

Relational Ramifications between Political Factors and Sukuk in Promoting Sustainable Forest Management

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Abstract

Sukuk has gained popularity as a versatile financial instrument, financing a wide range of projects, including those with a focus on sustainability, even before the introduction of green sukuk. This challenges the assumption that Islamic banking and finance are inherently more environmentally friendly than conventional counterparts, highlighting their commitment to environmental preservation in line with Sharia compliance principles. With climate change exacerbating and forests being one of the most effective natural resources for mitigating emissions, this study aims to explore the effectiveness of Sukuk in influencing sustainable forest management. Focusing on a forest area prone to conflicts, particularly related to issues like illegal logging and unauthorized permits, the study examines the role of Sukuk and political factors in implementing sustainable forest management. The study samples D-8 countries (Bangladesh, Egypt, Indonesia, Iran, Malaysia, Nigeria, Pakistan, and Turkey), representing a significant portion of the Muslim population, with data collected from 2010 to 2021. Utilizing unbalanced panel regression and various alternative approaches, the study tests hypotheses and validates its credibility. The findings show that sukuk influences Sustainable forest management, proving that even without the label “green”, it still may contribute to environmental conservation. Conversely, political factors are found to have a detrimental impact on forest management. The study has significant implications for literature and the government or regulatory body responsible for Islamic banking and financial institutions to implement or reinforce policies that promote a preference among Islamic banks for initiatives focused on environmentally sustainable projects.

Keywords: Sukuk, Sustainable Forest Management, Politics

JEL Classification: C33, Q56, L4

1. Introduction

At the 2015 United Nations Climate Change Conference in Paris, representatives from 195 nations successfully formulated a climate agreement with the ambitious objective of constraining the escalation of global temperatures to 1.5°C above pre-industrial levels. During this meeting, the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) engaged in negotiations to draft the agreement, which explicitly recognizes the vital contribution of forests in the fight against climate change. Since the year 2000, it is estimated that forests have extracted an average of 2 billion metric tons of carbon from the atmosphere annually (Harris et al., 2021). This function, known as the "carbon sink," plays a role in mitigating climate change by slowing down the accumulation of carbon dioxide (CO₂), primarily from fossil

fuel burning in the atmosphere. As forests grow, the trees within them absorb carbon from the air and store it within their wood, plant materials, and beneath the soil. Without forests, a significant portion of this carbon would persist in the atmosphere as CO₂, a crucial greenhouse gas responsible for climate change.

However, despite the merits offered by forests, deforestation continues to exist. Examining its underlying root causes has highlighted economic development, population pressure, and institutions as essential determinants of forest loss (Imai et al., 2018; Leblois et al., 2017). As represented by The U-shaped Environmental Kuznets Curve (EKC), as income levels increase, environmental degradation also rises initially (Hashmi et al., 2023). Protecting the environment may come at the expense of income and conversely. Not to mention institutional aspects that cause deforestation, as evidenced by a survey on corruption in environmental matters conducted by USAID and Management Systems International, which revealed notable instances; for example, in 2000 in Romania, approximately 3% of businesses acknowledged frequently paying bribes to secure environmental licenses. In a survey conducted in Slovakia 1999, businesses disclosed that bribes were suggested in about 8% of their visits to environmental protection agencies, while, in contrast, respondents indicated having to pay bribes in 24% of all visits to obtain construction permits. Furthermore, in 2002, it was reported that a significant portion, precisely 56%, of public officials in the Ministry of Forestry were perceived to be regularly receiving unofficial payments (Winbourne, 2002).

Moreover, deforestation can occur due to various factors, such as the conversion of forests into croplands and pastures, primarily for subsistence purposes, which involves growing crops or raising livestock to fulfill daily needs. The conversion of land for agricultural purposes typically stems from multiple direct causes. For instance, countries may construct roads in remote areas to enhance overland transportation of goods. While road development itself contributes to a certain degree of deforestation, it also facilitates access to previously unreachable and often unclaimed land. This, in turn, attracts logging activities, both legal and illegal, which frequently follow road expansion or are even the catalyst for it. Once loggers have extracted valuable timber from an area, they move on, leaving behind roads and logged areas that attract settlers—farmers and ranchers—who clear the remaining forest through slash-and-burn practices to create croplands or pastures for cattle. This completes the deforestation cycle initiated by road construction. In other scenarios, forests degraded by logging become susceptible to fires and are eventually deforested due to recurrent accidental fires originating from nearby farms or pastures.

Therefore, thoughtful, sustainable management of forests can emerge as a crucial strategy for avoiding illicit transactions of forest products and addressing deforestation in the coming years. Not only does sustainable forest management (SFM) benefit from reducing emissions, but also it helps economic and social benefits while ensuring the forest ecosystems. In essence, sustainable forest management is a strategy designed to achieve a balance among environmental, social, and economic goals. Instead of leaving forest ecosystems entirely untouched, the focus is on preserving or improving their productivity, diversity, and resilience. This approach also leads to the production of natural resources and services that benefit both local communities and the wider world.

Realizing optimal sustainable forest management (SFM) necessitates devising a strategy to enhance the competitiveness and appeal of SFM compared to alternative land uses, and accomplishing this objective mandates financial support for the necessary inputs. This funding is instrumental in addressing cash flow challenges, adopting efficient technologies, and managing risks (Boscolo et al., 2010). The absence of readily available financing options hinders the implementation of economically viable sustainable forest management activities. Moreover, the funding of SFM has been a topic of extensive discussions at the intergovernmental level, with stakeholders only agreeing on one observation: SFM is both costly and severely under-financed (Singer, 2016).

Banks can be a crucial part in solving this problem since banks conduct rigorous risk assessments and due diligence processes before extending loans or investments (Kim and Santomero, 1988). These evaluations encompass environmental considerations, such as the potential impact of projects on forests and biodiversity (Sullivan et al., 2005). By integrating environmental risk assessments into their decision-making, banks can incentivize borrowers to adopt sustainable practices, thereby promoting responsible forest management (Kumar and Prakash, 2020; Raut et al., 2017).

For instance, multilateral bank loans from institutions such as the World Bank, the Inter-American Development Bank (IDB), and the IMF have been utilized to finance efforts aimed at preserving the forest sector (Djik and Savenije, 2009). In Africa, significant funding for forestry projects has been sourced from Official Development Assistance (ODA), including multilateral flows primarily from the World Bank and bilateral financing, with the African Development Bank playing a crucial role (Gondo, 2012). In Indonesia, financing for forest preservation is administered by the Indonesian Ministry of Forestry (Leimona et al., 2009).

The banking sector exerts substantial influence on forest management practices. On one hand, banks have been implicated in financing unsustainable forest-based industries, including illegal logging (Setiono and Hussein, 2005). Conversely, the banking industry has a longstanding involvement in financing ecological conservation efforts, such as initiatives promoting food and energy security (Hidayat, 2018).

