Determinants of Sustainable Bond Yield among IDX-Listed Companies

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ABSTRACT: This study analyzes the development of sustainable bonds among IDX-listed companies in the post-Covid period of 2022 and identifies the factors influencing sustainable bond yields. The research observes 749 sustainable bonds issued by 93 IDX-listed companies. Multiple regression analysis is employed to explore the relationship between the bond yield as the dependent variable and sustainability factors—Number of Company-Supported SDGs, ESG Risk Ratings, CSR Funds, and GHG Emissions—as independent variables, along with control variables including three bond characteristics (Modified Duration, Issuance Size, Term to Maturity) and eight company characteristics (Board of Commissioners and Directors Diversity, Company Size and Age, ROA, Current Ratio, Industry, State-owned Enterprise status). The findings reveal positive correlations between the Number of Company-Supported SDGs and ESG Risk Ratings with bond yields, while CSR Funds and GHG Emissions show negative correlations with bond yields, indicating complex relationships between sustainability performance and sustainable bond yields. The study results suggest strategic recommendations for companies, investors, policymakers and regulatory bodies, as well as educational institutions to enhance the effectiveness and appeal of sustainable bonds in Indonesia.

KEYWORDS: Bond Yields, CSR Funds, ESG Risk Ratings, GHG Emissions, IDX-Listed Companies, SDGs, Sustainable Bonds

I. INTRODUCTION

In recent years, sustainable finance has grown within financial markets, integrating Environmental, Social, and Governance (ESG) criteria into financial practices, resulting in "blended value" investments [1]. This growing concern for sustainability is reflected in the increasing investments in eco-sustainable initiatives, leading to market expansion [2,3]. Data from UNCTAD [4] reveals that the sustainable finance market reached USD 5.8 trillion in 2022, marking a 12% increase from the previous year. This realignment of financial initiatives from traditional profit-only focuses on those valuing both financial returns and sustainability contributes to fostering a more sustainable global economy. The shift towards sustainable economic practices has resulted in the urgent need for new financial instruments to fund the initiatives of addressing social and environmental challenges, introducing sustainable bonds as key instruments [3]. Unlike conventional bonds, sustainable bonds' fungibility is designed to finance projects that yield positive environmental and social outcomes [5,6]. This distinctive feature enables them to cater to the increasing stakeholder expectations for long-term economic, environmental, and social returns over mere short-term profitability. Consequently, sustainable bonds have emerged not only as financial instruments but also as tools to address and balance both shareholder and stakeholder value [7,8].

The growing commitment to financing projects that deliver tangible environmental and social benefits has further driven the popularity of sustainable bonds, reflected in their market growth. The market for these bonds has increased fivefold increase from 2017 to 2022, with USD 738 billion issued in 2022 [4]. This figure represents 8.9% of the total bonds issued within the same year [6], positioning sustainable bonds as catalysts for growth within the sustainable finance market. With an annual growth rate of 72%, the sustainable bonds market is expected to accelerate as global efforts towards sustainable development intensify [6]. This transformation underscores the expanding role of sustainable financial instruments as valuable assets in the global transition towards sustainability, offering an attractive opportunity within the market. Following the global trend towards sustainability, Indonesia has actively engaged in the sustainable finance, evidenced by government initiatives promoting sustainable financial instruments [9]. In 2021, the Financial Services Authority of Indonesia (OJK) launched the second phase of the Sustainable Finance Roadmap (2021-2025), aiming to further align the nation's financial practices with the Sustainable Development Goals (SDGs). This plan includes strengthening regulatory frameworks, enhancing financial resilience, and increasing the demand and supply of sustainable financial instruments [10]. Supported by government initiatives, sustainable financial products in Indonesia are gaining traction, with sustainable bonds reaching approximately USD 7.0 billion in 2022 [11]. This growing integration of sustainability within Indonesia's financial landscape highlights an emerging area of interest requiring further academic exploration.

Despite this growth, studies on sustainable bond yields that particularly combine sustainability factors with traditional financial metrics remain lacking, especially in emerging markets like Indonesia. Existing literature mainly focuses on global contexts and examines green bonds with different conventional financial metrics. For example, the performance of green bonds is shaped by the specific nature of the projects they finance, such as pollution control, eco-efficient products and technologies, sustainable natural resources management, and biodiversity conservation tend to yield higher performance [3]. This performance is further heightened for issuers that are solely dedicated to green initiatives, though negatively impacted by lower country ratings. In terms of green bond premiums, positive green bond premiums are usually associated with private and non-certified issuers [12]. However, these studies are largely limited to global markets and emphasize green types of bonds, specifically before and during the pandemic. This underscores the need for further research within emerging markets like Indonesia, particularly in the post-COVID-19 context to determine their continued relevance.

