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Sustainable Financial Transformation: The Role of Green Bond Policy and SDGs Index in ASEAN

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ABSTRACT

This study delves into the dynamics of green bond issuance in ASEAN-5 (Indonesia, Malaysia, Singapore, the Philippines, and Thailand) and its key determinants, particularly green bond policies and the SDGs Index. Using secondary data from the IMF, World Bank, ADB, and financial reports, it applies panel data regression models (CEM, FEM, REM) for the 2016-2020 period with Chow, Hausman, and Lagrange Multiplier tests. The findings reveal that green bond policies have a significant positive impact, while the SDGs Index shows a weaker yet positive effect. Countries with robust regulations and market maturity, such as Singapore and Malaysia, have more advanced green bond markets than Indonesia and the Philippines, which face regulatory and financial literacy challenges. The study highlights the need for stricter regulations, greater transparency, and fiscal incentives to enhance investor participation, alongside improved green financial literacy to expand access to sustainable finance in ASEAN.

Keywords: Green Bonds; Sustainable Finance; SDGs Index; ASEAN-5.

ABSTRAK

Studi ini mengeksplorasi dinamika penerbitan obligasi hijau di ASEAN-5 (Indonesia, Malaysia, Singapura, Filipina, dan Thailand) serta faktor utama yang mempengaruhinya, terutama kebijakan obligasi hijau dan Indeks SDGs. Dengan menggunakan data sekunder dari IMF, Bank Dunia, ADB, dan laporan keuangan, penelitian ini menerapkan model regresi data panel (CEM, FEM, REM) periode 2016-2020 dengan uji Chow, Hausman, dan Lagrange Multiplier. Hasilnya menunjukkan bahwa kebijakan obligasi hijau memiliki dampak positif yang signifikan, sementara Indeks SDGs juga berpengaruh positif, meskipun dengan signifikansi yang lebih rendah. Negara-negara dengan regulasi yang kuat dan pasar yang lebih matang, seperti Singapura dan Malaysia, memiliki pasar obligasi hijau yang lebih berkembang dibandingkan Indonesia dan Filipina, yang masih menghadapi tantangan regulasi dan literasi keuangan hijau. Studi ini menekankan pentingnya regulasi yang lebih ketat, transparansi yang lebih baik, serta insentif fiskal untuk meningkatkan partisipasi investor, sekaligus memperkuat literasi keuangan hijau guna memperluas akses terhadap pembiayaan berkelanjutan di ASEAN.

Kata Kunci: Obligasi Hijau; Keuangan Berkelanjutan; SDGs Index; ASEAN-5.

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INTRODUCTION

In the last two hundred years, the global economy has experienced significant growth and development (Simamora, 2024). Climate change is currently a major issue faced by the entire world (Hukum, 2024). In a broader context, this issue is often discussed among academics, practitioners, and policymakers due to its significant impact on individuals, businesses, and the global economy (Tiwari et al., 2022). This phenomenon not only exacerbates the frequency and intensity of natural disasters, but also disrupts business activities, damages physical assets and causes loss of life. If the trend of rising global temperatures continues, it is estimated that nearly 10% of the total value of the world economy will be lost by 2050. Given the urgency and scale of the impacts, sustainable development, which encompasses economic, social, and environmental aspects, is becoming increasingly important (Setianto, 2023).

Environmental issues in Southeast Asia are often transnational in nature, as natural resources inherently continue to move (Wijaya et al., 2024). ASEAN region also one of the most vulnerable to climate change due to various contributing factors. Geographically, most of the region's populations live in coastal areas, making sea level rise and increased flood risk a serious threat. Climate change impacts in the region are not limited to flooding, but also include an increase in the frequency and intensity of hurricanes and other extreme weather disasters occurring at unprecedented rates. In addition to damaging infrastructure and threatening the safety of populations, climate change in ASEAN also has significant economic consequences, particularly for the financial sector which is increasingly stressed by the increased risk of disasters and economic instability due to worsening environmental impacts.

The ASEAN Capital Market Forum (comprising financial market regulators from ASEAN countries) has developed the ASEAN Green Bond Standards as a set of voluntary guidelines for issuing green financial instruments in the region (Tulloh et al., 2024). In this study, the ASEAN countries that are the object of observation include Indonesia, Malaysia, the Philippines, Singapore and Thailand. These five countries are the pioneers of the establishment of ASEAN and have shown commitment in addressing the impacts of climate change through the issuance of green bonds. But joint agreement of ASEAN countries in implementing Sustainable Finance will not be effectively realized without the awareness of investors and business actors (Kumajas et al., 2022).

From a geographical perspective, these five countries have similar natural characteristics, where the land area is surrounded by waters, including the South China Sea, which borders directly with each country. This geographical similarity means that ASEAN-5 countries face relatively similar climate change impacts, such as floods, landslides, increased greenhouse gas (CO_2) emissions, and other natural disasters. Given the risks posed by climate change, governments in the region need to adopt effective mitigation strategies, one of which is through the issuance of green bonds. Green bonds can also help reduce these negative environmental impacts through market-based mechanisms (Wijaya et al., 2024). This financial instrument serves as a source of funding for companies engaged in green and sustainable economic sectors, Sustainable economy is an economic concept that focuses on economic development that can meet the needs of the present generation without compromising the ability of future generations to meet their own needs (Simamora, 2024), thereby supporting the transition to a more environmentally friendly and climate resilient economy.

