SUSTAINABLE PREMIUM OF SUSTAINABLE BONDS: EMPIRICAL STUDY OF STATE OWNED ENTERPRISES IN INDONESIA

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Abstract— This study investigates the sustainable premium of bonds issued by State-Owned Enterprises (SOEs) in Indonesia and examines the determinants influencing the yields of these sustainable bonds. Sustainable premium is the price difference of sustainable bonds and conventional bonds that are proxied by yield to maturity (YTM). A sustainable premium benefits issuers by reducing funding costs and building social capital. This study uses data panel regression for data analysis that taken from bonds that are listed on IDX in 2020-2023. The data consist of 1.018 bonds then sorted based on the type of bond (sustainable bonds and non-sustainable bonds) and the issuing company. It is found that the yield to maturity of sustainable bonds tends to be higher than conventional bonds. This means that based on the data there was no sustainable premium on SOE's sustainable bonds in Indonesia. Meanwhile, the ESG risk score, status of SOEs, Return on Assets and Debt to Asset Ratio do not have a significant effect on the yield to maturity of SOEs' sustainable bonds. Rating, modified duration, GDP and inflation have significant effects to yield to maturity of SOEs' sustainable bonds.

Keywords: Sustainable Premium; Sustainable Bonds; State Owned Enterprises; Yield to Maturity; ESG

1. INTRODUCTION

1.1 Background

Sustainable bonds issued by companies have become a key financial instrument to address environmental and social challenges. The global issuance of sustainable bonds has grown rapidly due to increasing awareness of climate and sustainability issues. These bonds finance projects that positively impact environmental, social, and governance (ESG) factors, aligning corporate financing with broader sustainability goals (Park, 2009). Stakeholders, including investors and governments, are increasingly prioritizing sustainable values, leading to a surge in demand for sustainable financial instruments.

While the U.S. and European markets pioneered sustainable bonds, Asian markets though growing remain relatively small in scale (UNDP, 2024). In ASEAN, the green bond market has shown significant expansion potential. Indonesia has also witnessed a rising demand for green bonds, driven by its commitment to sustainable finance and the United

Nations' Sustainable Development Goals (SDGs) (Asian Development Bank, 2022) . The government has actively promoted sustainable finance initiatives, such as launching Indonesia's first SDG-linked bond in September 2021 (PwC Indonesia - ESG Team, 2023) . Investor priorities have shifted toward ESG metrics, influencing corporate risk management in the transition to a low-carbon economy (Lhutfi et al., 2024).

Sustainable bonds play a vital role in directing capital towards renewable energy, pollution reduction, and sustainable infrastructure (Asian Development Bank, 2022a). They enhance the credibility of issuers by aligning with ESG principles. The environmental aspect covers issues like energy consumption, pollution, climate change, and biodiversity, while the social aspect focuses on labor rights, human rights, stakeholder relations, and diversity policies. Governance includes board quality, executive compensation, transparency, and regulatory compliance. These factors contribute to investor confidence in sustainable bond investments (Ditlev-Simonsen, 2022).

Sustainable bonds are categorized into green bonds that focus on environmental projects, social bonds that target the social impact, and sustainability bonds which integrate environmental and social objectives with corporate governance (Climate Bond Initiatives, 2021). By allowing companies to finance sustainability initiatives through debt instruments, these bonds support long-term commitments to environmental and social responsibility. Investors prefer them as they align financial returns with sustainability objectives, contributing to global ESG standards (Flammer, 2020).

In Indonesia, sustainable finance is still in its early stages but is gaining momentum. As an emerging economy with abundant natural resources, Indonesia faces unique opportunities and challenges in integrating sustainability into its financial markets. The government and state-owned enterprises (SOEs) are increasingly aware of the importance of issuing sustainable bonds to balance financial performance and sustainability goals. Indonesia has made significant progress in green and sustainability-linked bond issuance to support infrastructure and energy projects that reduce carbon emissions and promote sustainable development (Asian Development Bank, 2022a).

