

Green Investment as a Financing Mechanism to Promote Sustainable Development: Standard Study of a Sample from Southeast Asian Countries Using the PVAR Model

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Abstract :

This study aims to shed light on green investment as a modern financing mechanism that supports environmentally friendly projects and contributes to achieving sustainable development goals through its tools represented in green sukuk and its impact on the gross domestic product of a group of Southeast Asian countries represented by Malaysia, Thailand, Indonesia, and the Philippines, using Panel Var model for the period 2018-2021. Depending on the variables GDP (LOGPIB) as the dependent variable and the independent variables represented in the volume of green sukuk issuance (LOGGS), investment in renewable energy (LOGENR), investment in the agricultural sector LOGAAGR, the total labor force LOGWF and the total population LOGPOP, the results indicate that green sukuk

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have a weak impact on GDP in the short and long terms; in addition, the gross domestic product are not only affected by the volume of issuance of green sukuk, but also by other variables that have been included in the study.

Keywords: Green investment, green sukuk, green projects, panel models, sustainable development.

Jel Classification Codes: G11, G23, Q42, C23, Q01.

Introduction :

In order to alleviate pressure on the uses of depleted traditional energy, and especially reduce their environmental repercussions, the shift towards sustainable, clean sources of energy has become the primary goal of both developed and developing countries. In addition, the concept of green economy is promoted in light of the drive towards sustainable development and the building of an environmental culture.

Many methods have emerged that reinforce this trend; the financial sector has had a significant part of this transformation through what is known as green investment. The latter aimed at achieving sustainable development through the adoption of a set of financing strategies of green finance that is concerned with the various financial flows of investments, enterprises, development initiatives as well as environmental policies to developing an economy that guarantees a sustainable future. Therefore, many industrialized countries like Southeast Asia (Malaysia, Thailand, Philippines, Indonesia) have endeavored in the research and exploitation of alternative renewable sources of energy through green investment mechanisms in line with green and environmentally friendly standards, including green sukuk.

1-1 Research problem :

To what extent green investment has contributed as a financing mechanism to promote the sustainable development of a sample of Southeast Asian States (Malaysia, Thailand, Philippines, Indonesia)?

1.2. Study hypothesis:

Green investment contributes to achieving sustainable development, especially in its part on green Islamic financial sukuk that are under consideration in Southeast Asian countries (Malaysia, Indonesia, Philippines, Thailand).

1.3. Study Objectives:

- Identifying green investment as a financing mechanism to promote sustainable development and achieve its objectives.
- Presentation of the green investment experience of selected South-East Asian countries (Malaysia, Indonesia, Philippines, Thailand).
- Indicate the main challenges that may prevent the enhancement of the role of green finance in support of sustainable development in South-East Asia.

1.4. Methodology:

The descriptive approach was used in the theoretical framework to give a glimpse into the importance of green investment and its role in supporting sustainable development. While the standard analytical approach was used in the applied aspect of the study, by identifying the relationship between green investment and its role in sustainable development of a sample of major exporters of Southeast Asia (ASEAN), drawing on the EViews program.

1.5. Literature review

In a study in title “The Impact OF Green Islamic Finance on the Renewable Energy Investment: Indonesia’s Experience in Green Sovereign Sukuk Instrument”, the researchers implicated on the State of Indonesia, drawing on the descriptive and analytical approach; the sample study was the issuance of Indonesia's green sovereign sukuk. One of the most important findings is that Indonesia has faced the

Problem of climate change through the use of green Islamic financing instruments like green sukuk, which promoted investment in green projects. Furthermore, Indonesia's first step was developing green

Islamic finance markets to finance renewable energy by issuing Islamic green sukuk while enhancing.

the effectiveness of the partnership between the government and the private sector to address climate change in order to achieve development and build a resilient economy in Islamic countries (Sahari&Henniche, 2020).

In another study in title” Green Finance and Sustainable Development Goals: China’s Case” by Jung Wan Lee, which was implicated on China, the primary objective is to demonstrate the role of green finance in achieving sustainable development goals and investment in infrastructure through the use of new financial instruments of green bonds. In his study, lee (2020) relied on the descriptive approach while the sample study was the issuance of green bonds in China. One of the most important findings is that green finance plays a significant role in addressing environmental and economic problems by supporting financial products and issuing green bonds and investing in them has reached the most important point of achieving sustainable development. thus, it emphasizes the positive impact of green finance by investing in its new financial instruments, and promoting their application in financial markets through the issuance of green bonds with transparency. Therefore, creating a partnership between the public and private sector diversifies green finance resources.