The risks posed by climate change to the business world and the financial sector are increasing globally. Based on Figure 1, the five ASEAN countries that are the object of observation in this study experienced a fluctuating trend related to bond issuance throughout 2016-2019. However, in 2020, all countries in ASEAN-5 experienced a decline in conventional bond issuance. This decline has occurred since 2019 and has become sharper in 2020 due to the COVID-19 pandemic that has hit the whole world. The economic disruption caused by the pandemic led to financial market uncertainty, weakened investment, and changes in funding strategies by governments and the private sector, which ultimately resulted in reduced bond issuance in the region.

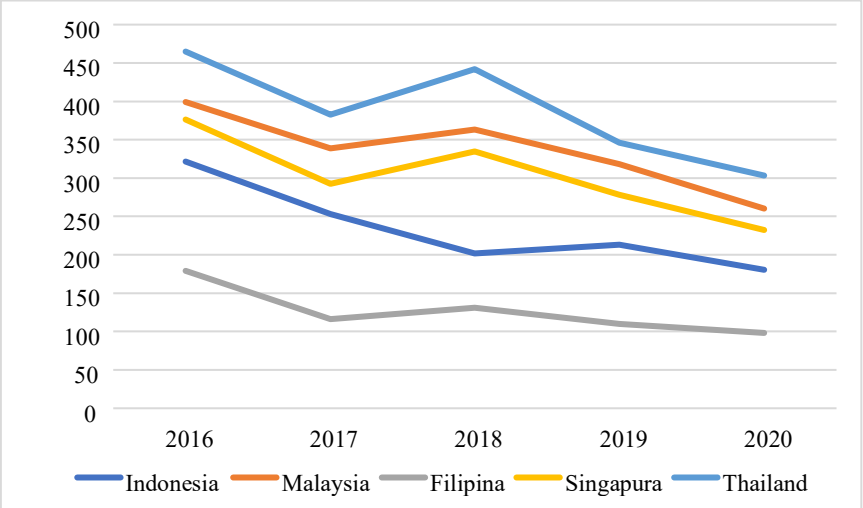

Figure 1. Trends in Conventional Bonds in ASEAN-5 Countries for the 2016-2020
Source: Asia Development Bank, 2024

Environment-based economic growth, or the "green" economy, has now become the orientation of countries worldwide, degradation of conventional bond issuance has motivated countries to seek more sustainable financing alternatives (Yaniza et al., 2023). In this context, the potential of Indonesia and several ASEAN countries for green projects, supported by rich biodiversity, is hindered by challenges in regulatory frameworks, market readiness, and project credibility, especially in the context of green bonds (Judijanto & Fawait, 2025). Green bonds have grown rapidly in recent years, demonstrating investors' commitment to supporting sustainable initiatives (khadafi, 2024). Growth based on the green economy, such as green bonds, is also highly conducive to a sustainable environment and inclusive social development (Lumbanraja & Lumbanraja, 2023). Various measures have been taken by several ASEAN countries, such as incorporating Sustainable Development Goals (SDGs) targets into the State Budget (APBN), climate budgeting, the issuance of green bonds, Energiewende, and the Government Pension Fund Global (Putra et al., 2025).

Findings from Ridwan et al. (2024) research reveal that the trend of green bond issuance continues to show an increase each year, public awareness of a sustainable economy has increased along with the impacts of climate change and its accompanying disasters. The two main strategies considered effective in achieving net-zero emission targets are green innovation and green space development Efficiency improvements in processes and development of environmentally friendly products are known as green innovations. These innovations play an important role in supporting the transition to a more sustainable and ecologically-based economy, while generating significant positive externalities for the environment and society.

Nonetheless, the implementation of green innovation and the development of green spaces still face major challenges, especially in terms of limited access to capital. However, the implementation of a green economy in developing countries still faces various challenges as seen in the developing countries of West Africa, including difficulties in accessing financing, complicated administrative procedures, low public awareness, limited government support, and the conflict between economic and environmental motivations (Badjeena et al., 2024). Addressing these challenges is crucial to promoting sustainable green economic growth in developing countries, including its implementation in ASEAN countries.

Therefore, green bonds serve as a policy instrument that can address funding barriers and reduce investment risks in green sectors. With increasing support for sustainable finance, green bonds are expected to be a strategic solution for ASEAN-5 countries in maintaining economic stability while addressing the increasingly complex challenges of climate change. In the context of this research, Liao et al. (2025) stated that green bonds contribute to the development of renewable energy and the reduction of carbon emissions, which in turn supports sustainable economic growth. Research by Sinha et al. (2023) shows that increased government spending on renewable energy is associated with increased use of green financing, which is important for environmental conservation and ecological efficiency. Moreover, policies that support green bonds can help countries in the Belt and Road Initiative (BRI) achieve sustainable development goals and reduce negative environmental impacts.

