, such as policy changes, investor preferences, and market trends.

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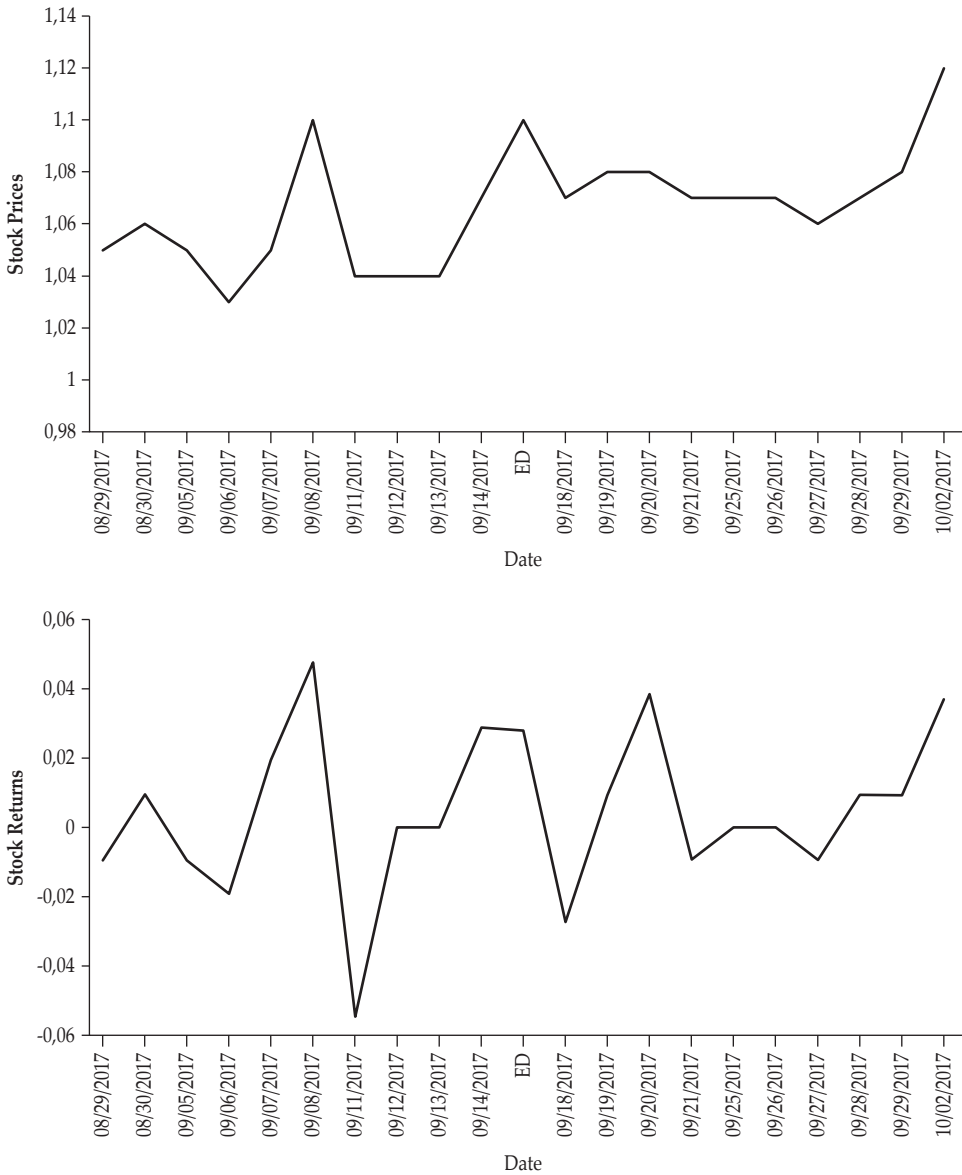
