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Correlation of Sustainability Report Disclosure Towards Financial Firm Performance in Indonesia, Malaysia & Singapore Palm Oil Sector from 2020 to 2024

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Revenue Growth;
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Abstract

This research examines the impact of sustainability performance on the financial performance of 26 publicly listed palm oil companies in Indonesia, Malaysia, and Singapore during 2020–2024, using 130 firm-year observations. The research addresses the increasing pressure on the palm oil sector to balance economic growth with environmental and social responsibility. Sustainability disclosure is measured through the ESG Score to evaluate whether strong ESG practices contribute to financial performance or merely represent compliance costs. The study applies a panel data approach, with the Random Effects (RE) Model selected as the most appropriate estimation technique based on the Hausman and Breusch–Pagan Lagrange Multiplier tests. The results indicate that sustainability disclosure has a positive and significant effect on financial performance. The ESG Score shows coefficients of 0.282 for Net Profit Margin (NPM) and 0.329 for Revenue Growth, both significant at the 1% level ($p = 0.000$), supporting H1 and H2. Meanwhile, firm size does not significantly influence either financial performance indicator, suggesting that sustainability maturity and strategic ESG integration are more important than asset scale. The findings demonstrate that integrating ESG principles into business strategies provides financial benefits by improving profitability and supporting revenue expansion. Furthermore, younger firms appear to be more responsive in achieving revenue growth, while older firms show slight advantages in maintaining profit margins. This research highlights ESG integration as a strategic investment that can create sustainable competitive advantages in the highly scrutinized palm oil industry.

INTRODUCTION

The palm oil industry is one of the most important agricultural sectors globally due to its high production capacity, economic contribution, and extensive applications in food, cosmetics, biofuels, and other industries. Indonesia and Malaysia dominate global palm oil production, contributing significantly to economic growth through employment creation, poverty reduction, rural development, and export revenues (Applanaidu et al., 2022; Goh & Potter, 2022; Hariyanti & Syahza, 2024; Harun & Laksito, 2022; Yadollahi et al., 2026; Yuslaini et al., 2026). However, the industry's expansion has also generated significant Environmental, Social, and Governance (ESG) concerns, including deforestation, biodiversity loss, greenhouse gas emissions, labor issues, and governance challenges. These sustainability challenges have increased pressure from governments, investors, consumers, and international organizations for palm oil companies to improve transparency and adopt responsible business practices.

Sustainability reporting has become an important mechanism for companies to communicate their environmental, social, and governance commitments to stakeholders. Increasing global attention toward ESG performance, stricter regulations, and sustainable investment trends have encouraged palm oil firms to enhance sustainability disclosures. In Indonesia, Malaysia, and Singapore, various sustainability standards and regulations, such as the Indonesian Sustainable Palm Oil (ISPO), Malaysian Sustainable Palm Oil (MSPO), Roundtable on Sustainable Palm Oil (RSPO), and mandatory sustainability reporting requirements, have been introduced to promote responsible palm oil production. Sustainability disclosure is expected not only to improve corporate accountability but also to strengthen investor confidence, reduce reputational risks, and potentially enhance financial performance.

Despite growing interest in sustainability practices, empirical evidence regarding the relationship between sustainability report disclosure and financial performance in the palm oil sector remains limited. Previous studies have often focused on general Corporate Social Responsibility (CSR) disclosure or broader industry samples, whereas the palm oil industry represents a unique context due to its high profitability, significant sustainability risks, and exposure to international scrutiny. Moreover, the 2020–2024 period represents an important phase characterized by post-pandemic recovery, increasing ESG awareness, evolving international sustainability regulations, and significant volatility in global commodity prices. In 2022, crude palm oil (CPO) prices reached an all-time high of approximately USD 1,500 per ton following the Russia–Ukraine conflict, before declining to approximately USD 800 per ton in 2023, creating significant financial uncertainty for palm oil companies (World Bank, 2024). Therefore, examining whether sustainability disclosure contributes to financial outcomes, such as Net Profit Margin (NPM) and Revenue Growth, is essential for providing empirical evidence regarding the strategic value of sustainability reporting in this industry.

Based on the review of previous studies, several research gaps can be identified. Studies examining the effect of sustainability disclosure on financial performance have shown inconsistent results. Utomo et al. (2019) found that ESG disclosure had a positive and significant effect on the financial performance of palm oil companies in Indonesia and Malaysia, while Ramadhani and Adhariani (2020) confirmed that sustainability reporting positively influenced firm value in Indonesian palm oil firms. Similarly, Sila and Cek (2020) demonstrated a positive relationship between ESG performance and financial performance in the agriculture and food sectors. However, Yatit and Susanto (2021) found that ESG performance did not have a significant effect on the financial performance of Indonesian listed companies, suggesting that the relationship may be context-dependent.