Sustainable premium of sustainable bonds is the price difference between sustainable bonds and conventional bonds (Zerbib et al., 2018). It is an extra price that the investor is willing to pay in order to contribute to sustainable finance that in the long term will align with the goal of ESG's values. This sustainable premium of sustainable bonds is proxied by Yield to Maturity of the bonds. Yield to Maturity (YTM) is a crucial factor in determining bond pricing and attractiveness. YTM represents the expected return for investors holding a bond until maturity and is influenced by factors such as market price, face value, coupon rate, and maturity period (Mishkin & Eakins, 2018). Higher-risk bonds generally have higher YTMs to compensate investors for taking on additional risk, whereas lower-risk bonds, such as those issued by governments or large corporations, tend to have lower YTMs due to their stability. YTM serves as a key measure of bond risk perception in financial markets (Mishkin & Eakins, 2018).

Investors in sustainable bonds face unique risks, including underperformance of sustainability projects, regulatory changes, and market volatility due to shifting consumer and regulatory preferences (Löffler Kristin, 2022). The rising demand for sustainable investments can lead to lower YTMs for these bonds, as investors accept lower returns in exchange for social and environmental benefits. This phenomenon, known as "Greenium," reflects investors' willingness to pay a premium for green bonds (Ahmadi & Feldhütter, 2023). ASEAN+3 countries have experienced Greenium benefits, reducing financing costs and enhancing issuer reputation of the green bonds (Asian Development Bank, 2022). However,

research on sustainable premium for corporate sustainable bonds in Indonesia remains limited.

The Indonesian government has introduced policies to encourage sustainable bond issuance, and both State Owned Enterprises and private companies have responded with increased green and sustainability bond offerings. Indonesia was among the first Southeast Asian countries to issue green sukuk for renewable energy and sustainable infrastructure projects (Asian Development Bank, 2022b). While the corporate sustainable bond market is growing, it remains relatively small compared to more developed markets.

The previous studies on green and sustainable bonds premium shows various results. Sustainable bonds that studied by Ahmadi & Feldhütter (2023) shows negative sustainable premium as well as the green bonds that studied Zerbib et al. (2018) show negative greenium. In addition, the report byAsian Development Bank (2022) shows that green bonds that ASEAN+3 countries (Indonesia, Malaysia, Philippines, Singapore, Thailand, Vietnam, China, Japan, Republic of Korea) benefitted from greenium. However, studied by Grishunin et al. (2023) shows that the green bonds in some European countries that observed did not have negative premium

Understanding the sustainable premium of sustainable bonds will be beneficial for bond issuers by optimizing their bond offerings to attract investors (Ahmadi & Feldhütter, 2023). On the other hand, investors will benefit from better insight into the risk-return tradeoff associated with sustainable bonds. Nevertheless, research on sustainable premium for corporate sustainable bonds in Indonesia remains limited, specifically SOEs. As agent of development of sustainable finance, SOEs expected to have greater influence in promoting the sustainable finance in Indonesian business. This research aimed to explore the sustainable premium of sustainable bonds that focuses on SOEs, YTM dynamics, ESG ratings in promoting sustainable finance in Indonesia. This research also contributes to increasing the attractiveness of sustainable corporate bonds, especially for state-owned enterprises, thereby facilitating greater investment in sustainability-related projects.

1.2 Literature Review and Hypothesis

1.2.1 Sustainable Finance and ESG theories

The trend towards sustainability in corporate finance has prompted a number of studies on sustainable finance. Sustainable finance is the finance's management that takes ESG considerations into account when making investment decisions in the financial sector (Ozili, 2022). Environmental, social and governance (ESG) factors influence a company's financial instruments so that a number of decisions regarding the company's financial management are based on sustainability principles (Ditlev-Simonsen, 2022). Key theories shaping ESG discourse include Signaling Theory, Stakeholder Theory, Modern Portfolio Theory, and Behavioral Finance Theory. These frameworks guide investors and corporations in assessing ESG's role in financial decision-making and bond pricing (Ditlev-Simonsen, 2022).