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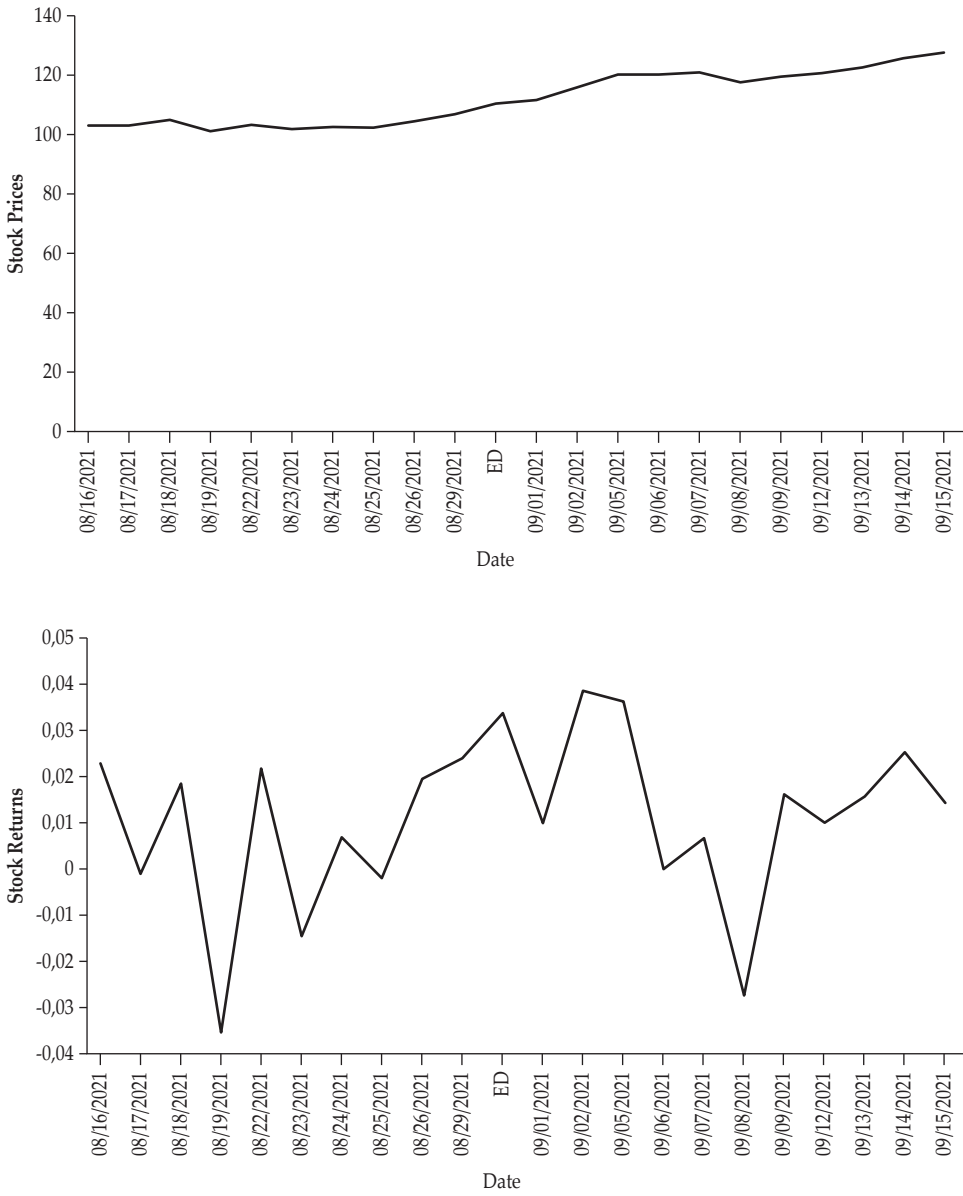
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