Growing concerns over global climate change have prompted various initiatives to accelerate the

transition to a green economy. The green economy concept not only focuses on sustainable economic growth, but also demands the existence of appropriate financial instruments to support the funding of environmentally friendly projects. Sustainable development stimulates economic growth and demonstrates how economic activities can promote the responsible use of resources (Mauliyah et al., 2023). In this context, green bonds have gained widespread attention as one of the most effective financing mechanisms to raise funds for sustainable development.

Green bonds are securities instruments designed to raise funds exclusively to support economic activities that are oriented towards environmental sustainability (Febrianti, 2024). Green bonds are also considered well-accepted and qualified financial instruments for funding and investing in the SDGs (Natswa, 2021).The funds obtained from issuing these bonds are used to finance environmentally friendly projects and encourage capital flows to the sustainable sector through various regulations, tax incentives, and credit enhancement mechanisms. The presence of green bonds in the fixed-income investment market has indeed opened new opportunities for the development and deepening of the sustainable investment market in the fixed-income sector through bond (Tobing & Setiawati, 2022). As an integral part of the sustainable finance system, green bonds provide a source of funding for projects that support climate change mitigation and adaptation and contribute to the efficient use of natural resources.

Green bond policies play an important role in accelerating the adoption of these instruments by financial institutions and corporations. Through the right policies, the issuance of green bonds can be increased, so that the allocation of funds for environmentally friendly projects is optimized. Funds raised from green bonds are used to finance or refinance projects that meet certain sustainability requirements, such as renewable energy, green transportation, and low-carbon infrastructure (Lee et al., 2023).

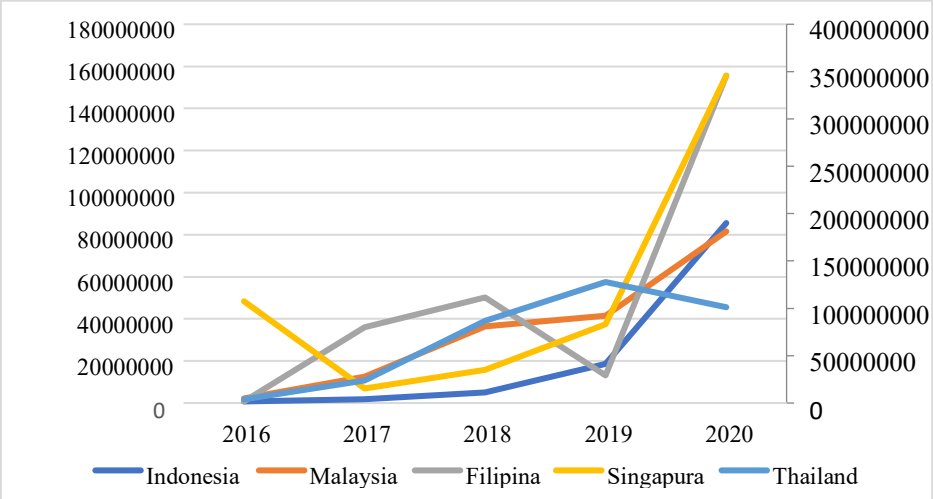

Figure 2. Trend of Green Bonds in ASEAN-5 Countries for the 2016-2020
Source: Asia Development Bank, 2024

Based on Figure 2 above, the issuance of green bonds in five ASEAN countries-Indonesia, Malaysia, the Philippines, Singapore, and Thailand-shows instability throughout the 2016-2020 period. In 2019, Indonesia, Malaysia, the Philippines, and Singapore experienced a decline in green bond issuance, while Thailand recorded an increase. However, this situation reversed in 2020, when Indonesia, Malaysia, the Philippines, and Singapore recorded an increase in green bond issuance despite the COVID-19 pandemic. In contrast, Thailand experienced a decrease in issuance in the same year. These fluctuations suggest that while green bonds are increasingly recognized as sustainable financial instruments, various external factors, such as national policies, market conditions and global economic dynamics, still affect their regional issuance stability.

As a relatively new financial instrument in the green economy, green bonds have provided significant benefits to issuers, particularly in lowering financing costs through increased long-term liquidity and attracting sustainability-oriented investors obtained from the issuance of green bonds are allocated to support projects and programs that contribute to climate change mitigation, including clean energy initiatives, sustainable transportation development, and more efficient water resource management.

Despite the growing interest in green bonds, their issuance volume is still much lower than that of conventional bonds. This suggests that although this instrument has great potential in promoting sustainable

development, structural challenges such as non-uniform regulations, the level of investor awareness, and the limited number of projects that meet green criteria are still the main obstacles in the expansion of the green bond market, especially in ASEAN-5 countries.