a. Signaling Theory and ESG Ratings

Investor commitment to ESG is reflected in sustainability-driven investment strategies. ESG ratings act as signals for investors, indicating a company's commitment to sustainability and social responsibility. Research suggests that firms with higher ESG ratings tend to have stronger cash flows, lower ex-ante risks, and better workplace conditions (Mendiratta et al., 2021). Consequently, companies with higher ESG ratings can attract more investors and enjoy lower financing costs (Baker et al., 2018). Moreover, sustainable bonds with second-party opinions command

higher pricing levels (Dorfleitner et al., 2022), and the price gap between sustainable and conventional bonds, known as the greenium, reflects investors' willingness to pay for lower risk (Ahmadi & Feldhütter, 2023; Windmar & Fischer, 2023).

b. Stakeholder Theory and ESG Investments

Stakeholder Theory emphasizes that a company's success depends on its interactions with key stakeholders, such as customers, employees, bondholders, and communities (Parmar et al., 2010). Companies demonstrating strong ESG commitments can build stakeholder trust, particularly in reducing environmental impact and carbon emissions (Kumar, 2023). Firms with poor ESG practices face higher regulatory penalties and environmental liabilities, increasing financial risks (Mendiratta et al., 2021).

c. Modern Portfolio and Behavioral Finance Theories

Modern Portfolio Theory (MPT) assumes rational investors and efficient markets, whereas Behavioral Finance Theory recognizes investor biases (Dorfleitner et al., 2022). The price gap between sustainable and conventional bonds is influenced by investor preferences for sustainability, sometimes resulting in higher bond prices and lower returns. This behavior aligns with the concept of emotional investing, where investors accept lower returns for non-financial benefits (Kahneman & Tversky', 1979; Wang Juan Wu, 2022).

1.2.2 Sustainable Premium and Yield to Maturity of Sustainable Bonds

Sustainable bonds fund projects aligned with ESG values, attracting investors willing to accept lower yields due to their social and environmental impact (Asian Development Bank, 2022; Löffler Kristin, 2022). Sustainable bonds should link their fund projects with the ESG values that will determine the bond's yield, although conventional bonds are not required to do so. This difference between the price of sustainable bonds and the price of conventional bonds is called the sustainable premium (Ahmadi & Feldhütter, 2023; Zerbib et al., 2018).

Yield to Maturity (YTM) of the bonds reflects bond price because they have an inverse connection, with higher bond prices resulting in lower yields and vice versa. YTM represents the expected return if a bond is held until maturity. It depends on reinvestment risk, interest rate risk, and market conditions (Mishkin & Eakins, 2018; Purba, 2020).

The sustainable premium, or the yield difference between sustainable and conventional bonds, has been observed in European and U.S. markets (Ahmadi & Feldhütter, 2023; Zerbib et al., 2018) but is absent in China (D. Wang & Li, 2020). In ASEAN, the sustainable premium was positive before COVID-19 and fluctuated during the pandemic (Oktavio & Riyanti, 2021). So, this study assumes **Hypothesis I** : Sustainable bonds have a lower YTM (negative sustainable premium) compared to conventional bonds.

1.2.3 ESG Impact on Yield to Maturity and Sustainable Premium of Sustainable Bonds

Investor demand for ESG-aligned investments has led to lower YTMs for sustainable bonds. Companies with high ESG ratings enjoy lower spreads and borrowing costs due to reduced long-term risks (Windmar & Fischer, 2023). Several studies have shown that ESG ratings can have a positive impact on the pricing of sustainable bonds, especially in the context of green bonds (Dorfleitner et al., 2022)**.** This is due to the assumption that companies with higher ESG scores have a good reputation which are considered to bear lower long-term risks, therefore they can raise capital at a lower cost (Windmar & Fischer, 2023).

Green Premium emerges as investors accept lower returns for environmentally responsible investments (Ahmadi & Feldhütter, 2023). This is also applied to sustainable

bonds where the investors are willing to accept lower yield for the sustainable purposes. Companies demonstrating strong ESG performance benefit from lower capital costs, making sustainability a strategic advantage(Roggi et al., 2024). ESG score risk reflects the magnitude of risks that have not been managed by a company related to environmental, social and governance issues (Von Münchhausen et al., 2024). The greater the score of ESG risk, the greater the risk that has not been managed by companies that eventually make it into the lower ESG ratings. **Hypothesis II** then develop to see the positive relationship between yield to maturity, sustainability and ESG score: higher ESG score risk has an influence on the higher YTM of sustainable bonds.