Apart from that, Islamic Financing was deemed more environmentally conscious due to its principles reflecting a commitment to environmental protection. For instance, the principle of *Khilafah* emphasizes human stewardship over the earth as agents of God, underscoring the responsibility to use natural resources wisely, with accountability in the afterlife. In addition, Bae et al. (2022) demonstrated that Islamic banks attract higher investments in environmental projects compared to conventional banks, primarily driven by their ethical values. Moreover, *Sukuk*, the flagship product of Islamic finance, is renowned for its ability to offer substantial financing volumes. Global *Sukuk* witnessed a notable growth of 11.2%, reaching USD 751 billion by the end of 2022 (MIFC, 2022). And it is viewed as a means to foster sustainable and equitable economic development. Therefore, underscoring the potential for *sukuk* to serve as a funding mechanism for sustainable forest management is crucial.

Although there is considerable attention on specialized *sukuk* designated for environmentally friendly projects, known as "green *sukuk*," this paper seeks to demonstrate that Islamic financing products, even those without a specific green

designation, can significantly influence the environment, particularly in sustainable forest management.

While acknowledging the suitability of green sukuk as a specific indicator for directing funds towards forest preservation, it is important to note that this instrument is relatively nascent within the broader Sukuk framework. Precisely, sukuk can contribute to forest management similarly to green sukuk by virtue of their alignment with fundamental Islamic finance principles, which inherently prioritize environmental preservation (Al Madani et al., 2020). Even though green sukuk are explicitly designed to fund environmentally friendly projects, conventional sukuk also adhere to Shariah principles (Dusuki, 2010) that prohibit activities harmful to the environment, including deforestation and unsustainable land use practices. As a result, funds raised through conventional sukuk can be directed towards infrastructure projects that indirectly support sustainable forest management, such as improving rural infrastructure to reduce deforestation pressures, enhancing agricultural practices that promote biodiversity, or funding conservation initiatives like habitat protection and forest restoration. For instance, Indonesian government has issued US\$ 2.7 million to support Maluku conservation center (Shantiko et al., 2020).

Moreover, governments and organizations issuing sukuk have increasingly recognized the importance of incorporating environmental considerations into their financing strategies. For example, in Indonesia, sukuk has been utilized to finance specific projects aimed at sustainable forestry management and conservation efforts (Al Madani et al., 2020). Similarly, in Malaysia, sukuk instruments have been employed to support sustainable agricultural practices and forestry initiatives (Khan, 2015). These examples demonstrate that while green sukuk provides a focused approach to financing environmental projects, conventional sukuk, through their adherence to ethical and sustainable principles, can also contribute significantly to forest management by supporting initiatives that promote ecological balance and conservation goals. Thus, both types of sukuk play complementary roles in advancing sustainable development objectives, including effective forest management practices.

Besides, the availability of sukuk-related data and Islamic financing remains limited, and existing studies are mostly investigated qualitatively. Therefore, this paper is unique in its high-quality analysis of the impact of Islamic financing endeavors on forestry, utilizing quantitative methods.

The study utilizes unbalanced panel regression to test a set of hypotheses. Multiple alternative approaches are utilized to scrutinize and validate the study's credibility. The study also takes samples from D-8 countries (Bangladesh, Egypt, Indonesia, Iran, Malaysia, Nigeria, Pakistan, and Turkey), representing most of the Muslim population, which the observation documented from 2010 to 2021, according to data availability. In addition, the data were provided by World Development, Financial, and Governance Indicators and OIC Statistics. The approach to select D-8 countries as samples is due to the expected ideal of sukuk implementation, considering it is Muslim countries that the majority are aware of Sharia compliance. Therefore, it might be perfect for achieving project-related environmental conservation.

Besides, the study differs from other research in the field of Islamic Banking and Financing by qualitatively exploring the relationship between Sukuk and Sustainable Forest Management. This area is seldom addressed or scarcely found in existing

literature. In contrast, the majority of prior studies have primarily used case studies or other qualitative approaches.

Thus, this research holds considerable implications for filling the gap in the existing literature and references, as there is a notable scarcity of studies that specifically examine the connection between Sukuk and Sustainable Forest Management. The study also has significant implications for the government or regulatory body responsible for Islamic banking and financial institutions to implement or reinforce policies that promote a preference among Islamic banks for initiatives focused on sustainable forest management. Additionally, this research serves as a cautionary message to both governments and the general public, highlighting the potential detrimental impact of politics on forest management initiatives.

The rest of this paper is structured as follows. Section 2 discusses the prior related literature, Section 3 explains the methodology, Section 4 reports and discusses the findings, and Section 5 concludes.

2. Previous Study and Hypothesis Background

The United Nations General Assembly acknowledged Sustainable Forest Management (SFM) as a dynamic and evolving concept in 2007, serving as a guideline to uphold and enhance the economic, social, and environmental values of all forest types for the benefit of current and future generations. It outlined seven thematic elements as a reference framework: the extent of forest resources, forest biodiversity, forest health and vitality, productive functions of forest resources, protective functions of forest resources, socio-economic functions of forests, and legal, policy, and institutional frameworks.

However, achieving a globally accepted definition of SFM is challenging due to the significant variation in forest types, climates, and socio-economic contexts worldwide. Nevertheless, SFM can be broadly defined as human interventions aimed at sustainably using and protecting forests to preserve and enhance a range of forest resources. Human involvement is central to SFM as it seeks to continually meet the diverse needs of society (Food and Agriculture Organization, 2020). In essence, SFM aims to ensure that forests provide goods and services to fulfill both present and future requirements while contributing to the sustainable development of communities.

Pennsylvania serves as a noteworthy case study for the successful implementation of Sustainable Forest Management (SFM). The state boasts an impressive forest coverage, with approximately 58 percent (16.9 million acres) of its land covered by forests. Among these woodlands, about one-third (29 percent, 4.9 million acres) is under public ownership by federal, state, and local governments (Albright et al., 2017). Historically, privately owned forests and woodlands constituted the majority, covering 71 percent of the state and spanning 12 million acres, with only 3 percent owned by the forest product industry. However, the landscape shifted with the implementation of regulations that restricted management practices, whether for income generation through harvesting or to enhance other forest values. These regulations dampened the enthusiasm of private landowners to maintain woodlands on their properties. Consequently, forest management practices were effectively streamlined without excessive involvement from private entities, which often complicate the process due to differing interests in forest management. Ultimately, Pennsylvania's approach to

forest management has yielded benefits, including tax advantages for local governments due to increased forest productivity (Jacobson, 2019).

Moreover, according to the definition of Sustainable Forest Management (SFM), which emphasizes maintaining forest productivity without degradation in forest stand numbers, it is logical to assess the success of SFM based on the forest area using forest land as a metric. This approach is supported by Lesiv et al. (2022), who stated that forest management is closely linked to natural regeneration, planted forests, and plantation forests, thereby influencing the total forest land area. Additionally, data from forest land enable the monitoring of changes in land cover across countries, as highlighted by American and Woodcock (2021).