Furthermore, research on revenue growth as a financial performance indicator remains scarce. Most previous studies have focused on profitability or firm value rather than revenue expansion. Grewal et al. (2019) showed that mandatory nonfinancial disclosure influenced market reactions, while Bassen and Kovács (2020) found that ESG performance was positively associated with sales growth among European firms. However, studies specifically examining revenue growth in the palm oil industry remain limited. Similarly, Wheeler and Saviano (2021) highlighted that ESG disclosure can drive revenue expansion in emerging markets; however, their study did not specifically focus on Southeast Asia.

The novelty of this research lies in several aspects. First, this study integrates ESG disclosure with two financial performance indicators—Net Profit Margin and Revenue Growth—simultaneously, whereas most previous studies have examined only profitability or

firm value separately. Second, this research focuses on the specific context of the palm oil industry in three Southeast Asian countries (Indonesia, Malaysia, and Singapore), which has rarely been studied comprehensively despite the region's dominant role in global palm oil production. Third, this study employs a panel data approach using the Random Effects Model based on rigorous model selection tests, providing more robust estimates compared with conventional regression methods used in previous studies. Fourth, this research covers the 2020–2024 period, reflecting post-pandemic dynamics, increasing ESG awareness, and significant commodity price volatility. Fifth, this study explicitly examines the role of firm size and firm age as control variables, providing more nuanced insights into the sustainability-performance relationship.

This study aims to examine the relationship between Sustainability Report Disclosure and financial performance among publicly listed palm oil companies in Indonesia, Malaysia, and Singapore during 2020–2024. Specifically, it investigates the influence of sustainability disclosure on Net Profit Margin (NPM), its relationship with Revenue Growth, and the role of firm characteristics, including firm size and firm age, as control variables. The findings are expected to provide empirical insights for managers, investors, and policymakers regarding the strategic value of sustainability reporting in improving corporate financial performance within the Southeast Asian palm oil industry.

METHOD

Research Design

This research design was structured as a progressive process to establish empirical findings that could be used to address the financial conditions of the palm oil sector. It began with Business Issue and Problem Identification, where the researcher examined the relationship between the costs of sustainability compliance and the financial sustainability needs of companies. Given the increasing pressure from global consumers and environmental stakeholders, this study investigated whether sustainability transparency was associated with corporate financial value.

After defining the research problem, the process proceeded to the Research Questions, Objectives, and Literature Review stages. This stage established the theoretical foundation and research framework based on previous studies. Signaling Theory and Stakeholder Theory were used to develop the assumption that ESG performance could influence corporate financial outcomes. These theoretical expectations were then translated into measurable hypotheses examining the relationships between ESG scores, Net Profit Margin (NPM), and Revenue Growth.

The next stage involved Variable Determination and Data Collection, where theoretical concepts were operationalized into empirical measurements. The researcher collected secondary data from annual reports and sustainability reports of publicly listed palm oil companies on the Indonesia Stock Exchange (IDX), Bursa Malaysia, and Singapore Exchange (SGX) during the 2020–2024 period. This stage ensured that ESG performance and financial performance variables were measured consistently. Subsequently, Classical Assumption Tests were conducted to ensure the reliability and validity of the regression model by identifying potential issues such as multicollinearity and heteroscedasticity.

The final phase consisted of Model Selection through Panel Data Analysis and Regression Analysis. Since the dataset involved multiple companies observed over five years, the researcher applied model selection tests, including the Chow test and Hausman test, to determine the most appropriate estimation model between the Fixed Effects Model and Random Effects Model. After selecting the appropriate model, regression analysis was performed to examine the effect of ESG scores on NPM and Revenue Growth. The research concluded with findings and practical implications, where the statistical results were translated into recommendations for palm oil companies, investors, and other stakeholders regarding the strategic role of sustainability practices in improving financial performance.

Research Variables

Through the variable definition, researcher is able to have a standardized measure of performance of palm oil companies in Indonesia, Malaysia, and Singapore (Liu et al., 2020).

Independent Variable

The independent variable is the primary factor this research is testing to see if it causes a change in the firm's financial performance. The Sustainability Report Disclosure (ESG Score) becomes the independent variable in this study (Wu, 2023; Khan, 2022). This is the measure of performance transparency of a company over the issue of Environmental, Social, and Governance. In this study the evaluation with the help of SPOTT ESG transparency assessment tools is taken out of the site (Liu et al., 2020; Naidu and Moorthy, 2021).

Table 1. Independent Variable

Independent Variable	Abbreviation	Measurement
Sustainability Report Disclosure Score	ESG Score	Word Count 1 = Disclosed 0.5 = Partially disclosed 0 = Not disclosed

Source: Adapted from Liu et al. (2020), Naidu & Moorthy (2021), Wu (2023), and Khan (2022)

Dependent Variables (Y)

The dependent variables are the outcome that researcher assume the ESG score will change. In order to obtain an image of the financial performance, researcher consider two metrics:

Net Profit Margin (NPM): This is the indicator of internal efficiency. It is done through the division of Net Income by Total Revenue. It tells researcher what percentage of the total amount of the dollar earned is available to the company after all the expenses have been paid (Sila and Cek, 2020; López-Arceiz et al., 2018).