1.2.4 Sustainable Premium, Yield to Maturity and State Owned Enterprises

State-Owned Enterprises (SOEs) generally face lower credit risks, benefiting from government support. As a result, sustainable bonds issued by SOEs attract higher investor confidence and lower yields (Q. Wang et al., 2019). Investors perceive SOEs as more stable, particularly in emerging markets, where government backing ensures reliability. This higher investor demand results in lower YTMs for SOE-issued sustainable bonds (Ge et al., 2020). It means that the sustainable premium should be enjoyed by the SOEs sustainable bonds.

Private companies, lacking government backing, are often considered riskier, leading to higher YTMs for their bonds. Higher credit risks and industry volatility contribute to increased borrowing costs for private firms (Q. Wang et al., 2019). Studies show that the cost of bond issuance is higher for private companies than for SOEs in China due to differences in market perceptions and government intervention (Ge et al., 2020).

SOEs play a crucial role in financing sustainable projects, such as infrastructure and public services, leading to lower YTMs due to their perceived stability (Q. Wang et al., 2019). Investors often favor SOE-issued sustainable bonds due to their alignment with public-sector priorities, increasing their attractiveness (Olschewski et al., 2023). Considering these factors, **Hypothesis III** suggests that SOE-issued sustainable bonds have lower YTMs than those issued by private firms.

2. RESEARCH METHODOLOGY

2.1 Data

This study's data originates from the Indonesia Stock Exchange (IDX), which has data on both sustainable bonds and conventional bonds issued by Indonesian corporations. The bond data is then sorted through dummy variables, so that the data used in the analysis is sustainable bonds issued by SOEs.

The bond data also includes bond characteristics such as issue term, price, yield, duration, and bond rating. Capital IQ provides data on ROE and asset liability ratios. The Indonesia Stock Exchange also provides data on ESG. Meanwhile, the Indonesian Statistics Agency provides inflation and GDP figures. The data collected is from the last four years, specifically 2020-2023.

2.2 Empirical Model and Variable Description

The empirical model of the research as follows :

$$Y_{it} = C + \beta_1 Sustainable_{it} + \beta_2 ESG_{it} + \beta_3 SOE_{it} + \beta_4 Leverage_{it} + \beta_5 ROE_{it} + \beta_6 Rating_{it} + \beta_7 Issue\ Term_{it} + \beta_8 Modified\ Duration_{it} + \beta_9 GDP_{it} + \beta_{10} Inflation_{it} + \varepsilon_{it}$$

Table 1. Variable Explanation

<table>
<tr><th>Variable Name</th><th>Variable Description</th></tr>
<tr><td>Y_{it}</td><td>Yield to Maturity of both sustainable bonds and conventional bonds</td></tr>
<tr><td>C</td><td>Intercept term</td></tr>
<tr><td>$\beta_1 Sustainable_{it}$</td><td>Dummy variable for the type of bond, namely 1 for sustainable bonds and 0 for conventional bonds.</td></tr>
<tr><td>$B_2 ESG_{it}$</td><td>The ESG risk value rating published by BEI in collaboration with Morningstar Sustainalytics. ESG risks are grouped into 5 categories, namely:
<table>
<tr><th>Risk Score</th><th>Category</th><th>Description</th></tr>
<tr><td>0-10</td><td>Negligible</td><td>Considered ESG risks that can ignored</td></tr>
<tr><td>10-20</td><td>Low</td><td>Considered low ESG risk</td></tr>
<tr><td>20-30</td><td>Medium</td><td>Considered moderate ESG risk</td></tr>
<tr><td>30-40</td><td>High</td><td>Considered high ESG risk</td></tr>
<tr><td>>40</td><td>Severe</td><td>Considered severe ESG risks</td></tr>
</table></td></tr>
<tr><td>$\beta_3 SOE_{it}$</td><td>Dummy variable for SOEs, namely 1 for SOEs and 0 for private companies.</td></tr>
<tr><td>$B_4 Leverage_{it}$</td><td>The ratio of total company debt to company assets.</td></tr>
<tr><td>$\beta_5 ROE_{it}$</td><td>Return non Equity.</td></tr>
<tr><td>$\beta_6 Rating_{it}$</td><td>Bond rating issued by the Indonesian Securities Rating Agency (Pefindo). The rating from Pefindo then converted as follows:
<table>
<tr><th>Ranking</th><th>Convert</th><th>Ranking</th><th>Convert</th><th>Ranking</th><th>Convert</th></tr>
<tr><td>idAAA</td><td>17</td><td>idA -</td><td>11</td><td>idB +</td><td>5</td></tr>
<tr><td>idAA +</td><td>16</td><td>idBBB +</td><td>10</td><td>idB</td><td>4</td></tr>
<tr><td>idAA</td><td>15</td><td>idBBB</td><td>9</td><td>idB -</td><td>3</td></tr>
<tr><td>idAA -</td><td>14</td><td>idBBB -</td><td>8</td><td>idCCC</td><td>2</td></tr>
<tr><td>idA +</td><td>13</td><td>idBB +</td><td>7</td><td>idSD</td><td>1</td></tr>
<tr><td>idA</td><td>12</td><td>idBB -</td><td>6</td><td>idD</td><td>0</td></tr>
</table></td></tr>
<tr><td>$B_7 IssueTerm_{it}$</td><td>The term of the bond until the bond matures.</td></tr>
<tr><td>$B_8 Modified\ Duration_{it}$</td><td>Changes in bond value due to changes in bond interest.</td></tr>
<tr><td>$\beta_9 GDP_{it}$</td><td>Gross Domestik Products.</td></tr>
<tr><td>$\beta_9 Inflation_{it}$</td><td>Inflation Rate</td></tr>
</table>