LITERATURE REVIEW

Green bonds are financial instruments designed to support projects with a positive impact on the environment, such as renewable energy, energy efficiency, and waste treatment (Ye & Rasoulinezhad, 2023). This concept has been applied in various countries to accelerate the transition to a sustainable economy. In Indonesia, the development of green bonds has been regulated in the sustainable finance policy, although its implementation still faces various obstacles, such as lack of investor understanding and limited incentives (Cendekiawan & Firmansyah, 2024). Based on research by Cendekiawan & Firmansyah (2024), Indonesia already has regulations regarding the issuance of green bonds, but the optimization of this instrument has not reached the expected level compared to other countries. Therefore, further cooperation between the government, private sector, and financial institutions is needed to improve the effectiveness of green bonds implementation in promoting sustainable development (Vassileva, 2022). In addition, financial technology (fintech) plays a strategic role in accelerating the adoption of the green economy (Rehman & Hossain, 2024). Fintech enables sustainable transactions and green investments through digital financial service innovations, such as crowdlending for renewable energy projects, green asset tokenization, and sustainability-based portfolio monitoring (Qoriah et al., 2025). Based on the research revealed that fintech can expand access to green finance by providing solutions that can be utilized for sustainable investment.

In the context of green bonds implementation mechanisms in Indonesia, research by At-Tibasiy et al. (2019) shows that PT Sarana Multi Infrastruktur (SMI) became the first institution to issue green bonds in 2018 in an effort to fund sustainable projects. The study also highlighted that the main obstacles in the implementation of green bonds include the lack of market transparency, limited incentives for investors, as well as the need for increased green finance literacy among stakeholders. To overcome these challenges, At-Tibasiy et al. (2019) recommended wider promotion of green bonds, increased fiscal incentives, and strengthened policies that support green investments.

Furthermore, the green economy is also a key strategy in supporting national economic recovery and addressing multilateral challenges. According to research by Anwar (2022), the implementation of a green economy can encourage a balance between economic growth and environmental sustainability, especially in dealing with the impact of the COVID-19 pandemic. The study highlights that appropriate green economy policies can help countries address economic inequality, improve global competitiveness, and reduce the negative impact of industrial activities on the environment. Thus, the green economy not only contributes to sustainable development targets (SDGs), but is also a solution for long-term economic resilience. Overall, previous research confirms that the development of green bonds and the green economy has a strategic role in supporting economic and environmental sustainability.

Research by Alamgir & Cheng (2023) shows that green bond issuance has a significant impact on reducing carbon emissions and increasing renewable energy production, with more striking results after the adoption of the Paris Agreement in 2015, thus confirming the importance of green finance in achieving global sustainability goals. Research by Ahmed et al. (2024) reveals that green bonds serve as a bridge towards achieving the UN Sustainable Development Goals (SDGs), by showing the positive stock market reaction to the announcement of green bond issuance by US-listed companies, and applying various asset pricing models to analyze its impact from 01/01/2013 to 30/06/2022.

Ecological Modernization theory (EMT) is considered to be able to answer the problems in this study. Khan et al. (2024) explain that the Ecological Modernization Theory (EMT) developed by Joseph Huber, Martin Janicke, and Arthur P.J. Mol in the 1980s offers a relevant conceptual framework for analyzing the role of green bond policies and the SDGs Index in driving sustainable financial transformation in the ASEAN region. This theory argues that the environmental crisis is not an inevitable consequence of industrialization, but can be overcome through restructuring the economic system by integrating sustainability principles into the core of production processes and financial policies EMT emphasizes structural transformation of the economy through technological innovation, institutional reforms, and market mechanisms that internalize environmental costs, thereby creating synergies between economic growth and ecological sustainability. In the ASEAN context, EMT explains how green bond issuance is a policy instrument to divert capital flows from conventional economic activities towards low-carbon projects. The theory highlights three key mechanisms:

first, internalization of environmental costs through financial instruments that link economic incentives to environmental performance; second, restructuring of the financial sector by creating a secondary market for green assets; third, strengthening institutional capacity through standardization of Environmental, Social, and Governance (ESG) criteria integrated with the SDGs Index.

Thus, Ecological Modernization provides a comprehensive theoretical lens to analyze the complex dynamics between green bond policies, SDGs Index, and systemic transformation towards sustainable development in ASEAN. It not only explains the causal mechanism between green financial instruments and environmental performance, but also offers a policy roadmap to accelerate the transition through institutional innovation, regulatory harmonization, and stakeholder adaptive capacity building (Khan et al., 2024).

Hypothesis Development

Effect of Green Bond Policy on Green Bond Issuance

The ASEAN green bond market is strongly driven by standards and incentives that support green bond issuance. The goal of ASEAN capital market regulators, the ASEAN Green Bond Standard, was created in 2017 to encourage sustainable investment and set standards for green bond issuance in the region. The study Muganyi et al. (2021) indicates that green finance policies, including green bonds, positively correlate with firm innovation and significantly impact green bond issuance in China, facilitating the development of a dynamic green finance ecosystem. Sheng & Montgomery (2025) shows that investors' heightened confidence in banks showcasing loan policies supportive of the green industry, reflecting an increased emphasis on sustainability considerations. Then, Saravade & Weber (2024) stated that Green bond policies play a pivotal role in accelerating green bond issuance by enhancing market credibility, reducing investor uncertainty, and aligning financial instruments with global sustainability expectations, as seen in Canada where reputational incentives drive substantial stakeholder engagement. Mertzanis (2024) research also reveals that a broader range of central bank mandates is positively associated with increased green bond issuance.