Schall and Ammer (2013) also concurred in their paper titled "How to quantify forest management intensity in Central European forests," suggesting that assessing forest management intensity involves measuring the total number of individual tree stands, or forest stands. Similarly, Tong et al. (2020) indicated that the expansion of forest land is a result of forest management practices. They observed various land use conversions to agriculture, which decreased the extent of forest cover. Hence, this study will use the total forest land area as a representation of sustainable forest management.

Over the last decade, sukuk has gained prominence as an Islamic financing tool widely adopted across diverse business sectors, and it was observed that sukuk growth could achieve US\$ 140 billion in 2020. It has attracted the interest of the international capital market, seeking to engage or invest in its implementation within their jurisdictions. Initially, the raised funds primarily supported infrastructure projects. However, recent years have witnessed a shift towards diversification across various sectors and asset types (Alam et al., 2018). For instance, sukuk funds can be directed toward specific development endeavors like renewable energy initiatives, forest projects, or low-cost housing programs. These projects appeal to investors focused on Sustainable and Responsible Investment, as they align with values promoting societal well-being (Asutay & Hakim, 2018; Razak et al., 2019). This evidence is also supported by (Qizam and Fong, 2019), suggesting that investors find sukuk more appealing because of its emphasis on positive projects aimed at environmental conservation. In addition, as stated by Erwinsyah (2022), Indonesia has allocated a budget from Sukuk for sustainable forest management, although the amount is still relatively small. The Ministry of Environment and Forestry's sukuk project has shown a gradual increase, reaching approximately 0.18 million rupiah in 2021.

Furthermore, Sukuk is one of the products in Islamic banking and finance, it undergoes a rigorous process to ensure that funds are not allocated to unethical businesses and activities that harm the environment, including forest degradation. The underlying principles of sukuk are aligned with the concept of Islamic Moral Economy (IME), which encompasses its axioms, value system, operational dimensions, and the behavioral norms of individual Muslims ('homoislamicus'). This framework has evolved through the knowledge creation process led by Muslim economists and is grounded in Islam's ontology and epistemology, specifically derived from the Quran and Sunnah. The details of the Islamic Moral Economy, as outlined by Asutay (2012) and Mergaliyev et al. (2019), are presented below:

a. Tawhid

Tawhid is the most important thing that Islam teaches, and it is at the heart of everything that Muslims think and do. The vertical part is how much a person believes in Allah and depends on Him. The horizontal parts of it show up in how each person interacts with the rest of creation and in a number of the other axioms. This represents the nature of knowledge and its articulation, suggesting that no stakeholder can have control over the others. It shows that this principle recommends an enhanced stakeholder governance framework for IBs based on *ihsan* or equilibrium. The prohibition of *riba*, for example, means capital de-centring and bringing capital to the same level as other stakeholders via the *ihsani* (good) process.

b. *'Adalah*

'Adalah, Justice in Islam means granting all Shariah-entitled individuals their due rights. Thus, it includes the rights of citizens as well as the rights of workers and employers. Additionally, it covers more esoteric concepts like environmental protection and animal rights. This axiom stands in opposition to oppression or *dzulm*. For the industry's goal purpose, which is to achieve equilibrium among stakeholders.

c. *Rububiyyah*

Rububiyyah is a developmental method that recognizes the operational purposes of Islamic banking in the shape of divine preparations for food, sustenance, and direction toward perfection. It means that all stakeholders have a predetermined route for development, which must be maintained through the opportunity spaces. It implies the application of intentional enlightenment to realize constructive norms and exemplary behavior. This idea is intimately associated with the notion of *ihsan*. In industry case, such as conformity of contracts and execution by suppliers to stakeholders.

d. *Tazkiyah*

Tazkiyah entails an expansion in harmony within the complementarity of *tawhid* so that the interests of all stakeholders can be fulfilled without injuring anybody else, implying a constraint on the operation of Islamic Banking. It is also linked with *ukhuwwah* that it symbolizes the brotherhood of man as Adam's acknowledged offspring. Consequently, a feeling of closeness, kinship, and cooperation that is attained in an ideal Islamic community; a conceptual expansion of *'adalah*. To build positive relationships between the Sukuk issuance and stakeholders throughout the project, in terms of creating effectiveness.

e. *Khilafah*

Khilafah reflects that humans are Allah's representatives on earth, meaning that man is ultimately accountable to Allah. As a representative of Allah on earth, one carries a duty for which he or she will ultimately be held accountable in the afterlife; hence, Islam provides a two-dimensional utility or welfare role. It should be stressed that this principle applies to everyone, not only rulers and leaders. It represents the Islamic banking and their stakeholders' responsibility, how they interact with environment and how they use natural resources wisely.

f. *Ihsan*

Ihsan is the key to the above elements, to keep them in harmony for sustainability. If *tauhid* is the basis and center of Islam, then *ihsan* is the finishing

touch or crowning glory. It is the end goal of the dynamic process of economic, social, and spiritual development, and getting there means getting to *falah* (success). So, it can be seen as putting all other values and axioms into practice and making them real. In order for it to be shown that tawhid is a vertical relationship with God, *ihsan* is a horizontal relationship between Islamic banking and stakeholders.

Therefore, it is obvious that Sukuk are ethical instruments, as they are designed to avoid funding impermissible activities such as gambling and weapons manufacturing. They are also structured to minimize leverage and speculation, thus contributing to a more stable financial system. These ethical characteristics make Sukuk appealing to investors driven by principles of ethics and social responsibility, particularly those aligned with Islamic values. Therefore, Sukuk inherently prioritizes ethical investments and does not require a "green" label to demonstrate its commitment to responsible investment practices. Instead, they naturally allocate funds to sectors that support environmental conservation efforts.

This adherence enables them to effectively support various aspects of sustainable forest projects, including reforestation, biodiversity conservation, and combating illegal logging. Thus, conventional sukuk can be instrumental in advancing broader environmental objectives, underscoring the versatility and impact of Islamic finance in promoting sustainable practices in forest ecosystems. As highlighted by Abdullah and Keshminder (2022); Alam et al. (2016); Alsmadi and Alzoubi (2022), green sukuk has emerged as an innovative financial instrument within Islamic finance, explicitly designed to support environmentally sustainable projects. However, it is crucial to note that non-green sukuk also contribute significantly to environmental conservation efforts, including initiatives aimed at forest preservation. For instance, studies by Al Madani et al. (2020)), Erwinsyah (2022), and Khan (2015) provide empirical evidence of non-green sukuk being utilized to finance various forest conservation projects.