2.3 Data Analysis Technique

The technique for data analysis in this research using data panel regression analysis due to its capacity to integrate data time series and cross section data using Stata application. This method is also used in accordance with the characteristics of the dataset and the research objectives.

The panel regression model is a fixed effect model because the objective of the study is variation in bond yields, and the Hausman Test was used to determine the technique. However, because in this study there are time invariant variables (variables that do not change over time), namely Sustainable and SOEs, the Hausman Taylor Model is used. The Hausman Taylor model has similarities with the fixed effect model because it can control the heterogeneity of unobserved variables. Yet, the Hausman Talor model has the flexibility to handle time invariant variables that cannot be handled by the fixed effect model(Greene, 2012).

The Hausman Taylor model divides dependent variables into endogenous (time variant and time invariant) and exogenous (time variant and time invariant) variables using the 2SLS approach. The model residuals (error terms) cannot be derived in a normal method, making goodness-of-fit measurements like R^2 useless (Greene, 2012). The Sustainable bonds, ESG risk score and SOEs are the focus of this study which then categorized as endogenous. This

categorization is done to reduce the association between these variables and error terms or unobserved components.

3. RESULT AND DISCUSSION

3.1 Descriptive Analysis

The following are the results of descriptive statistics from the data of sustainable bonds issued by the SOEs in Indonesia that listed in IDX during 2020-2023.

Table 2. Descriptive Analysis Results

Variable	N	Average	Std. Deviation	Min	Max
Yield	210	7.0747	1.5634	2.7229	12.7276
Sustainable	210	0.8723	0.3338	0	1
SOEs	210	0.4057	0.4911	0	1
ESG	210	24.9803	4.9690	11.45	42.06
Issue Term	210	4.9558	2.8676	1	30
ModDuration	210	4.2722	1.6564	0.9358	10.9365
Rating	210	14.9320	2.4450	8	17
ROE	210	6.8742	16.1934	-77.7807	66.3028
Lev	210	1.5854	1.7683	0.1386	9.7393
Inflation	210	2.9175	1.5368	1.68	5.51
GDP	210	2.9975	2.9892	-2.07	5.31

The table shows that the Yield to Maturity Bond value has an average of 7.0747 with a standard deviation of 1.5634 and a minimum value of 2.7229 and a maximum value of 12.7276. The minimum YTM value is the 2020 YTM of bonds issued by PT. Pegadaian Persero. This low YTM is the impact of the Covid-19 pandemic which has reduced the YTM of almost all bonds, both bonds issued by the state, namely FR 0031, which also touched 2.88 (Mulyono, 2023; Zhou et al., 2022) and by companies. The downward YTM trend during the Covid-19 pandemic shows improvement in the post-Covid-19 pandemic period.