Hypothesis 1 (H1): Green bond policy has a positive effect on green bond issuance in ASEAN.

Effect of SDGs Index on Sustainable Bond Issuance

A country can demonstrate its commitment to the Sustainable Development Goals (SDGs) by issuing green bonds to finance sustainable projects. For example, Indonesia issued the first SDGs bond in Southeast Asia in 2021. This shows the government's commitment to accelerate the achievement of SDGs despite facing financial constraints due to the COVID-19 pandemic (UN, 2021). According to research by Tran et al. (2024) that the sustainable development index has a positive and significant impact on green bond issuance in ASEAN-5 countries. As the factor endowment structure becomes very high, the country's sustainable development gains sufficient momentum, diminishing the role of green bonds (Dai et al., 2024). Barua & Chiesa (2019) find that stronger creditworthiness and financial transparency significantly increase green bond funding size, underscoring their importance in mobilizing SDG-aligned sustainable finance. Negi and Jaiswal (2024)highlight the growing focus on sustainable bonds, emphasizing their role in advancing SDGs through themes like pricing, risk, market dynamics, and policy integration

Hypothesis 2 (H2): The SDGs index has a positive effect on green bond issuance in ASEAN.

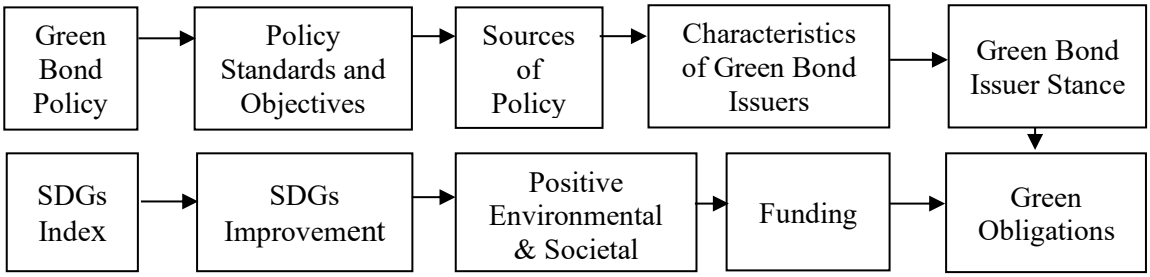

Figure 3. Research Framework

Source: Researcher Development, 2025

Thus, based on the explanation and framework above, this study analyzes green bond policies and the SDGs Index on green bonds. The research object covering five countries provides a more in-depth picture of the factors that influence the dynamics of green bond issuance in the ASEAN region, including responses to global economic dynamics. Through the Ecological Modernization Theory (EMT) approach, it can also explain how

sustainable finance mechanisms contribute to promoting sustainable development (Khan et al., 2024). Thus this research not only contributes to the development of green economy theory, but also provides empirical insights in formulating policies for regulators and practitioners to create a balance between economic growth and environmental sustainability in ASEAN**.**

RESEARCH METHODS

This study uses a quantitative method with a panel data regression approach to analyze the effect of green bond policies and the SDGs Index on green bond issuance in ASEAN-5 (Indonesia, Malaysia, Singapore, Philippines and Thailand) in the 2016-2020 timeframe. The data utilized in this study are derived from multiple authoritative sources: macroeconomic indicators such as GDP growth, inflation, and fiscal policy variables were obtained from the International Monetary Fund (IMF); sustainable development metrics and the SDG Index were sourced from the World Bank; and green finance statistics, including data on bond structures and market development, were collected from the Asian Development Bank (ADB). Complementary financial data were extracted from the financial statements and reports of ASEAN-5 countries. The research population comprises all green bond issuances within ASEAN-5, with the sample selected using a purposive sampling technique based on the criterion of countries that had issued green bonds during the 2016–2020 observation period. The study employs panel data regression analysis using three model specifications—Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM)—with model selection determined by *Chow, Hausman*, and *Lagrange Multiplier* (LM) tests. This study also includes several model stability tests to ensure stable estimation results that will produce the following equation:

$$GB_{it} = \beta_0 + \beta 1 GBP_{it} + \beta 2 SDGsI_{it} + \varepsilon \ldots\ldots\ldots\ldots (1)$$

Where: *GB* = Green bond issuance; *β0* = Constant; *β1 - β2* = Coefficient of the first and second independent variables; *GBP* = Green bond policy; *SDGsI* = SDGs Index; *i, t, ε = Cross Section, Time Series, Standard error*

RESULTS AND DISCUSSION

Descriptive Statistics

Based on the descriptive statistics in Table 1, the average LNGB is 16.97 with a median value of 17.40. The range of LNGB values is quite wide, from 13.53 to 19.66, indicating the variation in the number of green bonds issued among the observation sample. The standard deviation of 1.69 indicates a moderate level of variability in the data. The *skewness* of -0.65 indicates that the LNGB distribution is negatively skewed to the left, indicating that most of the LNGB values are above average. The *kurtosis* value of 2.48 is close to a normal distribution (mesokurtic). The *Jarque-Bera* test result of 2.07 with a probability of 0.36 indicates that the LNGB distribution is not significantly different from the normal distribution at the 5% significance level.