Comparatively, conventional bonds lack these inherent restrictions. Thus, transforming a conventional bond into an "ethical investment" requires extra measures, such as incorporating covenants to restrict potential uses of the funds. This incorporation of additional prohibitions is the genesis of green bonds and other labeled sustainable development bonds. Essentially, these bonds introduce constraints on the use of proceeds that, to some extent, already exist for Sukuk (Bennet, 2021). Thus, by highlighting the ethical attributes of Sukuk as a financial instrument, Sukuk can align well with the broader trend of ethical investing.

In short, the aforementioned studies confirm that sukuk might influence sustainable forest management. Given that sukuk is an in-depth process that guarantees that the fundraiser would not allocate financing to any unethical businesses and is devoid of harmful activities, including degrading the number of forests. Using the total Sukuk holding by Islamic banks as an indicator for Sukuk, the study derives the hypothesis:

H1. Sukuk could potentially contribute to the development of Sustainable Forest Management.

Forests are widely acknowledged as valuable natural resources, and it is widely recognized that countries abundant in resources often face heightened levels of conflict and authoritarianism compared to those without such resources, a phenomenon referred to as "the resource curse." This term denotes the difficulty many resource-rich nations encounter in effectively managing their natural resource wealth and addressing public welfare needs adequately (Roberts and Robinson, 2015). A survey conducted by Winbourne (2002) illustrates the political challenges present in the forestry sector, revealing significant economic losses attributable to illegal logging. For example, governments lose an estimated \$5 billion in annual revenue, with an additional \$10 billion lost to the economies of producing nations. Additionally, in 2002, the Ministry of Forestry was ranked eleventh out of 35 government agencies, highlighting internal challenges within the sector.

Fenetahun et al. (2021) on sustainable rangeland management found that political instability significantly impacts economic, socio-cultural, and environmental degradation. The research underscores how political instability contributes to human migration, leading to the degradation of rangelands, which in turn worsens food insecurity, exacerbates poverty, and contributes to environmental decline. Sofuoğlu and Ay (2020) emphasize that uncertainty resulting from political instability hampers resource conservation efforts and depletes resource stocks. This perspective is further supported by Mao (2018), which revealed a substantial increase of approximately 25.34 percent in carbon intensity during democratic transitions in Indonesia. Additionally, Masron and Subramaniam (2018) demonstrated a positive correlation between corruption and pollution, while Galinato and Galinato (2013) found a negative correlation between corruption and forest land. Based on these insights, the study utilizes political stability and control of corruption as indicators for political factors in sustainable forest management, leading to the formulation of hypotheses.

H2. Political factors play a crucial role in the attainment of sustainable forest management

The banking sector, in general both of conventional dan Islamic bank, plays a vital role in the modern economy, serving as the backbone for financial transactions of all sizes. The impact of financial development is evident in the creation and expansion of institutions, tools, and markets that facilitate substantial investments and growth, leading to poverty reduction and environmental improvement. Additionally, the quality of a bank can be assessed by its financial performance, which indicates its ability to allocate and manage resources effectively, ultimately increasing its value (Sintha, 2018).

Derived from the concept of "performed," which denotes actions such as "to do," "to carry out," or "to render", the term "performance" is fundamental in organizational management research. It is widely considered as one of the most crucial indicators of organizational success. Profitability is commonly cited as a key component of financial performance and capital quality, according to Liaqat and Sonia (2019). Earnings, a pivotal aspect of financial statements, draw significant attention as they serve as a yardstick for assessing how effectively banks achieve their business objectives as a

whole. Similarly, capital quality acts as a gauge for assessing the financial stability of a bank, indicating its ability to support foreseeable transactions and operations.

In addition, integrating environmental risk into a bank's business strategy and decision-making processes is crucial so that institutions may promote more environmentally viable projects. Not only do Islamic banks take this concern, but also conventional banks do the same action. Additionally, (Setiono, 2007) highlighted in his paper titled "Banking and Financial Policies for Sustainable Forest Management in Indonesia" that bank performance (profit and capital) has the potential to stimulate business interest in the forestry sector. This increased visibility of the bank's focus may capture public attention and consequently attract them as customers. According to Nizam et al. (2019), they argued that capital asset ratio and return on assets play crucial roles in influencing environmental performance. As a bank's profitability increases, it tends to focus on expanding access to funding for environmental practices, with forest conservation being a primary area of allocation due to its potential to mitigate climate change (Shakil et al., 2019). Nasreen et al. (2017) also suggested that a higher capital-to-asset ratio indicates better capitalization, with banks having higher capitalization generally perceived as safer, more prudent, and less risky. Consequently, such banks may hesitate to allocate investments to forest management projects due to their perceived higher risks. This leads to the formulation of the following hypotheses.

H3. The financial bank's performance is correlated with the presence of sustainable forest Management

3. Data and Methodology

Before diving into the data section, it's important to outline the variables used in the study. The study employs the total forest area as the dependent variable to measure sustainable forest management. This dataset represents the percentage of land area covered by forests. As specific data for sustainable forest management records are unavailable, the study adopts the approach proposed by Schall and Ammer (2013), which quantifies forest management based on land area.

Furthermore, in this context, SFM aims to maintain forest productivity without reducing the number of forest stands, making it logical to evaluate SFM success using forest land area as a metric. Lesiv et al. (2022) support this approach, noting that forest management influences the total forest land area through natural regeneration, planted forests, and plantation forests. American and Woodcock (2021) emphasize that forest land data is crucial for monitoring land cover changes globally.

In this study, the relationship between sukuk and sustainable forest management should be viewed as one where sukuk funding enhances forest management practices. These practices include better planning, monitoring, and execution of forestry activities, which help maintain or improve forest ecosystem quality. Consequently, forest areas remain stable and do not degrade, or the overall health and sustainability of forests are strengthened, resulting in forest land area expansion. This interpretation does not

suggest that sukuk funds are used to purchase forest land but rather that they support conservation efforts through effective SFM practices.

Furthermore, the explanatory variables include Islamic financing, macroeconomic activities, financial bank performance, and political factors. Sukuk is represented by the total amount of sukuk funds in Islamic banks. Financial bank performance is measured by the capital-to-asset ratio and return on asset, which gauge bank capital and reserve relative to total assets and bank profitability, respectively. Additionally, political matters are captured by the control of corruption and political stability indicators. Control of corruption reflects perceptions of the extent to which public power is utilized for private gain, encompassing various forms of corruption and the influence of elites and private interests. Political stability assesses the likelihood of political instability or violence, particularly driven by politics, including terrorism. For more details about data, refer to Table 1 for a summary of variables and Table 2 for descriptive statistics.

The data utilized in this study are sourced from diverse repositories. Forest management data is sourced from the World Development Indicators, OIC Statistics provides Sukuk information, Financial bank performance metrics, including capital and profit, are obtained from the Global Financial Development database, while indicators for control of corruption and political stability, representing political factors, are acquired from the World Governance Indicators. The study encompasses the period from 2010 to 2021, dictated by data availability within this timeframe.