The Sustainable value which is a variable dummy of sustainable bonds has an average value of 0.8723 with a standard deviation of 0.3338 and a minimum value of 0 and a maximum of 1. For the Type value which is also a variable dummy from BUMN companies, the average value is 0.4057 with a standard deviation of 0.4911 and a minimum value of 0 and a maximum of 1.

The ESG variable has an average of 24.9803 with a standard deviation of 4.9690 and a minimum value of 11.45 and a maximum of 42.06. The higher the ESG value, the greater the company's ESG risk, which means that the company has not applied a number of ESG risk management measures.

Issue term bonds have an average of 4.9558 with a standard deviation of 2.8676 and a minimum value of 1 and a maximum of 30. The higher the issue term value, the longer the bond exists.

Modified Duration bonds have an average of 4.2722 with a standard deviation of 1.6564 and a minimum value of 0.9358 and a maximum value of 10.9365. If the greater the modified duration value, the more sensitive the bond price is to changes in interest rates so that it is more risky. Conversely, bonds with low modified duration are less sensitive to changes in interest rates, so bond prices are more stable.

The bond rating has an average of 14.9320 with a standard deviation of 2.4450 and a minimum value of 8 and a maximum of 17. The higher the bond rating, the more reliable the bond issuing company because it has a low risk of default.

ROE of bond issuing companies has an average value of 6.8742 with a standard deviation of 16.1934 and a minimum value of -77.7807 and a maximum value of 66.3028. While the Leverage of bond issuing companies has an average of 1.5854 with a standard deviation of 1.7683 and a minimum value of 0.1386 and a maximum value of 9.7393.

The inflation rate has an average of 2.9175 with a standard deviation of 1.5368 and a minimum value of 1.68 and a maximum value of 5.51. Another important note is on the macroeconomic variable namely the GDP that has an average of 2.9975 with a standard deviation of 2.9892 and a minimum value of -2.07 and a maximum value of 5.31. Although Indonesia's average GDP is around 5%, because the data collection period is 2020-2023 which includes the Covid-19 pandemic period, there is a minus GDP value.

3.2 Panel Data Regression Tests

Panel data regression tests that are conducted to determine the best model to be carried out are the Chow Test, Hausman Test and Lagrange Multiplier test.

Table 3. Chow Test

Test	Statistic	Probability
F Test	34.00	0.0000

The Chow test is conducted to determine whether the common effect model or fixed effect model used in this study. From the table above, the significance of the Chow test is 0.0000, which means that the fixed effect is the best model.

The Hausman test is conducted to determine whether the fixed effect or random effect model is the best model.

Table 4. Hausman Test

Test	Chi-Square Statistic	Probability
Cross Section Random	21.45	0.0032

From the Hausman test results above, it can be seen that the significance value of the Hausman test is 0.0032, which is less than 0.05, which means that the fixed effect model is the best. Based on the results of the Chow test and the Hausman test, the results show the same result, which is that the fixed effect model is the best model, so the Lagrange multiplier test is not conducted.

3.3 Empirical Result

Table 5. Hypothesis Test Results

Variabel	Coefficient	T-Stat	Prob
Sustainable	12.78662***	2.78	0.005
ESG	-.0440358	-1.14	0.253
SOEs	-.8797366	-0.64	0.522
Rating	-.5240023***	-5.58	0.000
ModDuration	.5696592**	2.19	0.028
Issue Term	-.0046777	-0.04	0.971
Leverage	.0025394	0.05	0.960

Variabel	Coefficient	T-Stat	Prob
ROE	.0233374*	1.85	0.064
GDP	-.2405383***	-10.10	0.000
Inflasi	.092395***	3.10	0.002

*Standard errors are in parentheses : *** p<.01, ** p<.05, * p<.1*

Based on the results of testing the influence of several independent and control variables on the dependent variable—while accounting for variance, time invariance factors, and endogeneity factors[1]—it was found that Hypothesis I, which states that sustainable bonds have a lower YTM (negative sustainable premium) compared to conventional bonds, is rejected. The results of the hypothesis test indicate that the sustainable bond variable has a coefficient of 12.78662, with a p-value of 0.005. This signifies a positive and significant relationship between sustainable bonds and YTM, implying a positive sustainable premium.