Table 1. Descriptive Statistics

	LNGB	GBP	SDGI
Mean	16.970266	0.64	68.1943245
Median	17.3967212	1	67.9371743
Maximum	19.6613393	1	73.5518726
Minimum	13.5278284	0	63.0741373
Std. Dev.	1.68848436	0.489897948	2.79889135
Skewness	-0.65458140	-0.5833333333	0.32320844
Kurtosis	2.4803815	1.3402777777	2.489561328
Jarque-Bera	2.0665734	4.28728017	0.706669187
Probability	0.3558354	0.117227347	0.70234215
Sum	424.256657	16	1704.858113
Sum Sq. Dev.	68.4235069	5.76	188.011027
Observations	25	25	25

Source: Output Eviews, 2025

Descriptive statistical analysis shows the distribution characteristics of each variable in this study. The GBP variable has a mean value of 0.64, with a median value of 1, which indicates that in most observations,

green bond issuance tends to occur. This is due to the median value of 1, indicating that more samples have a value of GBP = 1 than GBP = 0. The minimum value of 0 and maximum value of 1 confirm that this variable is binary, representing the presence or absence of green bond issuance. The standard deviation of 0.49 indicates a fairly even distribution of data between the two categories. The skewness value of -0.58 indicates that the GBP distribution is skewed to the left, with more observations having higher values (1). Meanwhile, the *kurtosis* of 1.34, which is lower than 3, indicates that the GBP distribution is platykurtic, or flatter than a normal distribution.

The *Jarque-Bera* test result of 4.29 with a probability of 0.12 indicates that the GBP distribution is not significantly different from the normal distribution at the 5% significance level, so it can be considered to have near-normal distribution characteristics. The SDGI variable, which represents the Sustainable Development Index, has a mean value of 68.19 with a median of 67.94, indicating that this index score tends to stabilize around this value. The range of SDGI scores is between 63.07 and 73.55, reflecting a moderate level of variation in the achievement of SDGs targets between observations. The standard deviation of 2.80 indicates less extreme variation in the data. The skewness of 0.32 indicates that the distribution of SDGI is slightly positively skewed to the right, meaning more observations have values below the mean. Meanwhile, the kurtosis of 2.49, which is close to 3, indicates that the distribution of this variable is mesokurtic, or close to a normal distribution.

The *Jarque-Bera* test result of 0.71 with a probability of 0.70 indicates that the SDGI distribution is not significantly different from the normal distribution at the 5% significance level, so it can be assumed to have normal distribution characteristics. Overall, the descriptive statistics results show that the LNGB and SDGI variables are relatively normally distributed, while GBP as a binary variable shows a more flat distribution. This finding provides an initial indication of the relationship between green bond issuance and SDGs achievement in ASEAN-5 countries, which will be further analyzed in the hypothesis testing.

Correlation Test

The multicollinearity test results presented in Table 2 show that the correlation coefficient between the independent variables Green Bond Policy (GBP) and Sustainable Development Goals Index (SDGI) is 0.2531. This value is well below the critical threshold of 0.8, which is generally used to indicate serious multicollinearity in the regression model. Thus, this result indicates that there is no significant multicollinearity problem between the independent variables in the tested model. The absence of high multicollinearity ensures that the independent variables are not strongly correlated with each other, allowing the regression model to produce more reliable and accurate estimates. This reinforces the validity of interpreting the relationship between green bond policies and SDGs achievement on green bond issuance in ASEAN-5 countries.

Table 2. Multicollinearity Test

	GBP	SDGI
GBP	1	0.253111
SDGI	0.253111	1

Source: Output Eviews, 2025

Model Estimation (*Chow, Hausman, and Lagrange Multiplier)* Test Results

Based on several stages of testing, the *Chow* test shows a probability value of 0.0177, which means that the Fixed Effect Model is better than the Common Effect Model. Meanwhile, the *Hausman* test has a probability value of 0.0722, which is above the 5% significance limit, so there is not enough evidence to reject the Random Effect Model. The *Lagrange Multiplier* (LM) test with a probability of 0.7594 indicates that the Common Effect Model is not better than the Random Effect Model. Thus, based on the test results, the best model chosen in this study is the Random Effect Model.

Table 3. Model Estimation *(Chow, Hausman, and Lagrange Multiplier)* Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.353208	6.462396	0.364139	0.7192
GBP	1.840214	0.547676	3.360039	0.0028
SDGI	0.197074	0.095861	2.055823	0.0519
Effects Specification				
R-squared	0.480084	Mean dependent var		16.97027
Adjusted R-squared	0.432819	S.D. dependent var		1.688484

S.E. of regression	1.271622	Sum squared resid	35.57448
F-statistic	10.15726	Durbin-Watson stat	1.869457
Prob(F-statistic)	0.000750	Normality Test	1.324959
Cross Section Effect			
Indonesia	0.051173		
Malaysia	0.486609		
Singapura	0.247793		
Filipina	2.933786		
Thailand	-3.719361		
Best Testing Model	Prob	Chosen Result	
Chow test	0.0177	Fixed Effect	
Hausman test	0.0722	Random Effect	
Lagrange Multiplier test	0.7594	Common Effect	

Source: Output Eviews, 2025

Based on the regression results presented in Table 4, the constant value (C) of 2.3532 reflects the average value of LNGB when all independent variables are zero. However, this constant is not statistically significant with a probability of 0.7192, which indicates that its presence in the model does not have a strong impact on the dependent variable. The coefficient of the Green Bond Policy (GBP) variable is 1.8402 with a probability of 0.0028, which is significant at the 1% level, indicating that the green bond issuance policy has a positive effect on LNGB. That is, an increase in green bond issuance contributes significantly to increasing the value of LNGB, which confirms the importance of green financing policies in supporting economic sustainability.