APPENDIX



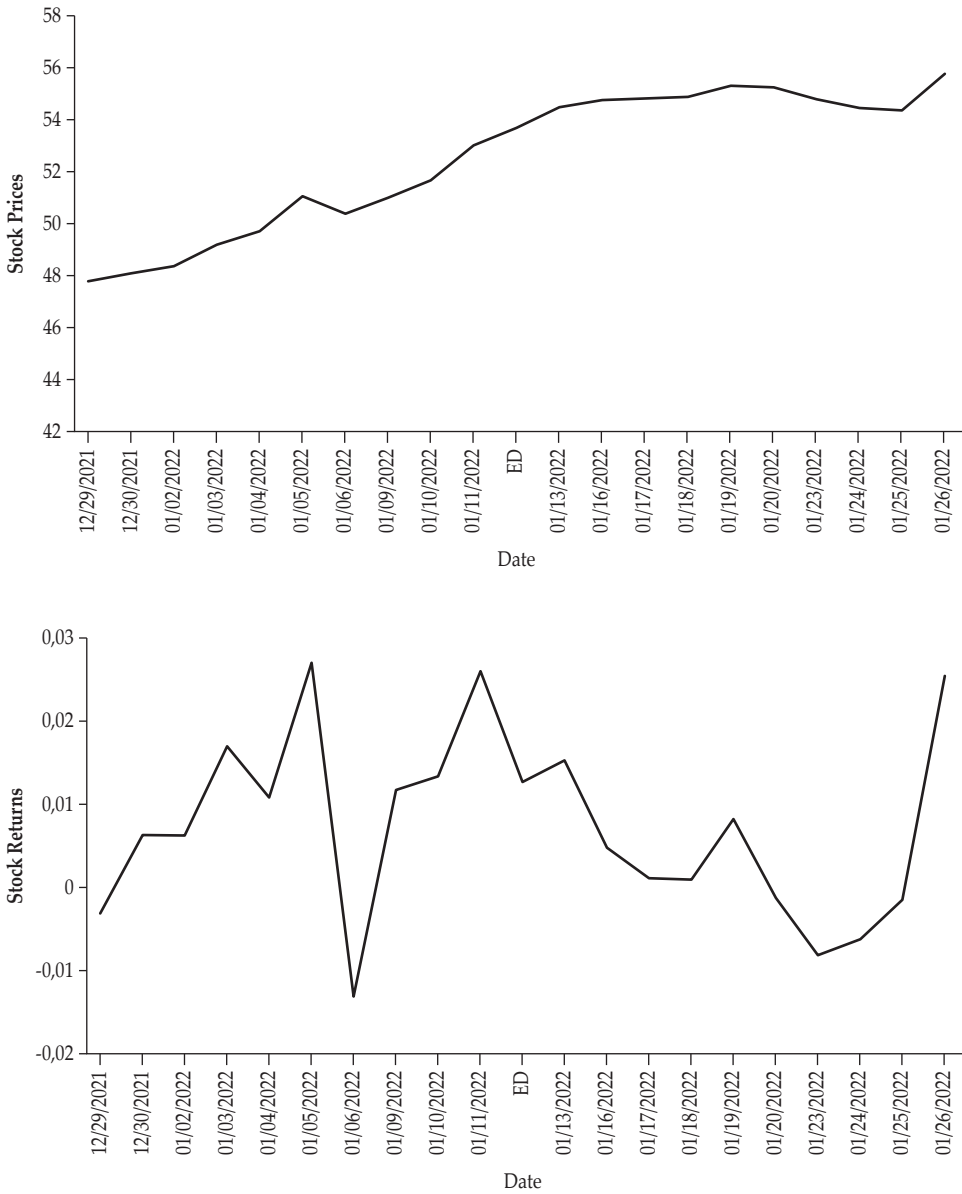
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Figure A1.