Table 1 Variable Summary Should Be Here

Table 2 Descriptive Statistic Variables Should Be Here

Moreover, various panel tests are undertaken to identify the most suitable model for investigating the correlation between sustainable forest management (SFM) and sukuk. All data undergo a logarithmic transformation before analysis to normalize the data distribution and enhance its resilience, except for data already expressed as percentages. The study posits that the association between sustainable forest management and other independent variables follows a logarithmic pattern. This transformation aims to linearize the variables. The model presented in this study adopts the ordinary least squares approach along with the inclusion of the error term.

$$FOM_{it} = \alpha + \beta_1 SUKUK_{it} + \beta_2 CA_{it} + \beta_3 ROA_{it} + \beta_4 COC_{it} + \beta_5 PS_{it} +$$

The variables i and t represent country and time variables, respectively, with FOM denoting forest management, and SUKUK, CA, ROA, COC, and PS representing sukuk, capital to total assets, return on assets, control of corruption, and political stability, respectively. However, Ordinary Least Squares (OLS) is commonly used to estimate the parameters of a linear regression model, under the assumption of no correlation between unobserved individual or entity-specific effects and the observed variables (De Souza and Junqueira, 2005). When observed variables are correlated with unobservable factors, OLS estimates may be biased. In such cases, Fixed Effects

estimation is preferred as it accounts for unobserved heterogeneity by distinguishing individual or entity-specific effects (Bai, 2009). Random Effects estimation, on the other hand, treats unobserved heterogeneity as a random variable and assumes it is uncorrelated with the observed variables. However, the final results of the model analysis depend on the outcomes of various tests of panel regression, such as the Lagrange multiplier, Chow test, or Hausman test. The study also applies classical assumptions to ensure the model's reliability for analysis and to mitigate potential biases. By adhering to these assumptions, the study aims to enhance the validity of the findings and minimize any distortions that may occur during the analysis process.

4. Result

This part discusses the study findings from the regression process, highlighting the significance of Sukuk and politics in promoting sustainable forest management in D-8 countries. The analysis of the statistic relationships is structured and estimated by using the unbalanced panel regression. As support and enrichment for the discussion, additional variables that could have an impact on the study, such as financial bank performance that consists of capital and profit, will also be explored.

After conducting various tests on a panel data model, the analysis focusing on the influence of Sukuk on sustainable forest management across D-8 countries suggests that the fixed effect model is preferred. The Hausman test indicates a p-value greater than the alpha level, meaning the null hypothesis cannot be rejected, and therefore, the fixed effect model is deemed appropriate for analyzing the data.

The study incrementally adds variables within each group (Sukuk, political factors, and bank performance) to ensure data adequacy and assess the consistency of outcomes. Results demonstrate that the model remains consistent, validating the reliability of Sukuk's impact, despite Sukuk not being statistically significant when directly regressed with forest management. Nevertheless, the coefficient's sign remains consistent, indicating a positive impact on forest management, with minimal deviation in coefficient values across different regression models.

Furthermore, the study conducts tests for multicollinearity, autocorrelation, and heteroscedasticity to assess the robustness of the model. The correlation matrix presented in Table 3 indicates the correlation among variables, serving as an indicator for multicollinearity testing. The results show that the variables are not affected by multicollinearity issues, as each variable demonstrates a value below 0.80. However, upon examining autocorrelation and heteroscedasticity, both tests indicate abnormal correlation and the presence of heteroskedasticity in the model. As a result, additional adjustments are required for the model to be accurately analyzed.

The aforementioned issues can be addressed using Driscoll-Kraay standard errors. These standard errors enable the adjustment for both heteroskedasticity and autocorrelation in the estimation of regression coefficients. By accommodating these issues, Driscoll-Kraay standard errors offer more robust standard errors, enhancing the reliability of hypothesis testing and inference (Hoechle, 2007). After successfully passing various tests to confirm its dependability, the model is to proceed to the next stage, analysis. After completing these thorough analyses, it is possible to confidently conclude that the model is reliable and acceptable for further investigation. The

conclusive outcome of the relational ramifications between political factors and sukuk in promoting Sustainable Forest Management (SFM) is presented in Table 4.

Table 3 The Correlation Matrix of The Variables Should Be Here

Table 4 Estimation Result Should Be Here

The final estimation shows the existence of many significant variables, indicating that multiple additional factors significantly affect the achievement of sustainable forest management (SFM). In other words, the achievement of sustainable forest management (SFM) is influenced by a multitude of determinants beyond the ones highlighted in the table. Sukuk is found to be positively and highly significant in contributing to sustainable forest management (SFM) in D-8 countries. To be more detailed, each one percent rise in Sukuk causing sustainable forest management (SFM) increases around 0.0019 percent.

On the political side, The study indicates that political factors, including both political stability and control of corruption, significantly hinder the advancement of Sustainable Forest Management. Throughout all stages of regression analysis, these factors consistently exhibit a negative impact, outweighing the positive influence of Sukuk. This suggests that politics pose a significant risk and could potentially contribute to deforestation. To be more detailed, each rise of control of corruption by one percent may lead to a decrease in the possibility of Sustainable Forest Management by 0.0027 percent. Similarly, a one percent increase in political stability could result in a 0.0016 percent reduction in the implementation of Sustainable Forest Management. Notably, corruption appears to have a more pronounced effect on forest management than political stability alone.

In addition to that, capital and profit, which are possessed by banks (Islamic and conventional), revealed the link that a bank's performance actually contributes to the achievement of Sustainable Forest Management, Whether realized or not. Although the study revealed only a small impact, if it is continued, it will help the achievement of excellent Sustainable Forest Management. However, capital is not found to have a contribution to forest conservation, but the profit that the bank earns might have a positive impact. Precisely, each one percent rise in capital leads to a 0.0001 percent increase in accelerating Sustainable Forest Management.

5. Discussion

5.1 Relational Ramification between Sukuk and Sustainable Forest Management

The relationship between the implementation of Sustainable Forest Management and Sukuk was revealed by the study. They have a strong positive correlation, indicating that Sukuk's design, in general, without green labels, could still have an impact on protecting the environment, specifically forest management. Referring to the finding, where each one percent rise in Sukuk causes sustainable forest management

(SFM) to increase by around 0.0019 percent, this finding was supported by Khan (2015), Al Madani et al. (2020) and Erwinsyah (2022). Additionally, they stated that the Sukuk initiative plays a role in expediting and enhancing the effectiveness of the forestry priority program, which encompasses the production, conservation, and protection of forest resources.

Based on some of the Islamic moral economy in the literature sections above, there are well-delivered points that emphasize concerns about the environment and natural resources, indicating that since the beginning, the nature of the product in Islamic banking and finance, including Sukuk, is indeed environmental-friendly without needed to add environmental label, which is now being intensively campaigned for. Furthermore, since protecting the environment is mandated by Islam, it stands to reason that Shariah compliance should include good environmental practices. *Maqasid Shari'ah*, a fundamental concept in Islam, extends beyond Imam Al-Ghazali's definition to encompass the preservation of religion, human life, intellect, progeny, and wealth. Lahsasna and Hassan (2012) further expound on the objectives of *Maqasid Shari'ah* in the context of financial transactions, emphasizing equitable circulation and protection from harm, including environmental degradation, particularly in forests, which are vital to global ecological health.