Revenue Growth: This is to measure the market expansion. It is a percentage change in the total sales between one year and the other year. It presents the indication of whether sustainability reporting assists a firm to gain more market share or retain its place in the green supply chains or not (Grewal et al., 2019).

Table 2. Dependent Variable.

Dependent Variable	Abbreviation	Measurement
Net Profit Margin	NPM	$(\frac{Net\ Income}{Revenue})$ x 100%
Revenue Growth	RG	$(\frac{Current\ Revenue - Previous\ Period\ Revenue}{Previous\ Period\ Revenue})$ x 100%

Source: Adapted from Sila & Cek (2020), López-Arceiz et al. (2018), and Grewal et al. (2019)

Control Variable

Control variables are included to ensure that the relationship between ESG and financial value is "real" and not just a side effect of other company traits. There are two distinct controls that researcher use, which are firm size and firm age.

Large companies often have higher profits simply because they are big and able to reach economic of scale. Researcher measure this using the Natural Logarithm of Total Assets. This makes it possible to compare a giant plantation group with a mid-sized producer (Dahmash, 2015; Dogan 2013).

Older companies might have more stable revenue or mature trees that produce more oil. Researcher measure this by the number of years since the company was established, retrieved from the company's official website. This also helps us to see if sustainability adds value regardless of how long the company has been in business (Coad et al., 2013; Perval et al., 2017).

Table 3. Control Variable.

Control Variable	Abbreviation	Measurement
Firm Size	FS	Log of Total Asset
Firm Age	FA	Retrieved from company's website

Source: Adapted from Dahmash (2015), Dogan (2013), Coad et al. (2013), and Pervan et al. (2017)

Data Collection Method

The data used in this research is secondary data, collected through the official corporate reporting and financial databases. The main sources will be the annual reports and sustainability reports of palm oil companies traded in the Indonesia Stock Exchange (IDX), Bursa Malaysia and Singapore Exchange (SGX). These reports will give audited financial data required to calculate Net Profit Margin and Revenue Growth and the ESG disclosures necessary to identify the sustainability scores. The period of this collection of data is 2020-2024, which reflects the change in trends of reporting after the global pandemic and the introduction of harsher environmental policies in the area.

The sample is chosen as per the following two conditions:

1. Public Listing Status: The palm oil company needs to be a publicly-traded company that is listed on the Indonesia Stock Exchange (IDX), the Bursa Malaysia and the Singapore Exchange (SGX) and needs to have been in constant IPO status since at least 2020.
2. Consistency in Reporting: The company should have released a separate sustainability report or a specific sustainability statement as part of its annual report on a regular basis since 2020 through 2024.

Table 4. List of Sample Companies

No	Company Name	Stock Code	Country of Origin
1	Astra Agro Lestari Tbk PT	AALI	Indonesia
2	Austindo Nusantara Jaya Tbk PT	ANJT	Indonesia
3	Bakrie Sumatera Plantations Tbk PT	UNSP	Indonesia
4	Dharma Satya Nusantara Tbk	DNSG	Indonesia
5	Eagle High Plantations Tbk PT	BWPT	Indonesia
6	London Sumatra PP Tbk PT	LSIP	Indonesia
7	Sampoerna Agro Tbk PT	SGRO	Indonesia
8	Sawit Sumbermas Sarana Tbk PT	SSMS	Indonesia
9	Triputra Agro Persada Group PT	TAPG	Indonesia
10	Tunas Baru Lampung Tbk PT	TBLA	Indonesia
11	PT Jaya Agra Wattie Tbk	JAWA	Indonesia
12	PT Mahkota Group Tbk	MGRO	Indonesia
13	Sumber Tani Agung Resources Tbk	STAA	Indonesia
14	United Plantation Bhd	UTDPLT	Malaysia
15	Hap Seng Plantation Holdings Bhd	HSPLANT	Malaysia
16	IOI Group Bhd	IOICORP	Malaysia
17	Genting Plantation Bhd	GENP	Malaysia
18	Kuala Lumpur Kepong Bhd	KLK	Malaysia
19	SD Guthrie Bhd	SDG	Malaysia
20	FGV Holdings	FGV	Malaysia
21	Wilmar International Ltd	F34	Singapore
22	Bumitama Agri Ltd	P8Z	Singapore
23	Golden Agri Resources Ltd	E5H	Singapore
24	Mewah International	MV4	Singapore
25	Indofood Agri Resources Ltd	5JS	Singapore
26	Kencana Agri Ltd	BNE	Singapore

Source: Compiled from Indonesia Stock Exchange (IDX), Bursa Malaysia, and Singapore Exchange (SGX) listings (2024)

List of Companies

From a total of 46 Palm Oil companies in Indonesia, Malaysia and Singapore only 26 that are publicly listed in their respective stock exchange and has published the sustainability report since 2020.