Stock Prices & Returns of Green Sukuk Issuers (Mudajaya Group Bhd.) Around the Various Days



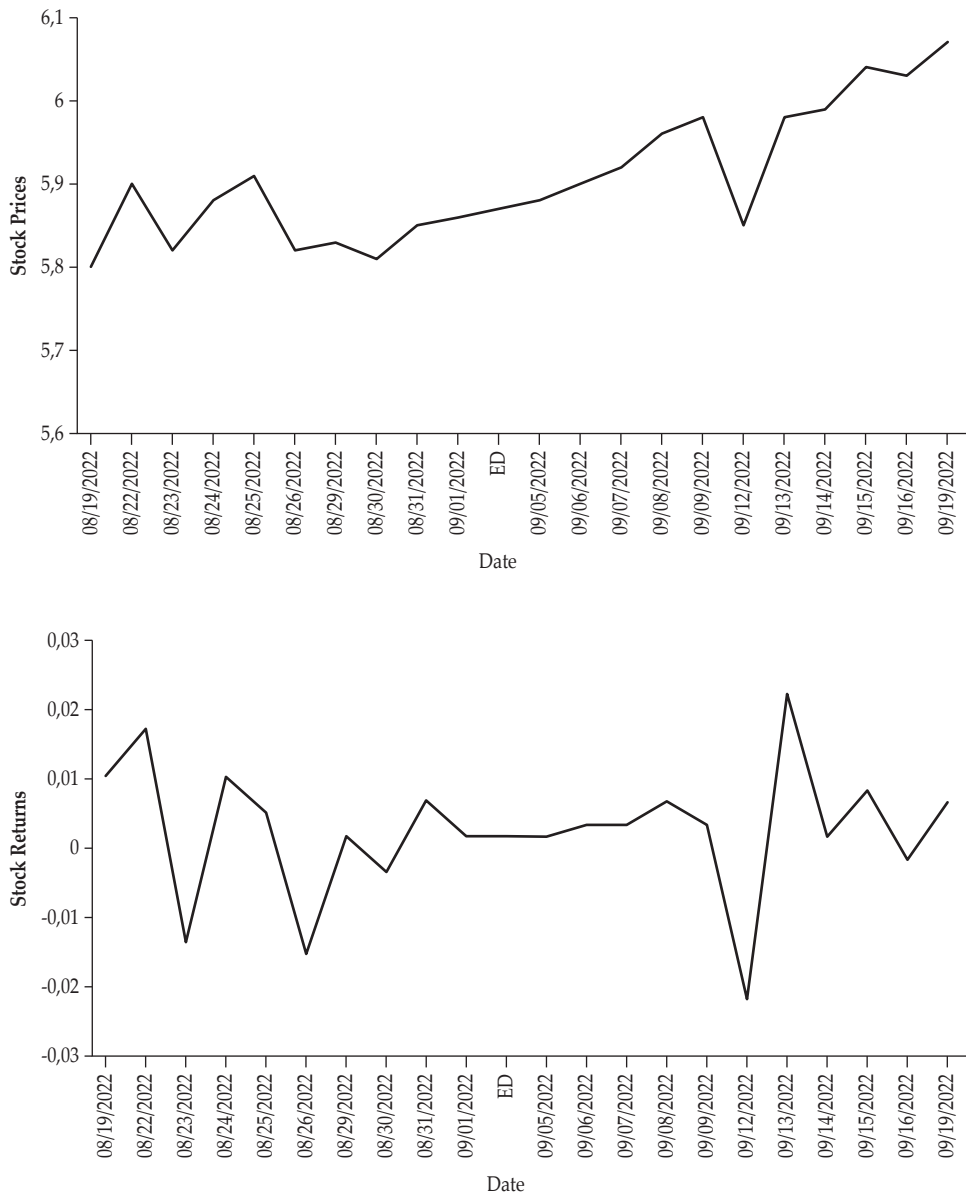
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Figure A2.