Meanwhile, the coefficient of the Sustainable Development Goals Index (SDGI) variable is 0.1971 with a probability of 0.0519, which is significant at the 10% level, indicating that the SDGs index has a positive influence on LNGB, although the impact is relatively small compared to GBP. This result suggests that the achievement of sustainable development targets contributes to an increase in green bond issuance, although the relationship is not as strong as green bond policies.

In terms of model fit, the R-squared value of 0.4801 indicates that about 48.08% of the variation in LNGB can be explained by the independent variables in the model, while the rest is due to other factors outside the model. The F-statistic value of 10.15726 with a probability of 0.000750 indicates that the overall regression model is significant at the 1% level, so this model can be used for further analysis with a high degree of reliability. In the normality test, the Jarque-Bera value of 1.324959 indicates that the residuals in this model follow a normal distribution, as this value is not significant at the 5% level. In addition, the Durbin-Watson value of 1.8695 indicates that there is no strong autocorrelation in the model, so the assumption of residual independence is met. Overall, the regression results show that GBP has a significant influence on LNGB, while SDGI also contributes albeit at a lower significance level. With the model fulfilling key statistical assumptions, the results of this study provide strong empirical justification regarding the role of green bond policy and SDGs index in supporting the development of sustainable financial instruments in the ASEAN-5 region.

Green Bond Policy on Green Bond Issuance

The results of statistical analysis show that green bond policy has a positive and significant influence on green bond issuance. This indicates a real difference between the conditions before and after the implementation of the policy. If the green bond policy is implemented (GBP = 1), then the value of green bond issuance has increased significantly. This finding is consistent with previous research Naeem et al. (2023) which confirms that green bond policies play an important role in driving the growth of the global green bond market.

As a sustainable financial instrument, green bonds exclusively support environmentally friendly economic activities, including green infrastructure projects, renewable energy, and sustainability-oriented industries. This instrument plays a role in diverting capital flows to environmentally friendly projects through various policy mechanisms, such as stricter regulations, tax incentives, and increased access to credit for issuers that meet sustainability criteria. Thus, green bonds are not only a source of funding for environmental projects, but also contribute to the efficient use of resources and climate change mitigation. The green bond policy is a fundamental element in a sustainable financial system, which aims to increase the issuance of green bonds by financial institutions and companies. Funds raised through green bonds are allocated for funding or refinancing projects that meet certain environmental requirements (Lee et al., 2023).

Through this policy, capital flows to green sectors can be optimized, thereby accelerating the transition to a low-carbon economy and sustainable development. Taking into account the causal relationships identified in this study, a theoretical analysis of how green bond policies directly affect green bond issuance will be presented in this section. Taking into account the causal relationships identified in this study, a theoretical analysis of how green bond policies directly affect green bond issuance will be presented in the next section.

From a funding perspective, green innovation requires substantial capital, especially in the research and development (R&D) aspect of sustainable technologies. The high cost required to recruit technology experts, purchase advanced equipment, and train staff is often a major obstacle for firms, especially small businesses, in adopting green innovations (Woo et al., 2013). In addition, the risk of failure in R&D and the uncertainty of market acceptance make firms with low risk tolerance reluctant to allocate funds for green technology development, for fear of losing investments that could be used for other business operations or expansion (Gu et al., 2021).

In this context, green bond policies act as financial instruments that provide long-term capital support for research and development of green technologies. With this financing scheme, companies can reduce short-term cost burdens and mitigate operational risks associated with green innovation. Ultimately, green bond policies can increase incentives for businesses to invest in sustainable technologies, promote the development of green sectors, and accelerate the transition to a low-carbon economy (Lee et al., 2023).

From a macroeconomic perspective, green bond policies also serve as a signal for the future direction of economic development. The government uses this policy as an instrument to guide and regulate macroeconomic dynamics by involving external forces. The implementation and strengthening of regulations related to green bonds indicate that future economic development will be oriented towards the principle of sustainability, with a focus on green, clean, and environmentally friendly growth. In addition to providing policy certainty, the implementation of green bonds also plays a role in increasing investor and stakeholder confidence, especially in the face of uncertainty due to changes in the macro environment. With strong policy assurance, market participants have a greater incentive to invest in sustainable projects, which in turn will accelerate green innovation and the development of green spaces in various economic sectors.