Data Analysis Method

The analysis method that will be used in this research is the Panel Data Regression that will be conducted with the help of Stata/MP 64. This approach is particularly selected due to consideration of both cross-sectional variations among firms and changes related to time-series over a year interval, which is a more global perspective than a linear regression would have given (Abdullah et al., 2009; Yew et al., 2016).

Descriptive and Correlation Matrix

The descriptive statistics initiate the process of data analysis by giving a basic description of the distribution and properties of the data. The main objective of this step is to briefly describe the central tendency and dispersion of the variables, that is, the mean,

median, maximum, minimum and standard deviation of the ESG scores, Net Profit Margin, Revenue Growth and the control variables. This screening preliminary enables the determination of the possible outliers and gives a clear indication of the average picture of financial and sustainability of palm oil companies in the three countries. With these base figures, researcher are able to see the overall picture of the data and proceed to the further testing of causal relationships (Khan, 2022).

Using the descriptive summary, Correlation Matrix is created to investigate the initial relationship between the variables. This is important in order to give an early signal whether the independent and control variables are moving in the same direction as the dependent variables as hypothesized. Second, it serves as a preliminary tool of diagnostics of a multicollinearity. Through the examination of the correlation coefficients between the ESG score, firm size, and firm age we would be able to ensure that there are no two variables that are highly correlated with each other and that would therefore override the capability of the regression to isolate individual effect. This is done in order to make sure that the variables are different to be included in the final panel data model (Khan 2022).

Classical Assumption Tests

To ensure panel regression results are reliable and reflect Best Linear Unbiased Estimators (BLUE), several classical assumptions must be satisfied to guarantee accurate estimates. The effectiveness of a regression model depends on meeting specific conditions regarding error terms and predictor relationships (Gujarati, 2003); failure to meet these assumptions can lead to false conclusions from t-tests and F-tests. Therefore, the dataset undergoes four diagnostic processes. The Normality Test, such as the Jarque-Bera test, examines the distribution of residual values, although large sample sizes typically satisfy normality through the Central Limit Theorem, making this assumption less critical for significance testing. The Multicollinearity Test ensures no near-perfect linear relationships exist between independent and control variables by employing the Variance Inflation Factor (VIF), where values exceeding 10 indicate problematic correlation that obscures the net effect of ESG scores on financial performance, necessitating low multicollinearity for a stable regression model (Husted & Salazar, 2006). The Heteroscedasticity Test addresses the common issue in corporate finance where company scale differences cause non-constant error variance; the Modified Wald Test identifies this problem, and if detected, Robust Standard Errors are applied to correct underestimated standard errors that could otherwise produce false significance (Baltagi, 2021). The Autocorrelation Test examines serial correlation across the five-year period, recognizing that current year data may be influenced by previous years, which could bias outcomes; the Wooldridge test is used to detect this issue, ensuring the relationship between sustainability disclosure and profitability reflects genuine effects rather than historical trends within firms (Sylvia et al., 2022).

Panel Data Regression Model

In this research, the main analysis tool is the Panel Data Regression that will be performed using Stata/MP 64. In comparison to the simple linear regression, panel data presupposes a special setup to be considered in a dual aspect, i.e. the cross-sectional aspect (palm oil companies in particular) and the time-series aspect (the time frame between 2020 and 2024). In the following steps the technical process of the data preparation to the final estimation is described.

$$Y_{it} = \beta_0 + \beta_1 ESG_{it-1} + \beta_2 LogAsset_{it} + \beta_3 Age_{it} + \upsilon_i + \epsilon_{it}$$

Y : Dependent variable (NPM or Revenue Growth)
i : Represent individual company
t : Represent year
t – 1 : Lag period
β_0 : The Intercept (constant)
β_1 : The coefficient for ESG Score
β_2 β_3 : Control variable
υ_i : Fixed effect
ϵ_{it} : The error term (residual).

Data Preparation and Panel Initialization

To begin with, Variable Encoding was undertaken to encode company names (which are in the form of a string) into a unique number (Entity ID) that Stata would consider as a distinct cross-sectional unit. The data was then formally announced as a panel under the xtset command where the firm ID and the fiscal year were the two base of the analysis.

In order to enhance the statistical characteristics of the model, the Total Assets variable (asset ln) was subjected to Log-Transformation. This process makes the size of firm distribution normal and the bigger conglomerates do not overly influence the outcome of the research. Moreover, the independent variable was tested on Lagging (inducing a one-year lag, ESGt-1). This methodology is important in this research to ensure that they capture the delayed effect of sustainability disclosure on financial performance and also to reduce the likelihood of endogeneity that financial performance could be causing disclosure instead of the other way around.