Even though existing studies have started to expand into developing countries, there remains a gap in the research, particularly in the context of Indonesia as one of the emerging markets. Oktavio and Riyanti [13] has highlighted that factors such as ratings, currency, issuance amount, and time to maturity influence the green bond premiums in ASEAN countries, yet this study has not fully integrated sustainability aspects of the bonds such as the number of SDGs supported, GHG emissions, CSR funds, or ESG scores. Despite recent scholarly attention, the majority of methodology within Indonesian sustainable finance research has been qualitative. Wahyuningsih et al. [14] described the characteristics of green bonds, noting that bonds with longer maturity (more than five years) and larger coupons are perceived as yielding higher returns due to increased risk. While Haddad & Rokhim [15] reported an annual increase in the performance of Indonesian green bonds, with yields slightly exceeding those of conventional bonds, their research has yet to identify the specific factors driving these outcomes. As recent studies within ASEAN and Indonesia similarly focus on green bonds, there is a clear need for further quantitative studies that delve into the sustainable finance market in Indonesia by incorporating more specific sustainability measurements.

Moreover, while several studies have assessed bond yields in Indonesia, they have concentrated on traditional financial determinants such as profitability, leverage, company size, return on assets (ROA), total assets, and bond maturity, which were found to have positive effects on Indonesian corporate bond yield [16,17]. Additional studies also revealed that factors such as bond rating, credit rating, and debt-to-equity ratio show no influence on the yield to maturity of Indonesian corporate bonds [16,17]. Given the increasing importance of sustainability in financial considerations, this leads to an urgency for more comprehensive research that not only considers traditional financial metrics but also incorporates sustainability factors. This approach is aimed at providing a clearer and more complete understanding of the dynamics affecting sustainable bond yields in Indonesia's emerging market.

Given the identified research gaps—lack of studies in emerging markets like Indonesia and the one-sided focus on the green aspects of sustainability in financial markets—the contribution of this study to academic literature and practical applications is two-fold. Firstly, the study explores the development of sustainable bond market in Indonesia in 2022. This period marks the start of the post-Covid period, allowing for clearer evaluation by reducing the direct effects of the pandemic and offering the most recent insights. Secondly, the research extends into including specific sustainability metrics, such as the number of company-supported SDGs, ESG risk ratings, corporate social responsibility (CSR) funds, and greenhouse gases (GHG) emissions, with traditional financial determinants in analyzing sustainable bond yields in Indonesia, an area unexplored in prior studies. This study provides practical guidance for corporations, investors, policymakers and regulatory bodies in sustainable finance, while offering valuable insights for academic researchers exploring sustainable bonds.

II. METHODOLOGY

The sample for this research comprises sustainable bonds outstanding in 2022 issued by companies listed on the Indonesia Stock Exchange (IDX). The year 2022 was selected because of its recent available data and the beginning of the post-Covid period, minimizing the direct effects of the pandemic. The dataset includes 749 sustainable bonds from 93 companies, sourced from both primary and secondary data. Yield data for the dependent variable was collected from the latest Indonesia Bond Market Directory published by IDX in 2023. Independent variables were obtained from companies' sustainability reports (number of SDGs supported, CSR fund allocations, and GHG emissions) and Sustainalytics for ESG risk ratings. Control variables were collected from the Indonesia Bond Market Directory (bond characteristics), companies' annual reports (BoC and BoD diversity, company age, and industry) and financial statements (company size, ROA, current ratio).

This study constructs a hypothesis based on a literature review that explores the previous studies on the relationship between sustainability-related factors and bond yields, including number of SDGs supported, ESG risk rating, CSR fund, and GHG emissions. First, the number of SDGs supported by the company is perceived to be linked to improved performance in the sustainable bond. Studies suggest that bonds financing projects aimed at eco-efficiency, pollution control, and sustainable water management positively impact green bond performance by reducing environmental risks and enhancing the firm's operational efficiency. This improves the firm's reputation and attracts more investors, leading to cost savings and operational efficiencies [3]. Therefore, it is suggested that supporting more SDGs correlates with better sustainable bond performance, attributed to broader contribution to sustainability and an enhanced corporate image. This study hypothesizes a negative relationship, where a greater number of SDGs supported correlates with a decrease in sustainable bond yield.