Moreover, Wang et al. (2022) in their study, “Does Green Finance Inspire Sustainable Development? Evidence from a Global Perspective”, the primary objective was to assess the relationship between green finance and sustainable development worldwide through the Granger causation test. In this study, Wang et al. (2022) relied on a descriptive and analytical approach; the sample of the study was an empirical analysis of the impact of investment in green finance projects on sustainable development. One of the most important findings is that the relationship between green finance and sustainable development in the short term is unstable. While, in the long run, green finance has a positive impact on

sustainable development, which supports the theory of interaction; this impact has generated many new financial instruments and strengthened their development in order to achieve sustainable development in many countries demonstrated.

1.6. Study Structure:

To answer the study problem, the research was divided into three parts:

Part I: Concepts on green investment and its funding role to promote sustainable development

Part II: Green Investment's Contribution to Identified Energies as a Mechanism for Promoting Sustainable Development: A Sample Study from Southeast Asian States (Malaysia, Philippines, Indonesia, Thailand)

Part III :Discussion and Results

1. Concepts of green investment as a financing mechanism to promote sustainable development :

A transition to a green economy and adequate financing is one option that is expected to contribute to improving the efficiency of economic sectors, and promoting opportunities for sustainable development.

1.1 Definition of green investment:

Within the concepts of a green economy, the concept of green investment has emerged in line with it, and its definitions include:

- The International Finance Corporation (IFC) defines green investment as various funding for environmentally friendly projects aimed at protecting the environment and conserving natural resources (IFC, 2022).
- It is also defined as a form of socially responsible investment aimed at supporting environmentally friendly enterprises and companies and contributing to the fight against climate change. (Rubin, 2024).
- Green investment contributes effectively to financing projects that respect the environment. This financial contribution is linked to the practice of environmental ethics to improve both individuals and the environment. Modern financial investment is linked to the degree to which this investment contributes to improving environmental issues and measuring their environmental effectiveness as well as the scale of benefits they derive (AlMalki, 2017).
- Green investments are defined as the financing process through which green capital is used for the public and private sectors to invest in the provision of environmental goods and services, such as water treatment, protection of the diversity of ecosystems, landscapes and agricultural land, on the one hand, and mitigation and compensation of environmental and climate damage, such as the provision of renewable energy, and thus aimed at promoting sustainable development on the other (Remmashe&Douffi, 2022).

From previous definitions, green investments prioritize environmental sustainability and social responsibility, taking into account the long-term impact on society and good financial returns. Therefore, green finance is an important type of long-term sustainable financing that integrates environmental and social norms into

business and investment decisions to finance green projects favorable to green economy plans.

1.2 Types of green investment:

Green investments are made through financial instruments that support environmentally friendly projects. Stocks of companies that support energy transformation such as Tesla or FirstSolar are mainly included under this term. It may also include clean and renewable sources of energy (solar, wind, hydrogen or uranium), sustainable agriculture and green transport (electric vehicles). In that matter, investment in renewable energy projects is one of the most important green investments, including renewable energies (Abi & Momen, 2019): solar, wind, bioenergy, hydrogen energy, geothermal energy, hydropower.

1.3 Financing instruments available for green investment:

The global green finance market has grown rapidly with the development of various financing instruments, including:

- Green stocks by buying shares in companies with strong environmental commitments as many new startups seek to develop alternative energies and materials, even large companies place bets on a low-carbon future. For example, some companies such as Tesla have accessed billions of dollars in valuations by targeting environmentally conscious consumers.
- Green bonds: These fixed-income securities are sometimes called climate bonds, and represent loans to help corporate banks and government bodies finance projects that have a positive impact on the environment. These bonds can come with tax incentives that make them a more attractive investment than traditional bonds.
- Green Funds: Equity Investment in a Mutual Fund which funds companies that respect environmental and societal standards, i.e. funds aimed at sustainable development (English Harvard business review, 2021).
- Green Insurance: is a financial protection that covers environmental risks and responsibilities and promotes a sustainable environment. It is not only a substitute for the good will of environmental risks, but also it is the cornerstone of green insurance and is divided into three main categories: environmental liability protection, environmental sustainability and environmental resilience (Remmashe&Douffi, 2022).
- Green loans: According to the World Bank, a green loan is a form of financing that enables borrowers to use revenue exclusively to finance projects that make a significant contribution to achieving environmental objectives. It is similar to a green bond in that it raises the capital of eligible green projects; however, it relies on a loan that is usually smaller than the green bond, as the latter can be listed on the stock exchange or specifically declared (2022).
- Green banking products: issued by commercial banks to finance green projects. This is done by consolidating policies and addressing the banking constraints required by green finance in providing cash flows for green

investment and reducing and covering risks related to green commons by strengthening the loan guarantee system. Banking products are characterized by a range of features, including efficient improvement of market quotas and increased profits in businesses (Valid, 2022, p. 17).