Moreover, referring the Maqasid Shari'ah model (MSM) developed by Al Madani et al. (2020) illustrates the pathway of Sukuk transmission culminating in initiatives for Sustainable Forest Management.

Figure 1 The Potential Utilization of Sukuk for Sustainable Forest Management Should Be Here

Decision-makers initiate the process by aligning sukuk issuance with the institution's mission, often focusing on promoting sustainable development. Funds raised through sukuk are then allocated to specific projects aimed at preserving wealth, fostering development, ensuring equitable distribution, and promoting fair circulation. Projects aimed at wealth preservation emphasize rigorous quality management, environmental protection, and responsible resource utilization to minimize excessive resource depletion. Wealth development initiatives aim to stimulate economic activities, enhance socioeconomic prosperity, and boost productivity through advancements in research and technology. Wealth circulation efforts facilitate fair distribution among diverse stakeholders by supporting trade, infrastructure development, and financial activities. Projects focused on fair wealth distribution aim to create livelihood opportunities, foster equitable employment, and support microenterprises and microfinance.

Collectively, these initiatives contribute to sustainable development and human well-being. In the realm of forest management, this approach translates into strategies for preserving and sustainably managing forests, enhancing the economic benefits derived from sustainable forestry practices, and ensuring that local communities derive value from forest resources. This involves developing sustainable tourism infrastructure, improving transportation for forest products, and promoting financial instruments that bolster sustainable forestry practices. Expected outcomes include protected and sustainably managed forests, improved livelihoods for forest-dependent communities,

and overall enhancement in quality of life through responsible and equitable utilization of natural resources.

Furthermore, sustainable financing provided by Sukuk emphasizes the management of a company's impact on the economy, environment, and society while also securing its long-term sustainability. This entails addressing issues such as resource scarcity and economic inequality, all of which have implications not only for society but also for businesses (Kunhibava et al., 2018).

This discovery also indicates that the implementation of Sukuk in D-8 countries has effectively adhered to the primary objectives of Shariah principles. As evidenced in the study, Sukuk has a tangible impact on promoting Sustainable Forest Management. Consequently, based on the comprehensive analysis conducted, it can be affirmed that H1 is supported, suggesting that Sukuk has the potential to foster the advancement of Sustainable Forest Management, even without a specific "green" designation.

5.2 Relational Ramification between Political Factors and Sustainable Forest Management

The study demonstrates a negative correlation between political factors and sustainable forest management, which is evident in both control of corruption and political stability. Regression analysis reveals that a one percent increase in control of corruption is associated with a 0.0027 percent decrease in the likelihood of Sustainable Forest Management implementation. Similarly, a one percent rise in political stability correlates with a 0.0016 percent reduction in Sustainable Forest Management implementation. This is linear with what Fenetahun et al. (2021) and Galinato & Galinato (2013) in their studies. Among the political variables examined, control of corruption, representing corruption levels, shows a more pronounced negative impact on Sustainable Forest Management implementation. This could be attributed to corruption's detrimental impact on environmental initiatives, such as diverting funds intended for conservation efforts into private accounts, thereby depleting natural resources. Moreover, corruption can contribute to environmental pollution by influencing bribery in environmental inspections and permit issuance, as well as facilitating the illicit trafficking of wildlife and other natural resources.

Furthermore, corruption and political instability within institutions can hamper economic progress. At the national level, corruption and political instability can obstruct forest development by curtailing public spending. Corruption can also influence policies in favor of rent-seeking businesses, while political instability introduces uncertainty that discourages resource conservation and diminishes resource reserves. Not to mention, the focus investigation in this research is D-8 countries, most of which are developing countries, the politics have not been tackled and still become a big enemy for their development.

Masron and Subramaniam (2018) analyze environmental legislation in developing countries and try to assess its efficacy in mitigating environmental degradation with developed countries. While numerous environmental challenges have been successfully tackled in developed nations, they persist in developing countries, largely due to pervasive political corruption. Consequently, many health and environmental issues remain unresolved. This is evident in the prevalence of respiratory illnesses caused by indoor and outdoor air pollution from fossil fuel

consumption, which continue to be major causes of mortality in developing countries but are less widespread in developed nations.

To provide a clearer understanding of the activities classified as illegal in forestry and their potential link to political deceit and corruption, there are some examples provided by Contreras-Hermosilla (1997) listed below:

Unauthorized occupation of forest lands

- Rural families, communities, or private corporations encroach on public forested lands to convert them into agricultural or cattle ranching areas.
- Private companies or individuals persuade landless peasant farmers to illegally occupy forested areas, aiming to pressure governments into granting land ownership rights to the farmers and subsequently purchasing these lands from them.

Illegal Logging

- Extracting more timber than authorized.
- Logging without proper authorization.
- Obtaining logging concessions through bribery.
- Duplicating felling licenses.
- Killing trees through girdling or ringbarking to facilitate legal logging.
- Engaging local entrepreneurs to purchase logs from protected areas.
- Logging protected species or within protected areas.
- Logging outside designated concession boundaries.
- Logging in prohibited areas such as steep slopes, riverbanks, and water catchment areas.
- Removing under- or oversized trees from public forests.
- Reporting inflated volumes extracted in forest concessions to conceal unauthorized extraction from non-concession areas.

Illegal Timber Transport, Trade, and Smuggling

- Transporting logs without proper authorization.
- Transporting illegally harvested timber.
- Smuggling timber.
- Exporting and importing tree species are banned from trade under international agreements like the Convention on International Trade in Endangered Species of Wild Flora and Fauna.
- Exporting and importing timber in violation of national trade bans.

Transfer Pricing and Other Illicit Accounting Methods:

- Stating values and quantities lower than the actual amount exported.
- Declaring inflated purchase prices for inputs from related companies.
- Manipulating debt cash flows to transfer funds to subsidiaries or parent companies, such as by inflating debt repayment to evade taxes on profits.
- Misrepresenting, undervaluing, underestimating, and mislabeling species exported or sold domestically.

Unlawful forest processing:

- Conducting operations without the required processing license.
- Disregarding environmental, social, and labor laws and regulations while processing.