Second, ESG performance as indicated by ESG risk ratings, serves as a risk indicator for investors. Strong ESG performance, reflected by a lower ESG risk rating, is associated with lower bond yields, reflecting a decrease in perceived risk and borrowing costs due to enhanced investor confidence [18,19]. Building upon this, the hypothesis proposes a positive relationship, where the lower ESG risk ratings lead to lower sustainable bond yields.
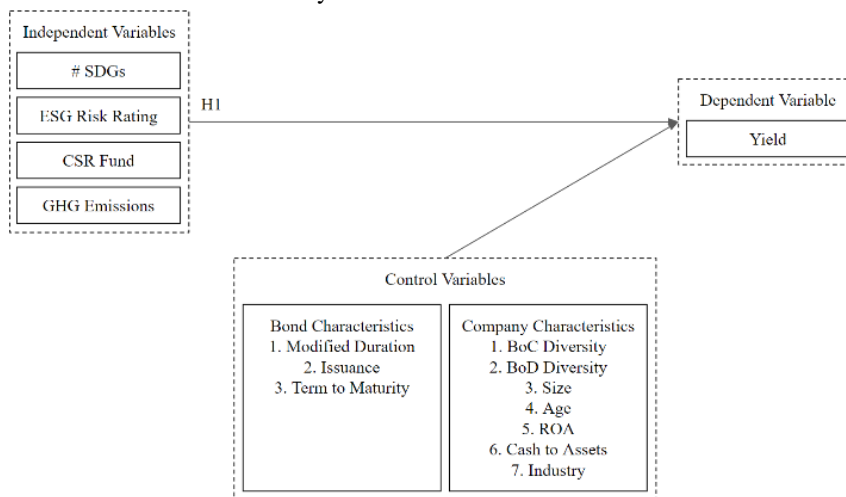

Figure 1. Conceptual Framework

Third, CSR funding indicates the financial commitment of a firm to sustainable initiatives. Literature suggests that strong CSR policies are linked to reduced capital costs and enhanced market valuation [3]. This increases the bond attractiveness and broadens the investor base, thereby reducing bond yields by issuing the bond at a lower cost. Based on this insight, a negative relationship is hypothesized, where a higher CSR funding results in lower bond yields.

Fourth, regarding GHG emissions, the relationship with bond yields has yet to be explored. Achieving the SDGs requires investments that avoid fossil fuels and GHG emissions, emphasizing industries that do not exploit natural resources intensively [14]. The risks posed by GHG emissions include the broader economic impacts of climate change, pollution, loss of ecosystem services, and large-scale environmental accidents. These factors suggest that poor environmental performance could increase a firm's risk profile, leading to higher bond yields. Conversely, firms with better environmental practices tend to experience lower bond spreads, reflecting reduced risk as perceived by investors [18]. Thus, the hypothesis suggests a positive correlation, where higher GHG emissions correlate with higher sustainable bond yields due to the increased risks and investor concerns over sustainability.

Table 1. List of the Variables

Variable	Explanation	Expected Result	References
Yield	Bondholder's return on investment		[3]
SDGs	Number of company-supported SDGs	-	[3]
ESG Risk	Rating of ESG risk	+	[18]

CSR Fund	Financial resources allocated to social and environmental initiatives	-	[3,21,22]
GHG Emissions	Amount of GHG emitted	+	[14.18]
Modified Duration	Sensitivity of bond's price to interest rate changes	+	[23.24]
Issuance Size	Amount of bond issuance in IDR	+	[25]
Term to Maturity	Number of years until the bond is due	+	[14,20,27]
BoC Diversity	Proportion of female to total BoC	-	[28]
BoD Diversity	Proportion of female to total BoD	-	[28]
Company Size	Company scale, measured by the logarithm of its total assets	-	[20,24,29,30]
Company Age	Duration since the company's establishments in years	-	[31]
ROA	Profitability, measured by the proportion of the net profit to total assets	-	[17,32]
Current Ratio	Liquidity, measured by the proportion of cash to assets	-	[16,33]
Industry	A dummy variable equals one (1) if the issuer operates in the particular industry, and otherwise it is zero (0)	1/0	
BUMN	A dummy variable equals one (1) if the issuer is state-owned enterprise, and otherwise it is zero (0)	1/0	

Building upon the reviewed literature, this research suggests that superior sustainable performance, indicated by a greater number of SDGs supported, lower ESG risk rating, increased CSR funding, and lower GHG emissions, is associated with lower sustainable bond yields. This study aims to provide a better understanding of how sustainability factors influence bond performance within the realm of sustainable finance. Therefore, the author hypothesizes that there is a negative relationship between sustainability performance and sustainable bond yield.

H1: There is a negative relationship between sustainability performance and sustainable bond yield.