- Green capital markets: financial markets that include market-oriented mechanisms and products of green sukuk and bonds that are one of the specially targeted financial instruments in financing climate or environmental-related projects (Tarif, 2017, p. 5). These tools are tax-free to encourage financing investments that are concerned with preserving the environment, reducing pollution, achieving an ecosystem and avoiding projects from the unexpected change in nature (valid, 2022, p. 18)
- Green Investment Funds: is a program that allows investors to complete an investment program managed by a specialized investment adviser to achieve the greatest return and least risk. These funds also serve as a means of gathering small investments for use in various investment instruments to maximize return. (2022, p.18)
- Green Instruments: are securities, proving to their owner the property of a known number of quotas common to him, issued to protect or restore the environment, climate and agriculture against pollution and damage. Its primary objective is to achieve sustainable development in the light of the purposes of Shari'a, and it is beneficial to the architecture and revival of the Earth. "(Belo Thani et al. ,2022, p. 45).

1.4 The importance of green investment in promoting sustainable development:

Sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet its needs (Hervé, 2010, p.14). Three-dimensional sustainable development is not just limited to the environmental aspect, but also it is a combination of three components: economic development, social development and environmental development. Green investment is a key element in promoting environmental sustainability by investing in environmentally friendly enterprises and a gateway to promoting economic and social development. Thus, the importance of green investment in promoting sustainable development is highlighted in the following aspects:

- Green investment is environmentally and economically critical. Environmentally, it promotes the building of smart cities in the long term and investment in green projects, reducing carbon emissions. While economically, it promotes the overall economic growth of the country or State adopting this model (k.Ozili, 2022, p. 6).
- Green Investment redefines business, infrastructure and institutional profiles by increasing green sectors in the economy and attracting a broad investor base for them in green investment and creating green

environmentally friendly enterprises (Al Banna& Abdul Amir, 2019, p. 156).

- Green finance contributes to enhancing countries' financial stability through the process of balancing economic growth and reducing environmental pollution by avoiding the risks referred to in the 2015 speech of the Governor of the Bank of England on physical risks, transformational risks and liability risks in order to achieve sustainable development goals (Spinaci, 2021).
- Green investment preserves the environment and contributes to cost reduction and economic growth.
- Creates new wealth and diverse jobs in the long, medium and short terms.
- Maintaining environmental, water, food and energy security contributes to the improvement and well-being of society.
- Raising the Efficiency of Exploiting Natural Resources and Bringing New Types of Technology such as Green Technology and Waste Recycling Technology.(Bekendi. 2019, p42).
- Green investment helps attract investments and create jobs .

To learn more about green investment as a modern financing mechanism that contributes to sustainable development, we overview a sample of Southeast Asia countries (Malaysia, Thailand, Indonesia and the Philippines) using the Panel Var model during 2018-2021.

2. Methods and tools: the contribution of green investment in renewable energies as a mechanism to enhance sustainable development: sampling study of a group of South Eastern Asian Countries

The sampling study follows the next steps:

- Definition of the study variables and model building;
- Time series stability test
- Cointegration test (Johansen),
- Granger Causal Test
- Analysis of impulse response and variation functions

2.1 Definition of the study variables and model building:

The variables are shown in the following table:

Table01:

Dependent and independent variables

Variable name	Variable code
Dependent variable	
Logarithm per capita GDP (current prices in US \$)	LOGPIP
Independent variable	
Logarithm for the volume of issuance of green Islamic instruments	LOGGS
Logarithm for energy investment with the participation of the private	LOGENR

sector (current prices in US dollars)	
Logarithm to invest in advanced technology (current prices in US dollars).	LOGTECH
Logarithm for the overall population census.	LOGPOP
Logarithm for total workforce.	LOGWF
Logarithm for Value Added in Agriculture (Current Prices in US \$)	LOGAGR

Source: by researchers

In this study, multiple and varied data have been relied upon for greater familiarity with the variables used in the standard study. The data used are the estimate of the standard model of the annual data for the period 2018-2021 obtained from the World Bank: PIB Gross Domestic Product (GDP), ENR Investing in Energy, TECH Investing in Technology, POP overall population census, WF total labor force, AGR added value in agriculture sector. As for the issuance of green sukuk, data are available monthly and collected from the official website publishing the issuance reports of the ASEAN Green sukuk, ACMF.