Besides that, there are several reasons suggesting that the forest and forest industry sector could be more vulnerable to illegal activities and corruption compared to other sectors. This appears to be particularly true in numerous tropical and subtropical nations, where forest ecosystems are highly intricate, access can be challenging, and inadequate monitoring systems and limited media coverage hinder the detection of illegal operations. The susceptibility of these countries to forest-related crimes and corruption can be attributed to the following factors (FAO, 2009):

- Forest operations in these nations often encompass expansive territories situated in remote regions, distant from public observation, media coverage, and oversight by official regulatory bodies. Independent assessments are infrequent, and public regulatory agencies typically have limited enforcement capabilities over vast and secluded areas.
- In nations abundant in forest resources, the value of these resources is high, yet precise information regarding timber volumes and quality is often lacking.
- Even with comprehensive forest inventories in place, logs exhibit significant variability in terms of volume, species, and quality. Quantifying commercial volumes becomes challenging, especially when logs are affected by central rot or when species identification allows room for error. When different prices are set for various species and qualities of logs across different concession areas, there is potential for downgrading qualities and species. This situation often requires subjective interpretation rather than objective and precise measurement, prompting governments to establish area-based uniform fees in forest concessions.
- Government officials, often receiving low wages and lacking adequate supervision, are responsible for overseeing high-value products across extensive areas. In such scenarios, there are strong incentives for engaging in corrupt practices.
- The multitude of regulations and permits issued by governments to manage forest resources efficiently create additional avenues for corruption whenever unsupervised public officials are tasked with approving these permits or enforcing the regulations. Timber transit permits serve as notable examples of rules that are often circumvented despite good intentions. Additionally, regulations are frequently inadequately designed, subject to frequent changes, and open to interpretation, making them susceptible to manipulation.
- • The penalties for corruption are typically insignificant compared to the potentially lucrative gains. Moreover, in cases of systemic corruption, it becomes challenging to detect and penalize corrupt officials and their collaborators in the private sector or civil society, especially when many others, including those responsible for enforcement, may also be involved in corrupt practices.
- Lastly, in many cases, government forest regulators with limited authority working in remote areas are compelled to engage in illegal activities or face potential physical harm. Violence often accompanies efforts by forestry authorities to monitor and curb illicit operations.

Essentially, the combination of valuable timber resources, limited oversight, low wages, variable timber quality, subjective decision-making powers, inadequate information, unequal power distribution, and minimal risk of severe punishment collectively foster a conducive environment for illicit activities and corruption. Thus, after a comprehensive analysis, it can be affirmed that H2 is supported, indicating that political factors significantly influence the achievement of sustainable forest management.

5.3 Relational Ramification between Financial Bank's Performance and Sustainable Forest Management

The research reveals that a financial bank's performance has a modest impact on Sustainable Forest Management, with profit (return on asset) being the only significant correlation, while capital shows no significant connection to forest management. Specifically, the profitability of banks, whether Islamic or conventional, contributes to advancing Sustainable Forest Management. A mere 0.0001 percent increase in Sustainable Forest Management is observed for every one percent rise in capital. Despite the relatively small effect size, this finding underscores the importance of considering the financial performance of banks, often overlooked, in forest management. This finding aligns with the findings of Nizam et al. (2019) and Shakil et al. (2019) suggesting that as a bank's profitability grows, it tends to prioritize expanding funding for environmental initiatives, including forest management. This strategic approach signals to the public the bank's involvement in forestry investments, potentially attracting customers supportive of environmental conservation efforts.

Investment in tree-planting initiatives is a prevalent strategy among banks to engage in forest management. This approach aims to reduce emissions contributing to global warming, combat pollution, and land degradation, or generate credits to offset their carbon emissions during the operational bank process. While banks currently have limitations on their contributions to forest management, according to The Bank's Policy on Forestry from ADB (1995), there is potential for them to prioritize using their profits to invest in various sectors related to forestry. These sectors may include (1) the cultivation of both timber and non-timber forest products, (2) establishing plantations for industrial timber, fuelwood, and watershed rehabilitation in degraded areas, and (3) supporting the conservation of biodiversity and ecosystems within forests.

Therefore, following a thorough analysis, it can be concluded that H3 is validated, demonstrating a correlation between the financial performance of banks and the existence of Sustainable Forest Management.

6. Conclusion and Policy Recommendations

The aim of the study is to investigate the link ramifications of Sukuk and political factors in influencing the implementation of Sustainable Forest Management while also proving that Sukuk, even without being explicitly designed as a green product, significantly contributes to the enhancement of Sustainable Forest Management due to its inherent adherence to Islamic principles, which prioritize environmental preservation. Hence, Sukuk has the most potential to finance a forest management project that still has problems with the funding source. Additionally, Bangladesh, Egypt, Indonesia, Iran, Malaysia, Nigeria, Pakistan, and Turkey, covered in D-8 countries, are deemed to have

the best representatives to present that their countries are well aligned with Shariah compliance. Thus, it is believed that it would deliver an excellent result in informing the public and being an example.

The study incorporates additional variables, such as the financial performance of banks, to enhance its analysis. The findings reveal a strong correlation between Sukuk and the enhancement of sustainable forest management, indicating Sukuk's potential to provide suitable financing for sustainable forestry projects. This underscores the notion that a "green" label is not necessary for Sukuk to demonstrate its commitment to responsible investment practices, as these bonds already impose constraints on the use of proceeds in unethical businesses. The findings also shed light on the well-managed Sukuk funds and good practices in D-8 countries. However, political factors, including control of corruption, are found to hinder Sustainable Forest Management. Corruption and political instability can obstruct forest development by reducing public expenditure and contribute to environmental pollution through bribery in environmental inspections and permit issuance, as well as facilitating the illegal trafficking of wildlife and natural resources. Furthermore, the study indicates that the financial performance of banks, specifically their profits, is linked to Sustainable Forest Management, albeit the contribution is relatively modest. This underscores the significance of bank support in allocating their profits towards forest conservation efforts, such as tree planting, to sustain forestry areas.

Given the scarcity of quantitative research exploring the correlation between Sukuk and Sustainable Forest Management, this study differs from other studies in filling the gap of existing literature in the Islamic Banking and Finance field. Whereas the previous studies have only relied on case studies or qualitative approaches. In addition, this study diverges from the current trend, which predominantly focuses on "Green" Sukuk, to address climate change. Hence, this study provides a novel viewpoint by investigating an alternative dimension of Sukuk's influence on Sustainable Forest Management.

Based on the findings, several policy recommendations can be proposed to address this issue, involving both government and Islamic banking and financing entities. Governments can collaborate with Islamic banking and finance to promote public-private partnerships (PPPs) in Sustainable Forest Management projects, utilizing Sukuk financing to attract private sector investment. PPPs can help mobilize resources, expertise, and technology for effective SFM implementation, aligning with environmental and social objectives. Another strategy involves providing financial incentives, such as tax breaks or subsidies, to encourage sustainable forestry practices among businesses (including Islamic banking and finance) and landowners. This support can encompass initiatives like reforestation, sustainable harvesting techniques, and biodiversity conservation.