This research employs multiple linear regression analysis for pure cross-sectional data with the variables listed in Table 1. The methodology is adapted from previous studies that examined the determinants of green bond performance [3] and greenium existence in European markets [20]. The multiple linear regression equation (1) is used to test the relationship.

$$Yield_t = \beta_0 + \beta_1 SDGs_t + \beta_2 ESG\ Risk_t + \beta_3 CSR_t + \beta_4 GHG_t + \beta_5 Mod.Duration_t + \beta_6 Maturity_t + \beta_7 BoC\ Diversity_t \\ + \beta_8 BoD\ Diversity_t + \beta_9 Company\ Size_t + \beta_{10} Company\ Age_t + \beta_{11} ROA_t + \beta_{12} Current\ Ratio_t \\ + \beta_{13} Industry_t + \varepsilon$$

III. RESULTS AND DISCUSSION

The data variables are explained with descriptive statistics displayed in Table 2. The number of observations reflects the availability and completeness of the data. All dependent and control variables have 749 observations, except for the BoC Diversity variable, which has 722 observations. This difference arises because not all companies in Indonesia implement a dual board system, as observed in Indonesia Eximbank, which has 27 sustainable bonds. The dataset reveals that the majority of sustainable bonds are issued from the Financial (35.91%) and Infrastructure (33.64%) sectors. Only a smaller proportion (24.70%) of sustainable bonds are issued by state-owned enterprises (BUMN), indicating an increasing contribution from non-state-owned companies in issuing sustainable bonds.

The independent variables have fewer comprehensive data coverage. Notably, the ESG Risk Ratings are available for only 53.14% of the dataset, indicating limited data availability from Sustainalytics. IDX-listed companies. Additionally, the other three independent variables—Company-Supported SDGs, CSR Fund, and GHG Emissions—are derived from companies' sustainability reports. This results in fewer observations since not all companies include these details in their reports. The limited availability of these data points underscores the need for more standardized and comprehensive sustainability reporting among IDX-listed companies.

The Yield variable has a mean of 7.36%, a standard deviation of 1.24%, a minimum value of 4.03%, and a maximum value of 11.67%. This indicates a balanced distribution of data points that are clustered relatively around the mean, as the mean value is

approximately equidistant from the minimum and maximum values. This implies that yield returns on sustainable bonds are relatively stable, with extreme values being uncommon. Overall, IDX-listed sustainable bonds offer yields that fall within a narrow range around the mean, making them attractive to investors seeking stable income while contributing to sustainable investments.

Table 2. Descriptive Statistics

Variable	Observation	Mean	Standard Deviation	Minimum	Maximum
Yield	749	0.074	0.012	0.040	0.117
SDGs	585	11.323	5.055	1.000	17.000
ESG Risk	398	28.058	5.936	12.900	49.600
CSR Fund	672	10.373	0.980	7.282	12.486
GHG Emissions	511	8.498	2.025	4.314	11.884
Modified Duration	749	2.603	1.743	0.446	9.709
Issuance Size	749	11.345	0.656	7.699	12.602
Term to Maturity	749	5.637	3.585	1.000	30.000
BoC Diversity	722	0.096	0.151	0.000	0.667
BoD Diversity	749	0.141	0.124	0.000	0.500
Company Size	749	13.922	0.677	12.182	15.299
Company Age	749	50.003	26.476	9.000	127.000
ROA	749	0.463	1.923	-0.072	8.890
Current Ratio	749	0.082	0.074	0.000	0.332

Figure 2. Number of Company-Supported SDGs Associated with IDX-Listed Sustainable Bonds in 2022

For the independent variables, the Number of SDGs Supported shows mean values closer to the maximum, indicating that most companies are highly committed to multiple SDGs. Figure 2 reveals that companies supporting 15 to 17 SDGs have issued the highest number of sustainable bonds (31.11%), totaling 233. This is followed by companies supporting 9 to 12 SDGs (108 bonds) and 6 to 9 SDGs (100 bonds). Companies supporting 12 to 15 SDGs issued 58 bonds, while those supporting 3 to 6 SDGs issued 54 bonds, and those supporting 0 to 3 SDGs issued 32 bonds. This pattern suggests that the majority of IDX-listed companies that demonstrate a stronger commitment to SDGs by supporting a high number of SDGs tend to issue more sustainable bonds. Stronger commitment to sustainability enhances the company's appeal, especially to socially conscious investors, and facilitates easier access to sustainable financing. The mean number of SDGs supported is 11.32, with a standard deviation of 5.06, showing a varying commitment to SDGs. However, 21.89% of the sustainable bonds issued lack data on the number of SDGs supported, highlighting a gap in reporting and the need for more comprehensive sustainability disclosures.
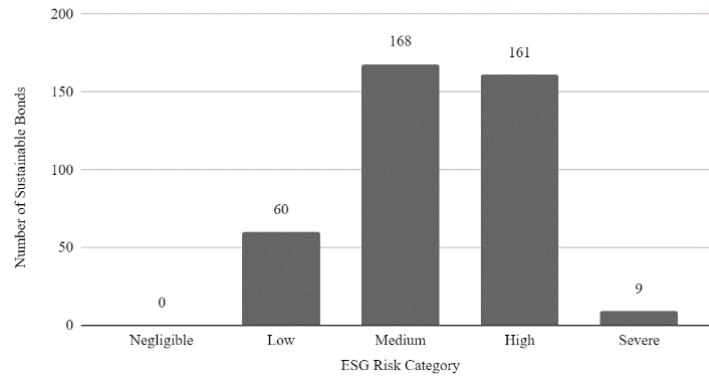
Figure 3. ESG Risk Associated with IDX-Listed Sustainable Bonds in 2022