Model construction: Steps to build the panel model based on the self-regression var (panel vector autoregression model), The model is written as follows:

$$\mathbf{Pvar : PIB = F(GS, ENR, TECH, AGR, POP, WF)}$$

After determining the standard model, we transform it into the so-called standard economic model through the variables above, and we get the standard model formulation and assessment through the following formula:

$$PIB = \beta_0 + \beta_1 GS + \beta_2 ENR + \beta_3 TECH + \beta_4 AGR + \beta_5 POP + \beta_6 WF + U_T$$

By introducing logarithms into the two parties, it is converted into the following written version:

$$PIB = \beta_0 + \beta_1 LOGGS + \beta_2 LOGENR + \beta_3 LOGTECH + \beta_4 LOGAGR + \beta_5 LOGPOP + \beta_6 LOGWF + U_T$$

Where: β : Represents model parameters, U_T : Represents error limit.

2.2 Time Series stability test for Panel Model:

To determine the stability and complementarity of time chains, the two most important tests are the Peruvian Flip Test (PP) and the Dickie Fuller Test (ADF). As they have a significant role to play in avoiding the problem of false correlation between independent and dependent variables resulting from time chains' instability in estimating the standard model. Based on EViews 12, we carried out tests (PP) and (ADF) on all-time series for all model variables and the results are shown in the following table:

Table02:
Time Series stability test

Variables	At the level		At the first difference	
	PP	ADF	PP	ADF
LOGPIB	0.69	0.7121	0.000	0.000
LOGGS	0.000	0.001	0.000	0.000
LOGENR	0.81	0.7702	0.000	0.000

LOGTECH	0.9579	0.9641	0.000	0.000
LOGAGR	0.9364	0.9286	0.000	0.000
LOGPOP	0.9698	0.9537	0.000	0.000
LOGWF	0.6720	0.6978	0.000	0.000

Source: by researchers based on the outputs of EViews12

The results showed that the chains for both LOGPIB, LOGENR, LOGTECH, LOGAGR, LOGPOP and LOGWF are unstable at the level and this is because the probability values for both the above variables are greater than 5%. But after addressing the chains in the first-class variance method of variables; the variance chains of the previously mentioned model variables were found to be stable at the first difference. This is to provide them on the requirement of stability in both tests; This is because their probability values are smaller than 5%. As for the discrepancies series for the volume of issuance of LOGGS green sukuk, they are stable at the level of both (PP) and (ADF) tests, as their probability value is less than 5% and from which we say that the chain is stable at the level or integrated first class.

2.3 Cointegration Test (Johansen):

One of the most important tests is the VAR model and its most important conditions. The cointegration test aims to determine the extent of the existence of a long-term relationship and the results reached through the outputs of EViews 12 are shown in (Table 3). Johansen's test indicates that the probability value of prob (trace test) is greater than the 5% significance level, where we accept the nihilistic hypothesis H0 which indicates that there is no common integration; this indicates that there is no long-term equilibrium relationship which is a condition that achieves the var model.

Table 3:
Impact Test Results for Trace for cointegration

Hypothesized	Fisher Stat.*	Prob.	Fisher Stat.*	Prob
No. of CE(s)	(from trace test)		(from max-eigen test)	
None	6.772	0.5614	18.23	0.0195
Atmost 1	0.202	1.0000	0.023	1.0000
Atmost 2	2.332	0.9691	1.293	0.9956
Atmost 3	11.61	0.1695	11.61	0.1695

Source: by researchers based on the outputs of EViews12 .

2.4 Granger Causal Test:

This model aims to determine the relationship between green Islamic sukuk and gross domestic product (GDP) through Granger's results of the causation presented and extracted from EViews 12 and described in (Annex 1), it can be said that:

- The probability of statistical (Prob f -stati = 0.035) is smaller than the 5% significance level of the relationship going from LOGGS to LOGPIB which means that LOGGS causes LOGPIB.
- The probability of statistical (Prob f -stati = 0.33) is greater than the 5% significance level of the relationship going from LOGPIB to LOGGS which means that LOGPIB does not cause LOGGS.