Sustainable bonds have a higher YTM compared to conventional bonds, meaning they do not exhibit a negative sustainable premium. A similar finding was reported by Grishunin et al. (2023), who observed that most green bonds in the European region between 2007 and 2021 did not have a negative greenium. Although this finding contrasted with the previous study that negative sustainable premium as well as negative greenium (Ahmadi and Feldhutter, 2023; Zerbib, 2018, ADB 2022), it should be also noted the investors' perception regarding projects funded by the sustainable bonds. The presence of a high YTM or positive sustainable premium for sustainable bonds may be attributed to investors' perceptions that projects funded by sustainable bonds carry higher risks due to the substantial costs required for funding. Additionally, the study's timeframe—during the COVID-19 period (2020–2022) and post-COVID-19 (2023)—was marked by economic uncertainty, including negative GDP growth in 2020 and rising inflation after the pandemic (O'Hara & Zhou, 2021; Tran & Uzmanoglu, 2023; Zhou et al., 2022). However, when examining the year-over-year movement of sustainable bond YTMs, a downward trend is observed, suggesting a decline in risk as the economy stabilizes post-pandemic.

Moreover, the excess supply of sustainable bonds may have contributed to their high YTM. Data from the Indonesia Stock Exchange (IDX) from 2020 to 2023 indicate that 1,018 bonds were issued by listed companies, of which 888 were sustainable bonds and only 130 were conventional bonds. This could lead to higher YTM, as an increase in bond supply, ceteris paribus, drives down bond prices and raises yields (Fabozzi et al., 2007). It is reasonable to assume that, during this period, corporate demand for funding surged due to the economic challenges posed by the COVID-19 pandemic. Furthermore, issuing sustainable bonds can enhance corporate reputation, improve regulatory standing, and align with corporate social responsibility (CSR) initiatives (Otoritas Jasa Keuangan RI, 2016).

The hypothesis II, which posits that ESG risk affects the YTM of sustainable bonds, is also rejected, as the p-value (0.253) exceeds the 0.05 significance threshold. This indicates that, while sustainable bonds may enhance an issuer's reputation, ESG risk scores are not yet a critical consideration for investors. This is understandable, given that the ESG risk ratings

[1] Variance refers to how much the dependent variable (Yield) changes or spreads out based on the independent variables in the model it can be understood through the magnitude of coefficients and standard errors. Time invariance refers to variables or factors that do not change over time, meaning their values are constant across different time periods. Endogeneity refers to correlation between multiple explanatory variables and unobserved individual effects in the model.

were only introduced by the IDX in 2020(Indonesia Stock Exchange, 2021), and therefore, neither issuers nor investors have fully integrated them into their decision-making processes.

Although previous research suggests that ESG values provide additional insights into the risk and performance of bond-issuing companies (Giese et al., 2019; Li et al., 2024; Mendiratta et al., 2021). Indonesian investors appear to lack awareness of this aspect a predominant focus on short-term profits may obscure their ability to recognize sustainable investment opportunities. However, companies that adhere to ESG principles tend to be more resilient to long-term risks, such as climate change, social instability, and regulatory changes. Additionally, ESG investments can bolster corporate reputation and attract investors who prioritize sustainability (Ditlev-Simonsen, 2022).

Interestingly, although ESG risk does not significantly impact YTM, the relationship is negative, suggesting that higher ESG risk correlates with lower YTM. This implies that lower ESG risk has a positive effect on high YTM. Over time, sustainable companies tend to demonstrate better financial performance, as they are more adept at managing risk and capitalizing on emerging business opportunities associated with a shift toward a more sustainable economy (Kumar, 2023).

The hypothesis III, which asserts that state-owned enterprises (SOEs) issuing sustainable bonds have lower YTM than private companies, is also rejected, as the p-value (0.522) exceeds 0.05. This suggests that the type of company does not significantly influence bond YTM. While SOEs are generally perceived as lower-risk entities due to government backing (Q. Wang et al., 2019), investors appear to view their risk level as comparable to that of private companies. Although some SOEs perform well, many still struggle with corporate governance, operational inefficiencies, and financial pressures (Asian Development Bank, 2022a; Wibowo et al., 2024).