The skew towards the higher values in ESG Risk Ratings indicates that many IDX-listed companies are still facing substantial sustainability risks. The mean ESG Risk Rating is 28.06, which falls within the Low-risk category, with a standard deviation of 5.94. This range, from a minimum of 12.90 (Low risk) to a maximum of 49.60 (Severe risk), highlights the variability in ESG performance among these companies. Figure 3 shows that the majority of sustainable bonds fall into the Medium (168 bonds) and High (161 bonds) ESG risk categories. This distribution indicates many companies committed to issuing sustainable bonds but are still in transitional phases. The Low-risk category includes 60 bonds, while no bonds are categorized as Negligible risk, suggesting that few companies have achieved the highest standards of ESG performance and reflecting the challenges in minimizing ESG risks across operations. The Severe risk category has 9 bonds; while it is positive that only a small portion of companies are at the highest level of ESG risk, the presence of bonds in this category underscores the need for these companies to prioritize improvements in their ESG practices to meet investor expectations and regulatory standards. Overall, while IDX-listed companies are working towards addressing ESG risks, most still face non-negligible risks, highlighting the need for continued focus on enhancing ESG practices and management.

Conversely, the mean values of the CSR Fund and the GHG Emissions are approximately equal in distance between their minimum and maximum. This balanced distribution suggests moderate variability, indicating that IDX-listed companies, on average, show a consistent commitment to social responsibility and environmental impact. The mean log of CSR Fund is 10.37, with a standard deviation of 0.98, reflecting relatively consistent investment in CSR activities. Similarly, the mean log of GHG Emissions is 8.50, with a standard deviation of 2.03, indicating moderate variability in emissions reported. This consistency in both CSR investment and GHG emissions highlights the efforts of IDX-listed companies to maintain responsible business practices and mitigate their environmental impacts.

For bond characteristics, the mean value of Bond Issuance Size is closer to the maximum value, suggesting that most companies issue larger bond sizes, which can indicate higher levels of debt. This skew towards higher values reflects a preference among companies for raising significant capital through bond issuance, which may increase default risk but also reflects their capability to manage larger debt obligations. In contrast, the mean values for Modified Duration and Term to Maturity are closer to their minimum values, at 2.60 and 5.64, respectively. The lower mean values suggest that most bonds have shorter durations and terms to maturity. A lower Modified Duration indicates lower interest rate risk, making these bonds attractive to risk-averse investors. Similarly, a shorter Term to Maturity implies quicker returns on investment, which can be favorable for investors seeking less risk exposure. While IDX-listed companies prefer issuing larger bond sizes, they tend to favor bonds with shorter durations and terms to maturity. This approach balances the need for substantial capital while minimizing interest rate risk and return duration to investors.

The company characteristics provide insights into the corporate governance and financial health of IDX-listed companies issuing sustainable bonds. For variables such as BoC and BoD Diversity, the mean values (0.10 and 0.14, respectively) are closer to the minimum values, indicating that most observations are concentrated near the lower end of the range. On the average, there are approximately 1 woman on boards of commissioners out of a total of 10 members, and 2 women on boards of directors out of a total of 10 members, highlighting limited gender diversity. This predominance of men on boards might reduce the range of perspectives

in decision-making, which can be detrimental to governance quality. The lower mean values in BoC and BoD Diversity highlight a need for greater inclusivity and diversity in leadership positions within these companies.

Variables such as Company Age, ROA, and Current Ratio also have mean values closer to minimum, indicating a distribution where most observations are concentrated near the lower end. Company Age has a mean of approximately 50 years, with a wide range from 9 to 127 years and a high standard deviation of 26.48. This high variability suggests a mix of both young and well-established companies issuing sustainable bonds. Younger companies may imply less experience and stability, potentially affecting their ability to attract investors compared to older, more established firms. ROA, with a mean of 46.32% and a standard deviation of 192.26%, shows high variability that indicates significant differences in how efficiently companies utilize their assets to generate earnings. This variation suggests that while few companies are highly efficient, others may struggle with asset utilization.

Similarly, the Current Ratio, has a mean of 8.24% with a standard deviation of 73.96%, reflecting varied liquidity management practices among these companies. These metrics suggest that some companies maintain high liquidity, while others may face challenges in managing short-term obligations. On the other hand, Company Size, with a mean value of 13.92, is approximately equidistant between the minimum (12.18) and maximum (15.30) values. This balanced distribution indicates moderate variability, suggesting that most companies issuing sustainable bonds are similar in size, which can imply consistent capacity to manage and service their debt. These statistics highlight a diverse landscape of IDX-listed companies issuing sustainable bonds, with significant variability in age, efficiency, and liquidity, with considerably consistent company sizes.