We conclude that there is a two-way causality for both the LOGPIB and LOGGS variants, from which we say that the relationship between the size of the green Islamic sukuk and sustainable development is one-way causality.

As for other variables, there is no causal link except in the relationship going from LOGPOP to LOGGS because the result of the probability of statistical (Prob f -stati = 0.04) is smaller than the 5% significance level. While in the inverse relationship from LOGGS to LOGPOP there is none because the probability is greater than 5% from which we say that there is a one-way causality that combines the total population with the volume of issuance of green sukuk.

Determining the degree of time lag:

Before determining the estimate of VAR, the degree of time lag of this model should be determined using the Var Lag Order Selection Criteria test: it is based on the criterion of "LR", "AIC", "SC" and "HQ", and through the output of the EViews 12, the period 1 appears to be the optimal time lag period in the model.

2.5 Estimation of the Panel Var model:

Auto-regression models are simple and multiple time series model in which the dependent variable is explained only by its past behavior and the past value of other internal variables used in the model. The model formula VAR (1) will, therefore, be estimated since the degree of delay was one degree and the results of the model estimate VAR (1) were given according to EViews 12 outputs

Equation :

$$\text{LOGPIB} = 0.58 * \text{LOGBIB} + (1 + 0.003 * \text{LOGGS} - 0.014 * \text{LOGENR} + 0.0017 * \text{LOGTECH} + 0.2455 * \text{LOGAGR} - 0.017 * \text{LOGPOP} + 0.3667 * \text{LOGWF}) + 5.70$$

At the formula's estimate, the economic interpretation of the following results would be:

- If the volume of issuance of green instruments increases by 1%, gross domestic product (GDP) rises by 0.003%, indicating a correlation between the issuance of green sukuk and GDP.
- If the volume of energy investment increases by 1%, gross domestic product (GDP) drops by 14%. This indicates an inverse relationship between renewable energy investment and gross domestic product (GDP). This is because the costs of investing in energy are too expensive, in addition to the significant difficulties associated with replacing renewable energy with non-renewable energy. the most important element is that each country reacts differently to the challenge of investing in renewable energy, which is consistent with the conclusion reached in the previous study of LulianaMatei in title "Is There a Link Between Renewable Energy Consumption and Economic Growth?". As a final result, this study included a negative

correlation between investment in renewable energy and short-term economic growth. This is due to the sample of OECD States on which the study was conducted, and given the different economic industry, we have reached this conclusion.

- If investment in technology increases by 1%, gross domestic product (GDP) increases by 0.017%, indicating a correlation between investment in technology and GDP.
- If value added in agriculture increases by 1%, gross domestic product rises by 0.2455%. This indicates a correlation between value added in agriculture and gross domestic product.
- If the total workforce increases by 1%, the gross domestic product increases by 0.3667%, indicating a correlation between the total workforce and the gross domestic product.
- If the gross population increases by 1%, the gross domestic product (GDP) decreases by 0.7359%, indicating an inverse relationship between the gross population census and the gross domestic product (GDP).

2.5.1 Statistical interpretation:

According to EViews 12 outputs, Adjusted R-squared values amounted to 95.81% of variables in GDP interpreted by the independent variables included in the model.

2.5.2 Model Quality Test:

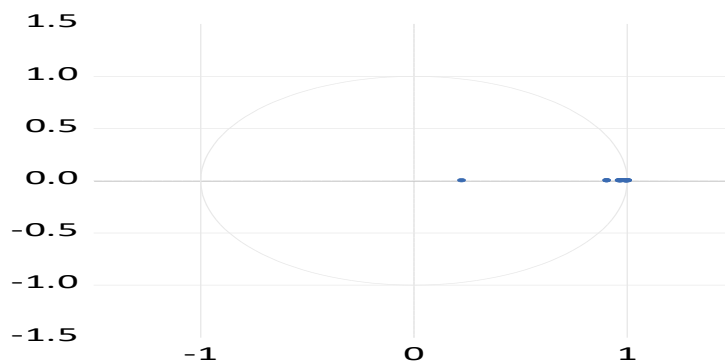
At this stage we will test the model in standard terms based on a set of tests illustrated by:

- Inverse root of AR Characteristic polynomial: The Inverse root of AR Characteristic polynomial test allows us to ensure the stability of the estimated model as a whole and the results are shown in the next figure:

Figure01:

Inverse root of AR Characteristic polynomial test

Inverse Roots of AR Characteristic Polynomial



Source: by researchers based on the outputs of EViews12

The results of the figure showed that most of the total transactions are less than 1 and all the roots are within the unit, which means that the model does not have the problem of linear association or heterogeneity of variability; so, we can conclude that the standard model used for the study is quite stable

Correlograms test:

based on the results obtained according to the outputs of EViews 12, a lot of the remains we have are all within the field of trust except for some.