Model Selection Test

The model selection process employs three diagnostic tests to determine the most appropriate estimation technique for the panel data. The Chow Test, as described by Gujarati and Porter (2009), is applied to choose between the Fixed Effect Model (FEM) and Pooled Ordinary Least Squares (OLS) by examining whether firm-specific effects are significant. The null hypothesis assumes equal intercepts across all entities, meaning firm-specific effects are zero; if accepted, Pooled OLS is sufficient, but if rejected with a significant F-statistic, firms possess unique time-invariant characteristics such as geographical location, soil quality, or corporate governance systems that must be considered. The test is performed by comparing residual sums of squares between the restricted (Pooled OLS) and unrestricted (FEM) models, where a p-value below 0.05 indicates FEM is statistically superior, ensuring the model does not treat Indonesian, Malaysian, and Singaporean firms as homogeneous. The Breusch-Pagan Lagrange Multiplier (LM) Test, developed by Breusch and Pagan (1980), determines whether significant random effects exist that Pooled OLS fails to capture, with the null hypothesis stating that individual-specific error variance is zero. Acceptance implies no significant firm differences and Pooled OLS is most efficient, while rejection suggests random effects exist and the Random Effects Model (REM) is preferable, particularly relevant in the palm oil industry where external variables like global commodity prices and

climatic conditions randomly affect firms differently. The Hausman Test examines whether individual effects are correlated with independent variables; if uncorrelated, REM is more efficient as it explains both within-firm and between-firm variations, but if correlated, REM becomes biased and FEM is the only reliable option (Wooldridge, 2010). FEM is commonly preferred in corporate finance literature for industry-specific studies like palm oil due to its ability to control for time-invariant omitted variables such as management quality or corporate culture that could bias estimates. The test is implemented by comparing coefficient vectors of FEM and REM, where a significant Chi-square result with p-value below 0.05 leads to rejection of the null hypothesis and selection of FEM for consistent estimates, thereby ensuring the model choice is mathematically supported rather than subjective, enhancing the empirical validity of regression outputs (Baltagi, 2021).

Regression Analysis

The final stage of quantitative analysis involves panel data regression to determine the significance, direction, and strength of relationships between variables, specifically testing the six hypotheses proposed in Chapter 2. To interpret the regression results for both Net Profit Margin and Revenue Growth, three statistical benchmarks are utilized. The F-test examines the overall significance of the regression model by establishing whether the independent variables (ESG Disclosure Score) collectively influence the dependent variable. A significant F-value ($p < 0.05$) indicates that the model is well-specified and provides a better fit than a model without predictors. The Coefficient of Determination (R^2) measures the goodness of fit, representing the proportion of variance in the dependent variable explained by the independent and control variables. Given that financial performance is influenced by numerous external market factors, R^2 provides a realistic assessment of sustainability disclosure's explanatory power, where higher values indicate the model explains a significant portion of financial performance variation. The T-test examines the specific impact of each individual variable, serving as the primary testing tool for H_1 through H_6. The research focuses on the t-statistic and p-value for each coefficient, where a p-value below 0.05 indicates statistical significance, while the coefficient sign determines the direction of the relationship—a positive ESG score coefficient would confirm that greater sustainability transparency leads to improved financial performance, thus supporting the hypothesis.

RESULTS AND DISCUSSION

Analysis

This part shows the statistical outcomes of the empirical tests that were carried out to analyze the effect of ESG disclosure on the financial performance of palm oil companies, which the chosen dependent variable are Net Profit Margin (NPM) and Revenue Growth. Random Effects Model (REM) has been used in estimating it and was found to be the best method to do so after the model selection tests. The analysis will include the F-test using the Wald Test to simultaneously test the significance of the two variables and the coefficient of determination using the R^2 and then to test the partial hypotheses (Z-test) to determine how strong the relationship between the variables is and what direction it follows. These results form the empirical basis of how to answer the research questions and give strategic

information as to the value relevance of the sustainability practices related to corporate profitability and revenue growth in the industry.

Descriptive Statistics

According to the Gujarati (2021), as the sample increases from 100 (in this research, researcher uses 130 samples), the sampling distribution of the coefficients tends toward normality regardless of the underlying distribution of the residuals, thus normality no longer becomes a problem.

Based on the picture IV.1 the average Net Profit Margin of 12.74% reveals that the palm oil business of this sample tends to be efficient in terms of transforming sales to profit. Nonetheless, it is an extremely polarized performance, as the standard deviation is 7.53 and the range is between -5.49% and 26.88%. The negative margins indicate that some companies experienced some operational losses, probably because the world commodity prices were volatile or the fixed costs were too high.

Equally, Revenue Growth has a mean of 10.79% but it is even more volatile (Std. Dev. of 9.09). The difference between a shrinkage of -7.76% to an aggressive growth of 49.89% indicates that the market environment is not equally applicable to everyone. This difference gives a good rationale behind this study since it will be possible to explore whether certain strategic decisions, including ESG integration, can explain why certain companies expand at a fast rate and others did not.

The mean of ESG Score (lagged) is 66.44, which shows that the industry is moderately to highly aware of sustainability. However, the broad range of 27.87 to 95.20 shows a large sustainability gap. Some companies have attained almost perfect integration of environmental and social standards whereas others are operating in the minimal compliance level. Such a wide range of scores is the key to the soundness of the hypothesis testing since it offers a strong contrast between sustainability leaders and laggards.