Based on the previous explanation, the main objective of green bond policy is to support environmentally friendly projects through increased access to funding and capital injection for the sustainable sector. In addition to the funding aspect, this policy also serves as a strategic instrument in determining the direction of future economic development, which ultimately creates macroeconomic stability, increases market confidence, and reduces risk uncertainty (Guo et al., 2020). The results of this study show that the relationship between green bond policies and green bond issuance is significant, confirming that these policies play an important role in driving the growth of the green bond market. The study conducted by Reboredo et al. (2020) analyzed the characteristics and market position of green bonds through an impulse-response approach, which revealed that green bonds have unique market dynamics compared to conventional bonds. From a financial risk perspective, Hu et al. (2023) found that green bonds significantly reduce a company's financing costs and increase its asset value. Factors such as risk perception, information asymmetry, and liquidity level are key elements in determining the attractiveness of green bonds in the capital market. Characterized by competitive yields, relatively lower risk, and promising growth prospects, green bonds are increasingly attracting global investors (Abakah et al., 2023). This increased demand has contributed to a surge in the trading volume of green bonds, thus strengthening their position as effective financial instruments in driving the transition to a green economy.

SDGs Index on Green Bond Issuance

Green bond issuance in ASEAN has shown an increasing trend in line with the growing global awareness towards sustainable development. One of the main factors contributing to this development is the Sustainable Development Goals (SDGs) Index, which serves as a key indicator in assessing a country's level of commitment to sustainability principles. Higher SDGs Index scores reflect more progressive policies and regulations, which in turn influence green financing strategies, including the issuance of green bonds focused on funding environmentally friendly projects.

The relationship between the SDGs Index and green bond issuance can be analyzed through regulatory mechanisms and policy incentives. Countries with higher levels of SDGs achievement tend to have stricter regulations in carbon emissions reduction, environmental conservation, and energy efficiency. These policies create a greater need for green financing instruments, thus encouraging the issuance of green bonds as one of the main solutions in supporting sustainable investment In addition, global and regional initiatives, such as the ASEAN Green Bond Standards, further strengthen the link between sustainable development and green

financial instruments. This standardization aims to create a harmonized regulatory framework for green bond issuance in the ASEAN region, while increasing the transparency and attractiveness of these instruments to global investors. The integration of sustainable development policies with green finance not only contributes to accelerating the achievement of the SDGs, but also strengthens the stability of the green finance market in ASEAN.

In the ASEAN region, Singapore and Malaysia have shown a strong commitment to green bond issuance, supported by progressive Sustainable Development Goals (SDGs)-based policies Empirical studies show that countries with higher SDGs Index scores tend to have more developed green bond markets, along with increased demand for sustainable financial instruments and more mature regulatory readiness.

However, challenges are still faced by developing countries in ASEAN, such as Indonesia and the Philippines, which experience barriers in terms of regulation, fiscal incentives, and green finance literacy. Lack of policy harmonization and limited institutional capacity to support the sustainable finance transition are the main inhibiting factors in the development of green bond markets in these countries.

Overall, the SDGs Index plays an important role in driving green bond issuance in ASEAN, as it reflects the government's commitment to sustainable development as well as regulatory readiness in creating a stable green finance ecosystem. An increase in the SDGs Index score can provide positive signals to investors, especially in terms of policy stability and the potential growth of the green sector.

CONCLUSIONS AND RECOMMENDATIONS

This study reveals that green bond issuance in ASEAN countries is influenced by policy factors, financial market readiness, and commitment to environmental sustainability. Supportive regulations, such as green taxonomy and fiscal incentives, play a key role in driving the growth of the green bond market. Singapore and Malaysia have shown success in implementing policies that are attractive to green investors, while Indonesia and the Philippines still face challenges due to immature regulatory infrastructure. In addition, financial market readiness is an important factor that determines the effectiveness of green bond issuance. Countries with more developed financial sectors and higher institutional investor participation have greater access to green finance, as seen in Singapore's expansion strategy. In contrast, countries with fledgling financial ecosystems find it difficult to attract green investors due to lack of transparency, lack of supportive financial instruments, and limited institutional capacity. Another factor at play is commitment to environmental sustainability. Countries with ambitious emissions reduction and energy transition targets, such as Thailand and Vietnam, tend to be more successful in attracting green investment. Initiatives such as net-zero commitment and the integration of environmental policies in the financial system have increased the attractiveness of green bonds as a strategic funding instrument for sustainable development in ASEAN.While this study highlights the pivotal role of policy frameworks, financial market readiness, and environmental commitment in influencing green bond issuance across ASEAN countries, it is limited by its reliance on macro-level indicators and secondary data, which may overlook the nuanced perspectives of key market participants such as issuers, investors, and regulators. Moreover, the analysis does not account for country-specific socio-political dynamics that could affect policy implementation and investor confidence. Future research should adopt a mixed-methods approach, incorporating qualitative insights through interviews or case studies to capture on-the-ground realities and behavioral factors. Additionally, longitudinal studies examining the impact of evolving regulatory environments and ESG integration at the firm level could provide a more comprehensive understanding of the mechanisms that drive sustainable finance in emerging markets. Such research would offer valuable contributions to the design of context-sensitive policies and investment strategies aligned with the Sustainable Development Goals (SDGs).

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