Certain variables, including bond ratings, modified duration, GDP, and inflation, have a significant impact on YTM. Bond ratings exhibit a negative relationship with YTM, with a coefficient of -0.5240023 and a p-value of 0.000. This aligns with expectations, as higher-rated bonds carry lower risk, leading to lower yields and higher bond prices. A high bond rating serves as a positive signal to investors, encouraging them to accept lower yields (Sabrina, 2019).

Modified duration has a positive and significant effect on YTM, with a coefficient of 0.5696592 and a p-value of 0.028. This suggests that sustainable bonds with higher modified duration tend to have higher YTM. This can be attributed to the fact that bonds with longer duration exhibit greater price sensitivity to interest rate fluctuations. Consequently, investors demand higher YTM as compensation for this increased risk (Fabozzi et al., 2007). Meanwhile, the bond issuance term does not significantly affect YTM, as it does not influence yield unless market prices and interest rates fluctuate.

Return on equity (ROE) has a positive and significant effect on YTM, with a coefficient of 0.0233374 and a p-value of 0.064. However, given that the p-value slightly exceeds the 0.05 threshold, this relationship is not particularly strong. Similarly, leverage, with a coefficient of -0.0091 and a p-value of 0.849, does not exhibit a significant relationship with YTM. ROE serves as an indicator of corporate profitability, while the debt-to-asset ratio reflects the extent to which a company relies on debt to finance operations. However, neither ROE nor leverage should be considered in isolation when assessing a company's financial health; investors should evaluate multiple indicators before making bond investment decisions.

Regarding macroeconomic factors, GDP and inflation both have significant effects on YTM. GDP has a negative and significant relationship with YTM, indicating that higher GDP

correlates with lower YTM, as stronger economic conditions enhance investor confidence (Greenwood & Vayanos, 2008). Conversely, inflation has a positive and significant effect on YTM, as rising inflation erodes the real value of bond coupon payments, prompting investors to demand higher YTM as compensation. GDP and interest rates are closely linked to inflation; when GDP increases and inflation remains under control, interest rates can be kept low, ultimately exerting downward pressure on YTM.

4. CONCLUSION

Based on the result of this research, it is then concluded that :

1. Sustainable bonds that issued by SOEs in Indonesia during 2020-2023 do not have a lower YTM compared to conventional bonds, meaning there is no sustainable premium associated with them. Instead, sustainable bonds tend to have a higher YTM, indicating that investors perceive them as carrying higher risks. The perception of higher risk may stem from the high costs associated with sustainable projects, economic uncertainties during the COVID-19 period, and an oversupply of sustainable bonds in the market, which affects bond pricing and yields.
2. Despite their potential to enhance a company's positive reputation, sustainable bonds still face skepticism from investors. While the type of sustainable bond significantly impacts YTM by increasing the yields, the ESG risk value itself does not have a significant effect. This suggests that, although ESG considerations may contribute to corporate image and long-term resilience, investors in Indonesia have not yet prioritized ESG risk factors when evaluating bonds. Instead, factors such as credit ratings, bond duration, GDP, and inflation play a more critical role in determining bond yields.
3. State-owned enterprises (SOEs) issuing sustainable bonds do not have a lower YTM compared to private companies, as investor perceptions of risk remain similar for both. Although SOEs are often viewed as safer due to government backing, many still face corporate governance challenges and financial pressures, making them no less risky than private issuers.
4. Given the high YTM of sustainable bonds, the managerial implication of this study suggests that issuers must carefully consider the implications for funding costs, as higher yields can lead to lower bond prices and reduced investor attractiveness. In order to increase investor interest, companies should improve communication about ESG risks and the implementation of sustainable projects, reinforcing the long-term value of sustainable bonds in addressing environmental and social challenges.

5. LIMITATION

This study has main limitation is the time period used in this study, namely from 2020 to 2023. During this period, the Covid-19 pandemic occurred which had a significant impact on the business world because the existing risks increased, while macroeconomic conditions also worsened. It is hoped that further research can increase the observation period so that it can provide a clearer picture of sustainable bonds and ESG risks

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