Stock Returns of Green Sukuk Issuers (BEXIMCO Ltd.) Around the Various Days



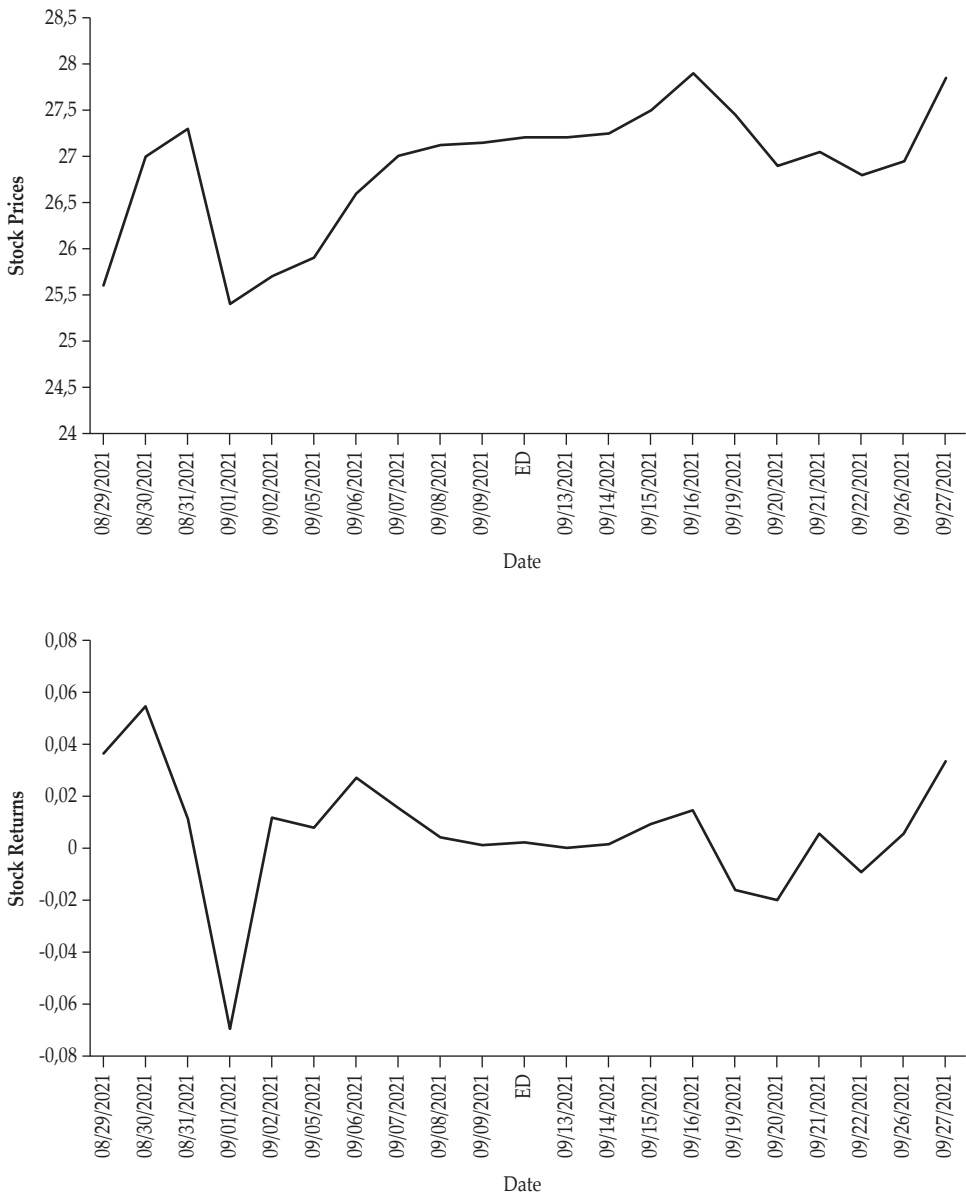
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Figure A3.