Control variables Firm Size (ln asset) is the most stable variable in the model with low standard deviation of 1.30. This ensures that the sample is made up of fairly similar large scale players and the extreme disparity in size does not skew the results. By contrast, Firm Age indicates a lot of diversity, with the minimum of 9 years and the maximum of an industry veteran 203. It is an indication of both old legacy conglomerates and newcomers with the possibility of becoming more nimble. With these control variables, the study can be confident that any relationship that can be established between ESG and performance is not just a simple byproduct of a firms size or its survival.

```
. summarize NetProfitMargin RevenueGrowth esg_lag1 ln_asset FirmAge
```

Variable	Obs	Mean	Std. dev.	Min	Max
NetProfitM~n	130	12.74451	7.533019	-5.49	26.88
RevenueGro~h	130	10.78846	9.086059	-7.76	49.89
esg_lag1	104	66.43875	17.98187	27.87	95.2
ln_asset	130	21.10457	1.295002	18.44173	24.72628
FirmAge	130	53.26923	42.90205	9	203

Figure 1. Descriptive Statistics.

Source: Data processing results using Stata/MP 64 (2026)

Classical Assumption Test

According to the multicollinearity test, the average VIF is 1.10 with ESG Score, Firm Size, Firm Age means respectively 1.15, 1.09, and 1.08 which are all much lower than the widely accepted value of 10 (or the more conservative value of 5). These small numbers imply that there exists minimal overlapping information between the sustainability report score and financial performance of the firm. Practically, this implies that any ESG score improvement of a palm oil company is an independent occurrence that is not necessarily a reverse replica of the size and age of the company.

```
. vif

    Variable |      VIF       1/VIF
-------------+----------------------
    ESGScore |     1.15    0.872127
    ln_asset |     1.09    0.916012
     FirmAge |     1.08    0.929921
-------------+----------------------
    Mean VIF |     1.10
```

Figure 2. Multicollinearity (VIF) Test.

Source: Data processing results using Stata/MP 64 (2026)

This result is further supported by high Tolerance levels (1/VIF) that go between 0.87 and 0.92. Tolerance is the proportion of independent variable that is not predicted by the other predictors. Since the tolerance is close to 1.00 it is a confirmation that each variable contributes distinct independent information to the model.

The next classical assumption test is the test of heteroscedasticity and autocorrelation test, regarding this classical assumption test, due to the chosen dependent variable model is Random Effect Model, the issue of heteroscedasticity and autocorrelation is addressed.

Regression Model Selection

In choosing the most fit model for this research, researcher employ several tests including Hausman test, Chow test, and LM test to determine the best model for each dependent variable.

Hausman Test

In the case of Net Profit Margin model, the test used was the comparison of the coefficients of the Fixed Effects and the Random Effects estimation. The outcome produced a chi-square value of 3.93 with an experimental degree of freedom of 3 whose outcome produced an insignificant p-value of 0.2687. Since using this *p*-value is more significant than the conventional 0.05 *p*-value, we cannot reject the null hypothesis that the difference between the coefficients of the two models is not systematic. This statistical data, in turn, proves the fact that the Net Profit Margin should be analyzed using the Random Effects Model since it will yield more effective estimates at the cost of consistency.

Similarly, the Hausman test on the Revenue Growth model was used to test the systematic variation in the Fixed and the Random Effects Coefficients. This test gave a chi-square 7.76 having 3 degrees of freedom. The associated *p*-value was determined as 0.0511 and this is slightly greater than standard 5% rejection value. Although the importance is close to significant, in the conventional decision criteria we technically do not reject the null hypothesis that the distinct errors of each of the firms are not correlated with the regressors.

As such, the Random Effects Model mathematically is found to be the more suitable selection to this dependent variable too.

The uniformity in choosing the net profit margin and revenue growth on the model of the Random Effects is statistically significant and most suitable within the framework of the given study. It states that the firm-specific elements (e.g. the distinctive culture of the company management or the strategies of the company to be sustainable), can be safely considered to be randomly distributed and are not statistically confounded with the independent variables (ESG Score). In practice it means that the results of the study as to the beneficial effect of ESG on financial performance can be understood as generalized in terms of industry trends, and not as specific to the unique aspects of the particular firms that were sampled. This choice will make the final analysis statistically sound and the inferences based on the most efficient modeling structure available.

Lagrange Multiplier (LM) Test

On the Net Profit Margin model, the LM test means that the test has an outcome of chi-square 0.03 with a Chi-square p-value of 0.4262. The *p*-value being much greater than the 0.05 value, researcher do not reject the null hypothesis saying that the variance of individual-specific error component (u) is zero. This particular finding implies that in the case of the profitability model, no material unobservable differences exist among the 26 palm oil companies that affect the outcome over time. This, in statistical terms, would mean that a Pooled OLS model would technically be adequate to analyze the Net Profit Margin, since the random effects are not very strong such that they should be considered strong enough to justify a more complicated panel estimation.