Table 3 presents the results of multiple linear regression analysis. All sustainability variables are significant, with Number of SDGs Supported and ESG Risk Rating showing positive correlations with bond yield, with coefficients of 0.0005 and 0.0003, respectively. Conversely, CSR Funds and GHG Emissions exhibit negative correlations with bond yield, with coefficients of -0.0054 and -0.0015, respectively. While all sustainability variables are significant, the results provide a mixed support towards a better sustainable performance leading to lower sustainable bond yields. The positive coefficient suggests that each bond yield. This finding contradicts the study by Russo et al. [3], which suggests that projects supporting sustainable initiatives typically result in lower yields. Their study, conducted globally during the period of 2013-2016 before the pandemic, may not fully account for the post-pandemic and Indonesia-specific economic environment, which has introduced new financial and operational challenges impacting yields differently. While supporting more SDGs reflects broader sustainability efforts, it might introduce additional costs, which can slightly increase bond yields. These additional costs can arise from investments in sustainable technologies, compliance with regulatory standards, and other initiatives aimed at supporting SDGs, coupled with the post-pandemic economic recovery period. Higher costs can translate to increased operational risks and financial burdens, thereby elevating the bond yield, as yields mirror the perceived risk of investment.

Similarly, the positive coefficient for ESG Risk Rating indicates that an increase in the ESG Risk Rating by one unit is associated with an increase in bond yield by 0.03%. This suggests that higher ESG risk ratings, which signify weaker sustainability practices, lead to higher perceived investment risks, resulting in increased bond yields. This finding aligns with the study by Capelle-Blancard et al. [18] in the context of developed countries and Polbennikov et al. [19] in a global landscape. Their research suggests that good ESG performance is linked to lower default risk and improved financial performance. Both studies, conducted before the Covid-19 pandemic in a broader landscape, underscore the consistent value of strong ESG practices in reducing investment risks and yields, remaining a critical factor in enhancing financial stability and attractiveness to investors.

Table 3. Multiple Linear Regression Analysis

Variable	Coefficient	p-value
SDGs	0.0005	0.0160
ESG Risk	0.0003	0.0010
CSR Fund	-0.0054	0.0000
GHG Emissions	-0.0015	0.0000
Modified Duration	0.0044	0.0000
Issuance Size	-0.0017	0.0020
Term to Maturity	-0.0005	0.0020
BoC Diversity	-0.0204	0.0000

BoD Diversity	-0.0044	0.2230
Company Size	-0.0032	0.0710
Company Age	0.0001	0.0000
ROA	0.0596	0.0400
Current Ratio	0.0414	0.0000
Basic Materials	0.0043	0.1720
Consumer Cyclicals	(omitted because of collinearity)	
Consumer Non-cyclicals	0.0049	0.3000
Energy	-0.0069	0.0960
Financials	-0.0036	0.4380
Healthcare	(omitted because of collinearity)	
Industrials	(omitted because of collinearity)	
Infrastructures	-0.0012	0.6980
Properties and Real Estates	0.0067	0.1450
Transportation and Logistics	(omitted because of collinearity)	
BUMN	-0.0051	0.0160
Constant	0.0871	0.0000
Adjusted R-Squared	0.8014	

The negative coefficient for CSR funds implies that a ten billion times increase in the CSR fund is associated with a decrease in bond yield by 0.54%. This finding aligns with the study by Russo et al. [3], which found that strong CSR performance enhances market value. By investing in CSR, companies demonstrate their commitment to ethical practices and social responsibility, in which the higher the investment in CSR indicates a better performance. This commitment can enhance their reputation and attract more investors, increasing perceived long-term benefits and investor confidence, resulting in lower perceived risk, and consequently lower yields. Companies that allocate substantial resources to CSR activities benefit from lower financing costs, reflecting the broader market recognition of the value of sustainable and responsible business practices.

The negative coefficient for GHG emissions suggests that a tenfold increase in GHG Emissions is associated with a decrease in bond yield by 0.15%. This result contradicts the initial hypothesis, indicating that higher GHG emissions are associated with lower bond yields, potentially implying that investors might perceive companies with higher emissions as having higher short-term profitability. Companies engaging in less environmentally friendly but more immediately profitable activities, such as using cheaper fossil fuels rather than spending additional investment in new and more environmentally friendly energy sources, may appear more financially attractive in the short term to certain investors, leading to lower bond yields. However, this perspective does not account for long-term environmental risks and the growing regulatory pressures to reduce emissions. Higher emissions pose significant long-term risks, including increased operational costs to comply with environmental standards, and reputational damage, which are underestimated by investors focusing on short-term returns, which explains the observed decrease in bond yields.