Stock Returns of Green Sukuk Issuers (Saudi National Bank)
Around the Various Days



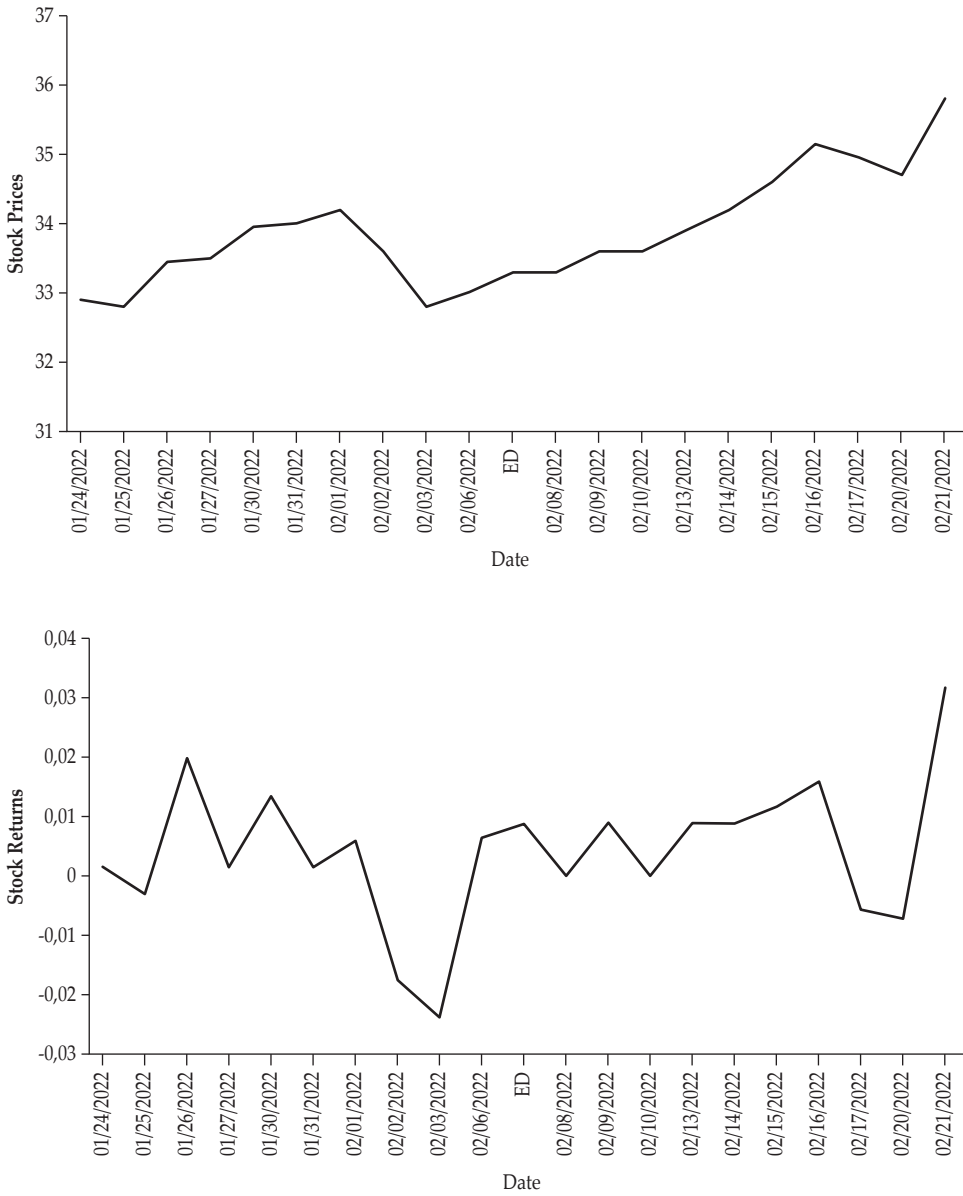
Source: Authors' processing

Figure A4.
Stock Returns of Green Sukuk Issuers (Dubai Islamic Bank (DISB)) Around the Various Days



Source: Authors' processing

Figure A5.
Stock Returns of Green Sukuk Issuers (Saudi Electricity) Around the Various Days



Source: Authors' processing

Figure A6.
Stock Returns of Green Sukuk Issuers (Riyad Bank) Around the Various Days