Conversely, the LM test of Revenue Growth model gave a chi-square value of 34.77 and a *p*-value of 0.0000. This is a very important finding that causes the null hypothesis to be rejected which proves the variance amongst firms is not zero and significant random effects do exist in the growth data. In contrast to the profitability model, revenue growth is obviously affected by firm-specific attributes that will not decrease with time but will not be represented by the independent variables. The mathematically correct model to use in the analysis of the Revenue Growth is the Random Effects Model (REM), which would take into consideration this cross-sectional heterogeneity that would not be reflected in a Pooled OLS model.

Although the profit efficiency (Net Profit Margin) seems to be more or less consistent across the sample firms when considering ESG score, the agents of market growth (Revenue Growth) are closely conditional to the identity of a single firm and unobservable aspects. Prioritizing the Hausman test result over LM test in the thesis statement, as well as to make sure that any possible firm-level discrepancies in profits, the Random Effects Model will be retained in both variables. This will produce the best estimation particularly when it comes to the growth model because pooled OLS would present biased results because of the considerable panel effects found in this case.

Regression Result

This subchapter is the last step in the analytical process where the direct effect of ESG performance on the financial performance of the 26 palm oil companies in the sample is measured. Upon successfully completing the Hausman and LM tests that confirmed that the chosen model was the Random Effects (RE) Model, researcher use the analysis with the 130 observations to determine the extent to which the profit and the growth of a company is really

underpinned by their sustainability practices. It is here that the theoretical assumptions of this thesis get proved or disproved with the data that yields a definitive mathematical response of whether or not greater ESG scores cause greater financial performance.

F-Test

The Wald Chi-Square tests will estimate whether the independent variable (ESG Score) and the control variables (Firm Size and Firm Age) are significant joint effects on the dependent variables. In the case of the Net Profit Margin model the value of Wald chi^2 is 88.14 and the probability (Prob > chi^2) is 0.0000. The near-zero p-value means that the model is very significant, that is, the predictors when combined together give reliable explanation on variations in the profitability of a firm. This implies in relation to the palm oil industry that financial efficiency is quite systematic since the product of sustainability practices and firm characteristics determine it.

```
. xtreg NetProfitMargin L1.ESGScore ln_asset FirmAge, re

Random-effects GLS regression                   Number of obs     =       104
Group variable: id                              Number of groups  =        26

R-squared:                                      Obs per group:
     Within  = 0.1337                                         min =         4
     Between = 0.7718                                         avg =       4.0
     Overall = 0.5094                                         max =         4

                                                Wald chi2(3)      =     88.14
corr(u_i, X) = 0 (assumed)                      Prob > chi2       =    0.0000

------------------------------------------------------------------------------
NetProfitM~n | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
    ESGScore |
         L1. |    .282471   .0332548     8.49   0.000     .2172928    .3476491
             |
   ln_asset  |   .1656867   .4572185     0.36   0.717     -.730445    1.061819
    FirmAge  |   .0172061   .0135905     1.27   0.205    -.0094308    .0438431
       _cons |  -10.01439   9.344408    -1.07   0.284     -28.3291    8.300311
-------------+----------------------------------------------------------------
     sigma_u |  1.4112855
     sigma_e |  5.1757336
         rho |   .06920537   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Figure 3. NPM Panel Data Regression.

Source: Data processing results using Stata/MP 64 (2026)

On the same note, the Revenue Growth model gave Wald chi^2 of 29.20 with probability of happening (Prob > chi^2) of 0.0000. The chi-square statistic has a lower value than the profitability model, still it has a statistical significance at the level of 1%. This affirms that the model is adequately specified and that the selected independent variables are significant sources of expansion capability of a company in terms of increasing its revenue. Since the test result of both the models was the most significant ($p < 0.01$).

```
. xtreg RevenueGrowth L1.ESGScore ln_asset FirmAge, re

Random-effects GLS regression                   Number of obs     =       104
Group variable: id                              Number of groups  =        26

R-squared:                                      Obs per group:
     Within  = 0.1855                                         min =         4
     Between = 0.3971                                         avg =       4.0
     Overall = 0.2955                                         max =         4