The findings reveal mixed results regarding a negative relationship between sustainability performance and sustainable bond yield. The positive relationship between the number of SDGs supported and bond yield and the negative relationship between higher GHG emissions and bond yields contradict the hypothesis, while the positive relationship between ESG risk rating and bond yields and the negative relationship between CSR funding and bond yields support the hypothesis. The results highlight the complexity of the relationships between sustainability practices and bond yields.

The regression analysis for the control variables related to bond characteristics reveals significant findings. Modified Duration shows a positive correlation with bond yield, with a one-unit change in modified duration leading to a 0.44% increase in bond yield. This aligns with studies by Čerović et al. [23] and Grishunin et al. [24], in which the positive correlation suggests that bonds with longer durations, which are more sensitive to interest rate changes, tend to have higher yields to compensate for the increased interest rate risk. Meanwhile, Issuance exhibits a negative correlation with bond yield, indicating that a one-unit increase in issuance size results in 0.17% decrease in bond yield. This supports the study by Calomiris et al. [25], suggesting that larger bond issuances, typically associated with greater liquidity and lower risk, tend to have lower yields. Term to maturity shows a negative correlation

with bond yield, where it shows that a one-unit increase in term to maturity leads to a 0.05% decrease in bond yield. This contradicts previous studies by Sergei and Alesya [20], Dayanti and Janiman [26], and Siregar and Pratiwi [27], which found a positive correlation. This suggests that the term to maturity impact on bond yield may vary depending on the specific model and context, such as differences in market conditions, investor sentiments, and sample characteristics.

The regression analysis for the control variables related to company characteristics reveals a mix of significant and insignificant findings across different models. The analysis shows BoD diversity is insignificant, indicating it does not strongly influence bond yields. However, there is a negative correlation between BoC diversity and bond yield, suggesting that for each unit increase in BoC diversity, bond yield decreases by 2.37%. This finding shows mixed results compared to Simionescu et al. [28], who suggest greater diversity enhances governance quality, improves financial performance, and reduces perceived investment risk, thereby lowering bond yields. This discrepancy highlights that the role of BoC in providing oversight and strategic guidance contribute to better governance, while the BoD's operational focus does not directly impact bond yields as significantly in reducing perceived risks that affect financial outcomes of bond yields.

The size of the company is found to be insignificant, contradicting the studies by Sangi and Setyawan [29] and Weniasti and Marsoem [30], which highlight a negative relationship between company size and bond yield. Conversely, the slight positive correlation of 0.0001 for company age implies that older companies might experience marginally higher yields. Older companies might have legacy issues, such as outdated infrastructure or higher maintenance costs, which can increase their operational risks. Additionally, these companies might be perceived as less dynamic and innovative, potentially leading to higher perceived risk by investors. This higher perceived risk can result in higher yields as compensation for the increased uncertainty. Specifically, for every additional year in company age, the bond yield increases by 0.01%, indicating a slight increase in perceived risk over time.

The regression analysis reveals a positive correlation between ROA and bond yields, indicating that for each unit increase in profitability, bond yield increase by 5.96%. This suggests that higher profitability is generally associated with higher bond yields, contradicting the study by Fitriadi and Marsoem [17]. The positive correlation implies that investors may perceive highly profitable companies as riskier investments, potentially due to aggressive growth strategies or high leverage that could increase financial instability. Similarly, the current ratio shows positive correlations with coefficients, in which one unit increase in liquidity corresponds to an increase in bond yields from 4.14%. This contradicts existing studies by Sangi and Setyawan [29]; the positive correlation might suggest that companies with higher liquidity ratios may be holding excessive cash. Investors might perceive this as a sign that companies are not efficiently deploying their assets into profitable investments, signaling potential issues with financial management. This perceived inefficiency leads investors to demand higher yields to compensate for the perceived risk.

The correlations observed among different industry sectors indicate that all industries, including Basic Materials, Consumer Cyclicals, Consumer Non-cyclicals, Energy, Financials, Healthcare, Industrials, Infrastructures, Properties and Real Estates, and Transportation and Logistics, are either omitted because of collinearity or found to have insignificant values. This indicates that the sector in which the company runs in pose no significant effect on sustainable bond yield. The significance of BUMN (state-owned enterprises) suggests that being a state-owned company has a notable impact on bond yields, specifically suggesting that if a company is state-owned, the bond yield decreases by 0.51%, reflecting the perceived lower risk and higher stability associated with government backing, making these bonds more attractive to investors and resulting in lower yields.