Autocorrelation LM test:

According to the results obtained according to the outputs of EViews 12, the probability value (Prob) of all model variables is greater than the significance level of 5%. This prompts us to accept the nihilistic hypothesis that there is no problem of self-association of errors; thus, this is the evidence that the model does not suffer from the problem of self-association.

Homoskedasticity test for contrast:

According to the results obtained based on the outputs of 12 EViews, the probability value (Prob = 0.32) is greater than the significance level of 5%. Therefore, we accept the nihilistic hypothesis that provides for constant **homoskedastic** ity within the limits of errors.

2.6 Analysis of impulse response functions:

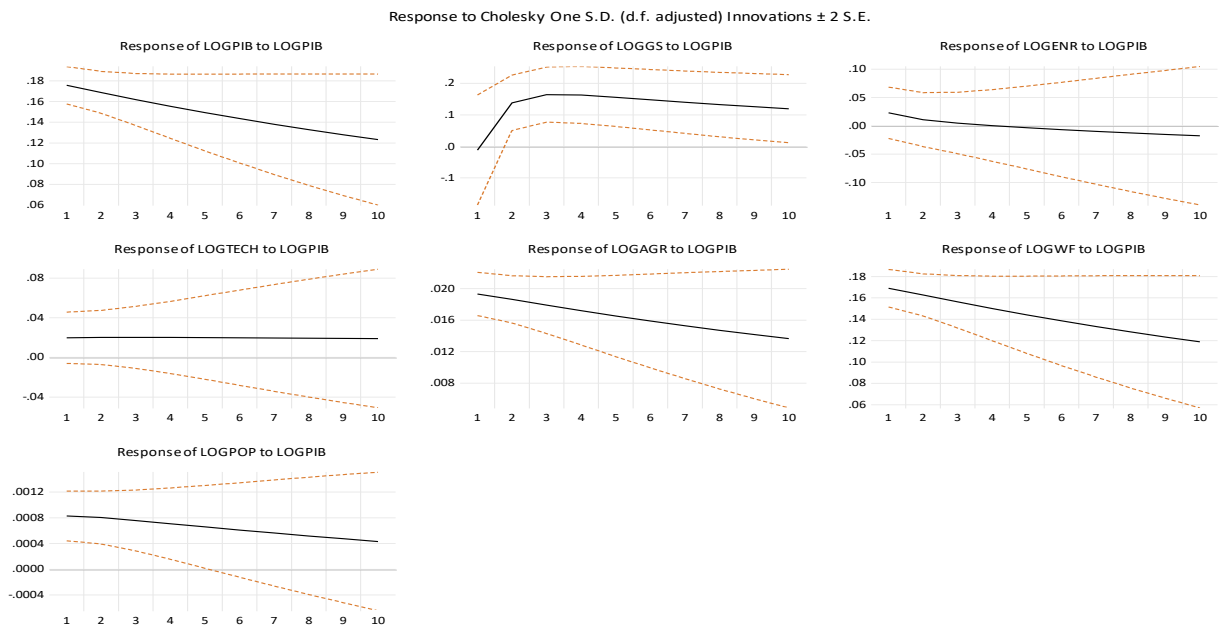
Analysis of impulse response functions allows us to recognize the nature of the shocks that model variables endure, and allows us to know their impact on gross domestic product (GDP). This is based on EViews 12 outputs, which is explained below:

- The response of GDP to itself: An unexpected shock of one standard deviation estimated at 1% would have a weak impact on GDP in the long term, where it reached 0.17% in the first year to decrease in value in the 10th year and reaching 0.12%; this is due to the different response of the economies of the countries included in the model.
- The response of GDP to a shock in the green Islamic sukuk: An unexpected random shock in the volume of issuance of green sukuk by a standard deviation of 1% will have a positive and significant impact especially at the beginning of the short and medium terms to a peak of 0.16% and then begins to decline to a long term of 0.12%. This difference and fluctuation are due to the different volume of issuance of green sukuk by the States included in the model, namely Malaysia, Indonesia, Thailand the Philippines.
- GDP response to energy investment shock: an unexpected energy investment shock of 1% has a negative and moral impact due to the difficulties associated with replacing non-renewable energy with renewable energy as well as each country's interaction differently with this change as well as the significant difference in different levels of development in their industries.
- GDP response to technology investment shock: An unexpected 1% technology investment shock has a positive and significant impact in the short and long terms, peaking at 0.18%.
- The response of GDP to the investment shock in agriculture sector: We note that an unexpected response in the field of investment in agriculture by 1% standard deviation has a weak impact at the beginning of the period 0.019% and then began a slight decline to reach 0.013% in the long term due to the countries' greater dependence on industrial investment than agriculture.
- The response of GDP to the shock of the total population census: When an unexpected response occurs in the total population census by a standard deviation