However, government involvement may be complicated due to potential corruption in politics. Transparency and accountability in forest management are crucial to address this issue, allowing public access to information. Therefore, not only should the government have oversight, but society, including the media and non-governmental organizations (NGOs), should also monitor and report any misappropriation. Nonetheless, addressing political challenges remains a significant task, as attempts to

reveal the truth can be suppressed. Establishing a dedicated platform for forest management reporting, monitored by the public, could help mitigate these challenges.

Although this study offers a distinctive perspective on Sukuk, it has limitations in providing the study with the latest data, primarily due to the limited data on Islamic banking and financing. In addition, there is significant potential for future research to broaden this investigation by including non-Muslim countries in the analysis.

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Appendix 1

Table 1 Variable Summary

Variable	Definition of Operational Variable	Unit	Source
Dependent variable			
Forest management	The total of forest land area	% of land area	WDI
Independent variable			
Islamic financing	The total asset of sukuk holdings by Islamic banking in D-8 countries	USD	SESRIC (OICStat)
Capital to asset ratio	The ratio of bank capital and reserve to total assets	%	Global Financial Development
Return on asset	The total of net income over the average total assets	%	Global Financial Development
Control of corruption	The various forms of corruption ranging from minor to significant, as well as the influence of elites and private interests on government affairs.	Percentile Rank	World Governance Indicators
Political stability	The likelihood of political instability and/or violence instigated by political motivations, including acts of terrorism.	Percentile Rank	World Governance Indicators

Table 2 Descriptive Statistic Variables of D-8 Countries

Variable	Mean	SD	Min.	Max.
Forest management	2.216	2.140	-3.096	4.081
Sukuk	7.094	2.110	1.244	10.586
Capital asset ratio	24.510	22.260	1	67

Return on asset	39.177	26.837	1	86
Control of corruption	31.573	17.219	7.692	67.298
Political stability	16.340	15.357	0.473	57.619

Source: Authors' calculation

Table 3 The Correlation Matrix of The Variables

	Forest managemen t	Sukuk	Capital asset ratio	Return on asset	Capital asset ratio	Return on asset
Forest management	1					
Sukuk	0.094	1				
Capital asset ratio	-0.206	-0.332	1			
Return on asset	0.371	-0.151	0.361	1		
Control of corruption	0.558	0.532	0.125	-0.263	1	
Political stability	0.682	0.386	0.107	-0.157	0.623	1

Source: Authors' calculation

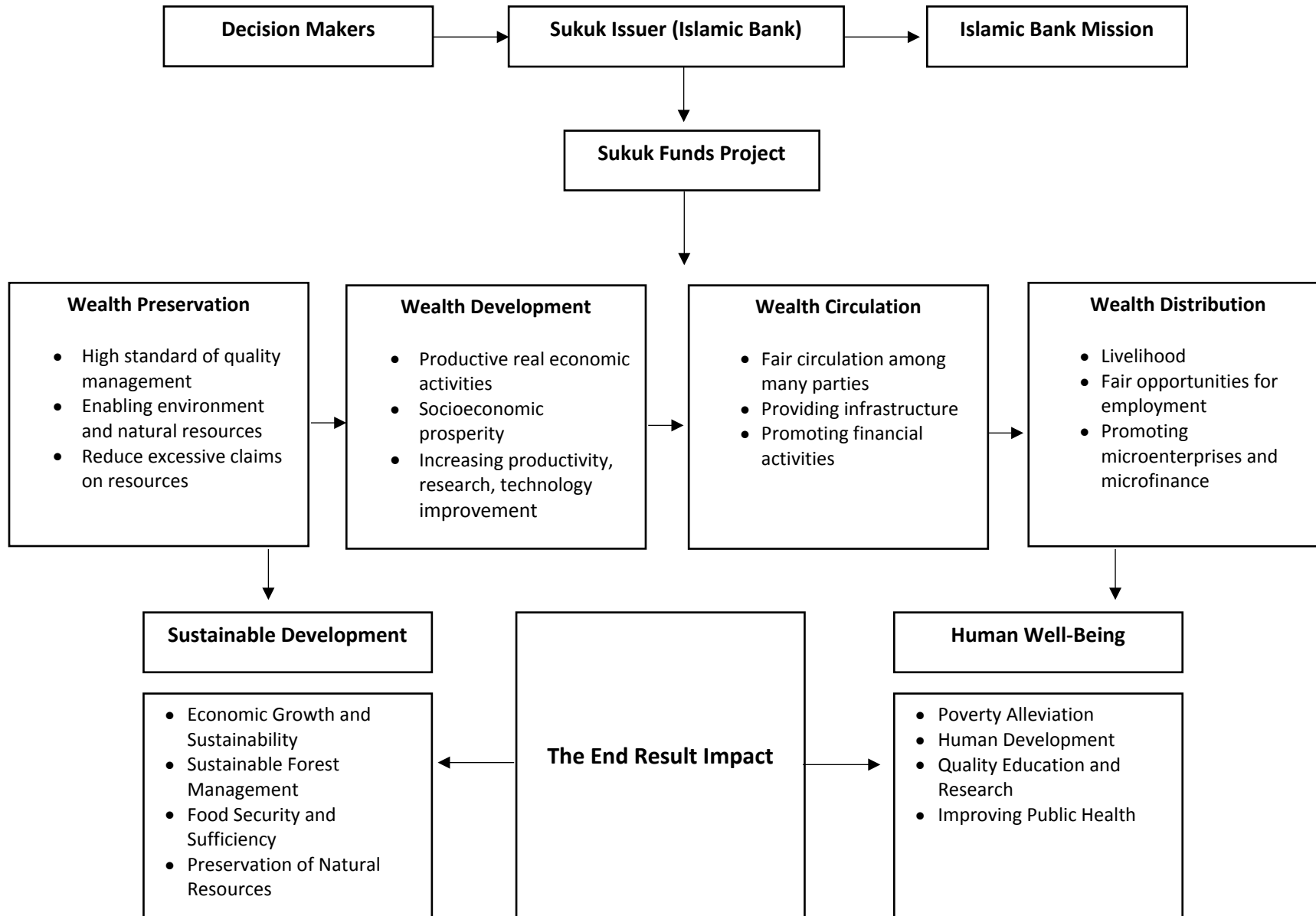
Table 4 Estimation Result

	Fixed Effect		
	(1)	(2)	(3)
Sukuk	0.0019 (0.0012)	0.0028** (0.0013)	0.0017** (0.0007)
Control of corruption		-0.0029*** (0.0005)	-0.0027*** (0.0007)
Political stability		-0.0016** (0.0006)	-0.0016** (0.0007)
Capital asset ratio			-0.0003 (0.0003)
Return on asset			0.0001*

Constanta	2.9360*** (0.0076)	3.0369*** (0.0188)	(0.0000) 3.0443*** (0.0191)
R-squared	0.1215	0.4454	0.5087
Countries	8	8	8

Source: Authors' calculation

Figure 1 The Potential Utilization of Sukuk for Sustainable Forest Management



Source: Al Madani et al. (2020)