The significance of the constant term indicates that there are baseline factors affecting bond yields that are not captured by the specific variables included in the models. The positive correlation suggests that, even in the absence of the specific independent and control variables considered, there is a base level of yield that bonds tend to offer, which is 8.71%. This base yield likely reflects the underlying market conditions and general risk factors inherent to the bond market. This variability could be due to differences in the model specifications, such as the inclusion of different sets of control variables or the specific characteristics of the bonds and companies being analyzed. The adjusted R-squared values measure the proportion of the variance in bond yields explained by the models, adjusted for the number of predictors. With an adjusted R-squared of 80.14%, the model indicates that it has the highest explanatory power, explaining over 80% of the variance in bond yields. This suggests that the combined effect of all variables included in this model provides a comprehensive understanding of the factors influencing bond yields

IV. CONCLUSION

The significant growth and evolving role of sustainable bonds among IDX-listed companies marks a pivotal shift in Indonesia's financial landscape, aligning with global sustainable finance trends while addressing local economic and environmental challenges. In the post-Covid era of 2022, there were 749 outstanding sustainable bonds from 93 IDX-listed companies across nine industries, showcasing the substantial increase in the issuance and market value of these bonds. The majority of these bonds are conventional, with a notable rise in Islamic instruments such as Sukuk Ijarah and Sukuk Mudharabah. Most of these bonds were issued by companies in the Financial and Infrastructure sectors, predominantly by non-state-owned enterprises. This trend corresponds with the global shift towards driving sustainable finance in Indonesia, where sustainable bonds are predominantly issued by companies that support all 17 SDGs.

The analysis reveals that most bonds fall into the medium to high ESG risk categories, with large issue sizes, low modified durations, and short terms to maturity. This indicates a preference for financing mechanisms that balance substantial capital raising with lower interest rate risk and quicker returns on investment. In terms of company characteristics, issuers of sustainable bonds are mostly younger companies with low profitability and liquidity, yet similar in size. This suggests that while these companies are embracing sustainability, there are areas for improvement in financial performance.

Since many companies still have medium to high ESG risk ratings, there is a need for continuous improvement in ESG practices and management to reduce ESG risks. Companies should improve their sustainability reporting by including detailed sustainability-related information on the number of SDGs supported and their supporting activities, ESG risk rating performance, CSR funds and their usage allocation, and GHG emissions. Furthermore, since most companies only provide general descriptions of proceeds such as for working capital, companies should specify their use of proceeds related to sustainable activities in their sustainable bond prospectus. This improved ESG management and detailed reporting will provide greater transparency, build investor trust, and align financial practices with sustainability goals, thus lowering the bond yield.

Recognizing that many companies still lack comprehensive sustainability reports, regulatory authorities should mandate the inclusion of detailed sustainability metrics in reports to ensure consistency and transparency across all IDX-listed companies. Policymakers and regulatory bodies should work towards standardizing the metrics for reporting sustainability impacts, which would help reduce the complexity sustainability reports for companies and enable investors to more easily compare the sustainability performance of different companies and make more informed investment decisions. Additionally, incentivizing investments in sustainability through tax breaks or subsidies for projects that meet certain sustainability thresholds could encourage more companies to invest in sustainable practices and help mitigate the perceived financial drawbacks of extensive SDG support. Moreover, given that not all companies have complete ESG risk ratings from Sustainalytics, regulatory bodies should consider forming partnerships with such platforms or developing uniform ESG scoring methods to ensure these scores are regularly updated and readily available for all companies.

The regression analysis provides insight into the dynamics influencing the yield of sustainable bonds among IDX-listed companies, revealing mixed results. Using multiple linear regression models, the analysis examines the impacts of sustainability factors, including the Number of Company-Supported SDGs, ESG Risk Ratings, CSR Funds, and GHG Emissions. The results show that the Number of SDGs Supported and ESG Risk Ratings have positive correlations with bond yields, indicating that supporting more SDGs and having higher ESG risk ratings are associated with higher bond yields. Conversely, CSR Funds and GHG Emissions exhibit negative correlations with bond yields, suggesting that higher investments in CSR and lower GHG emissions are perceived positively by investors, leading to lower bond yields. These findings partially support the hypothesis that better sustainability performance—lower ESG Risk Ratings and higher investments in CSR—can reduce perceived investment risk, thus lowering bond yield. Understanding these dynamics, investors can better align their investments with their risk preferences and financial goals.

Due to the preference for short-term benefits evident through lower bond yields associated with higher GHG emissions, there should be a concerted effort to educate market participants about the long-term benefits of sustainable investments, such as workshops, seminars, and educational campaigns. Additionally, future research could analyze the performance of sustainable bonds over extended periods to assess the long-term impacts of sustainability initiatives on bond yields. Comparing the impacts of sustainability factors on bond yields across different sectors and regions could further provide valuable insights into how contextual variables influence the effectiveness of these practices. This research could help identify industry-specific strategies or regional

approaches that maximize the benefits of sustainable finance. Fostering a deeper understanding of sustainable investments, market participants can make more informed decisions that balance short-term returns with long-term sustainability goals.

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