of 1%, it has a positive effect in the short and medium term with a value of 0.00075%, but in the long term this effect begins to decline to a value of 0.00043%. This is due to a significant rise in population growth especially in recent years which by its nature affects the gross domestic product and causes economic and social disruption through the inadequacy of certain social problems as poverty and unemployment.

- The response of GDP to the total labor force: When an unexpected response occurs in the total labor force census by a standard deviation of 1%, it has a positive effect in the short term as it reaches a peak of 0.169%. Then it starts a slight decline to reach in the medium term to 0.154% and continues to decline to settle in the long term in the value 0.119. The figure below illustrates the different response functions and their impact on GDP:

Figure02:
Impulse response functions test and its impact on GDP



Source: by researchers based on the outputs of Eviews12

Through our analysis of the different response functions and their impact on gross domestic product (GDP), when an unexpected response occurred, we reached a set of findings on the nature of the relationship between model variables and GPD. A positive impact of green sukuk and investment in technology on GDP was found, but the remaining variables were found to have a weak positive impact, not negative, on GDP, and the most important reasons are:

- The economic challenges and crises faced by the countries in the model, most notably the Covid-19 crisis in 2020, and their effects on many economic and social aspects.

- The various financing policies adopted by the countries under study, as well as development policies and plans.
- The significant difference in the economic and social structure of the countries included in the study.
- The state of the art in adopting the green Islamic financing system and investing in its tools as green sukuk.
- High costs of investing in green projects required by sustainable development.

2.7 Analysis of contrast:

At this stage, we are studying the causes of sustainable development based on the variable relied upon in the study as an indicator of sustainable development of "gross domestic product". The table below shows how much variability in the predictive for each variable which shows the variance error in itself and also shows the misprediction in other illustrative variables in the model.

From the table below, we note that variability in variance error in fluctuations, circumstantial and structural changes in GDP in the variable itself, which is the largest component of economic growth in the short, medium and long terms. It reached 100% in the first period and then begins to gradually

decrease in the long term by 96.23%, meaning that the amount of change in other variables is estimated.

at 3.77%. Therefore, the largest contribution of GDP fluctuations is attributable to the total labor force LOGWF by 1.35% in first place in terms of interpretation of the predictive error in GDP. It is followed in second place by investment in energy LOGENR (LOGENR), with the highest explanatory strength of 1.11% in the long run, followed by third place investment in technology with an interpretative power of 0.61%. Moreover, it is followed by other variables ranked with the highest interpretative strength of the volume of green sukuk LOGGS, and then the total population LOGPOP and the last ranking of investment in the agricultural sector LOGAGR, all contributed with the highest interpretive strength in the long run, as shown in the table:

Table04:
Analysis of the variance component of GDP as a result of the change in model variables

Period	S.E.	LOGPIB	LOGGS	LOGENR	LOGTECH	LOGAGR	LOGWF	LOGPOP
1	0.175663	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.243724	99.88138	0.033401	0.025993	0.014067	0.000596	0.041546	0.003020
3	0.293012	99.64664	0.079367	0.085428	0.045042	0.002326	0.131454	0.009745
4	0.332367	99.31803	0.131924	0.174441	0.091322	0.005341	0.259409	0.019538
5	0.365316	98.91340	0.189485	0.288768	0.151401	0.009711	0.415490	0.031747
6	0.393702	98.44856	0.250974	0.424390	0.223840	0.015481	0.590974	0.045784
7	0.418635	97.93741	0.315378	0.577686	0.307275	0.022682	0.778440	0.061131
8	0.440846	97.39199	0.381754	0.745444	0.400426	0.031336	0.971700	0.077347
9	0.460843	96.82256	0.449260	0.924858	0.502110	0.041459	1.165689	0.094060
10	0.478996	96.23774	0.517168	1.113492	0.611240	0.053060	1.356339	0.110959

Source: by researchers based on the outputs of EView12

Through the results analyzed from the above it was found that the total workforce LOGWF interprets the prediction error of LOGPIB more than other variables and then followed by investing in energy and investing in technology. It concludes that the independent variables included in the model and the volume of issuance of green Islamic sukuk have a more effective impact on the process of achieving and serving sustainable development in the long term, due to the fact that GDP contains other influential factors not included in the study model.

3. Discussion and Results:

Through the results of our standard study on some selected Southeast Asian countries: Malaysia, Indonesia, Thailand and the Philippines, the following can be concluded:

- Gross domestic product (GDP) responds to itself. An unexpected shock with a standard deviation of 1% will have a weak impact on GDP in the long term due to a negative impact in the long term because of the lack of an immediate response, and this is due to the nature of countries' economy constituting the model.
The response of GDP to a shock in the green Islamic sukuk will have a significant positive effect in the short term and then begin to decline in the long term. This is due to the recent issuance of green sukuk that began in 2017 by the State of Malaysia and then expanded the volume of issuance to parts of Southeast Asia in 2018, most notably Indonesia, Thailand and the Philippines.
- The response of GDP to the energy investment shock by a standard deviation of 1% will have a negative impact. This is due to the difficulties experienced by countries and their economies to move from non-renewable to renewable energy investment and the extent to which these countries react from this change as well as the significant costs of investment in this area.
- The response of GDP to the technology investment shock is 1%, which has a positive impact in the short and long terms. This is due to the reliance of the countries of Southeast Asia on the green technology policy that was framed in 2009. Malaysia was one of the leading countries to invest in this area and adopt it as a way to achieve sustainable development.
- The response of gross domestic product (GDP) to the investment shock in agriculture has had a weak impact in the long term and this is due to many countries' dependence on the industrial sector rather than agriculture.
- Gross domestic product (GDP) responds to the shock of the total population census, where a positive impact has been found in the long and medium terms, but in the short term the impact has begun to decrease as a result of the economic nature of the countries and their ability to achieve self-sufficiency of their population in addition to the state's development policies.
- The response of GDP to the shock of the total workforce when an unexpected response occurs in the labor force census by a standard deviation of 1% has a positive effect in the short term and then begins to decline to the point of long-

term stability. This is due to the nature of the demand for work and the amount of supply worked by enterprises and investment companies that need labor.

Conclusion:

This study sought to illustrate the importance of green investment as a development strategy and an innovative funding method in support of sustainable economic development. It presented its contribution through a standard study to some South-East Asian countries that are considered leading countries in this area. Green environmentally friendly projects have become one of the most important contemporary issues advocated by international financial bodies because of the dramatic and damaging change in the climate resulting from investment and the rational use of natural resources

-Furthermore, green investment is an innovative financing mechanism that takes into account the environmental dimension and its areas are green bonds, green insurance, green sukuk and green investment funds.

- to verify the impact of green investment on gross domestic product (GDP), which is a key pillar of sustainable development, the study was on a sample of major exporters of South-East Asia, namely Malaysia, Indonesia, Thailand and the Philippines. Also, the pilot analysis has been used based on the Panel Var model by testing many variables for sustainable development.

- High global demand for green sukuk from investors as one of the most important products contributing significantly to sustainable development. This is due to the availability of green sukuk on the principle of transparency.

- Green investment through the sukuk mechanism has an impact on gross domestic product (GDP), but this impact is weak because GDP carries many factors affecting it. In addition, the countries under consideration differ from each other economically as well as in terms of the volume of issuance of green sukuk.

- The impact of green sukuk on GDP is significant in the long term.

- Green investment in renewable energy, technology and manpower has a significant impact on GDP in the long term.

Recommendations:

- Consolidating the green investment strategy as an ideal financing approach that contributes by adopting green sukuk as a mechanism for achieving and serving sustainable development.

- Increase studies and research in the field of green investment and increase awareness campaigns for communities as environmental protection is everyone's responsibility.

- Algeria's economy contains various components that allow it to adopt various green investment instruments as a mechanism for achieving sustainable development by expanding investment in green projects, especially solar projects, as Algeria has the largest area of desert that it can exploit in the field of investment in renewable energy.

- Provide a climate conducive to the opening of a financial market based on the principles that allow for the adoption of green instruments that will by

their nature enhance Algeria's economy and promote its growth and sustainable development.

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