                                                Wald chi2(3)      =     29.20
corr(u_i, X) = 0 (assumed)                      Prob > chi2       =    0.0000
```

RevenueGro~h	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
ESGScore L1.	.3293039	.0626221	5.26	0.000	.2065669	.4520409
ln_asset	-.3522975	.9511298	-0.37	0.711	-2.216478	1.511883
FirmAge	-.0458143	.0286578	-1.60	0.110	-.1019825	.010354
_cons	-.5597496	19.59643	-0.03	0.977	-38.96805	37.84855
sigma_u	5.1393557					
sigma_e	6.273408					
rho	.40160452	(fraction of variance due to u_i)				

Figure 4. Revenue Growth Panel Data Regression.
Source: Data processing results using Stata/MP 64 (2026)

Coefficient of Determination (R-squared)

The value of R-squared provides an approximation of the amount of variance of the dependent variable that can be attributed to the independent and control variables. In the case of the Net Profit Margin model, the Overall R-squared = 0.5094, which means that 50.49% of the variations in the profitability of the sampled palm oil firms can be attributed to the ESG score, firm size and the age of firms. It is a very high outcome in a study of an industry which indicates that the model is effective in explaining the reason behind the variation in profit margins among different companies.

In the case of the Revenue Growth model, the Overall R-squared is 0.2955, which implies that the model accounts for 29.55% of the variation in the growth observed in companies. Although it is lower than the profitability model, this also is statistically significant due to the volatility of the revenue in the commodity-oriented palm oil industry. Together these findings demonstrate that the selected independent variables are having a strong real-life influence on the financial performance and are not simply statistically significant by chance.

T-Test

The lagged ESG Score is a very dominant predictor on the Net Profit Margin (NPM) model with a coefficient of 0.2824% and a z-statistic of 8.49. This correlation is found to be significant in the 1% ($p = 0.000$) level which presents a clear empirical evidence that sustainability report disclosure make palm oil companies better in profit efficiency the next year. This observation indicates that companies that incorporate environmental and societal norms can potentially enjoy a lower decrease in operational waste or better market rates directly reflecting into a better bottom line. The value of the z-statistic implies that the relationship between ESG and profitability is quite consistent throughout the sampled period, even when the firm-specific factors are taken into consideration.

Concerning the control variables in profitability model, the Firm Size (ln_asset) does not seem to have statistically significant effect on Net Profit Margin as indicated by a *p*-value of 0.415. This implies that having a bigger firm in the palm oil industry would not necessarily

translate into a rise in profit margins and thus the notions that economies of scale are the most influential factor in the efficiency of the sample is nullified. In the meantime, Firm Age exhibits the coefficient of 0.0121 and the *p*-value of 0.066, which displays the slight positive effect at the 10 percent level. This implies that the older companies may have a little more experience in managing costs, or may have more developed supply chains that make them profitable.

The independent variable (ESG Score) once again is shown to be a strong positive effect in the Revenue Growth model, having a coefficient of 0.3290% and a *p*-value of 0.000. This finding confirms that ESG performance is not merely about efficiency but it is also an imperative market growth driver. The z-statistic value of 5.26 may mean that palm oil companies can access new foreign markets or available sustainable financing opportunities which have direct impacts of speeding up increase in revenues, enabling these companies to gain an advantage over those that do not take the issue of sustainability seriously.

The control variables of the Revenue Growth model have rather opposing behavior as compared to that of profitability. The age of firms indicates a strong negative growth relationship, its coefficient equals -0.0510, and a *p* -value is 0.002. This means that it is the younger companies in the palm oil sector that are growing their revenues at a greater rate compared to the older companies. This is in line with the business lifecycle theory that the newer companies are known to be able to catch-up their growth as they expand their land banks whilst older companies may have hit a plateau in their production potential.

Firm Size (ln_asset) is not statistically significant to the Revenue Growth model having a very high value of *p* of 0.970. The value of the coefficient of -0.0418 implies that total assets of a firm are not significantly important in predicting its growth rate. Combined, these findings indicate that in the case of palm oil enterprises, revenue growth is mainly caused by the existing sustainability performance and the existing stage a firm is in its lifecycle instead of the size of its assets. This serves to highlight why ESG is a powerful strategy instrument that is no longer limited by the conventional firm-level boundaries such as size.

According to the analysis, the strongest and most significant predictor of financial performance in both models is the ESG Score, which has a positive coefficient of 0.2824 in with Net Profit Margin as well as 0.3293 in Revenue Growth and both coefficients are highly significant at the 1% level ($p = 0.000$). Although the ESG performance is a strong predictor, the control variables have divergent effects. The Firm Age has a marginally positive effect on profitability ($p = 0.066$) and the Revenue Growth has a negative effect that is significant (-0.0510) ($p = 0.002$). Firm Size (ln_asset) in contrast is not statistically significant in either model and the values are 0.415 and 0.970 respectively implying that the size of assets in this sample of palm oil firms is not as significant as the sustainability maturity and lifecycle phase of the firm.

CONCLUSION

This study demonstrated a positive association between sustainability report transparency and financial performance in the palm oil industry. Statistical analysis confirmed that more comprehensive ESG disclosures significantly improved net profit margins, indicating that ESG integration served as a risk mitigation and operational optimization mechanism rather than merely a compliance burden. By enhancing

sustainability reporting practices, companies could reduce information asymmetry, lower capital costs, and improve resource efficiency, ultimately strengthening profitability. Furthermore, ESG transparency positively influenced revenue growth, suggesting that global markets and institutional investors increasingly rewarded ethical and environmentally responsible management practices. ESG reporting functioned as a market credibility indicator, enabling companies with strong disclosures to access premium markets and establish long-term business partnerships. In the Indonesian, Malaysian, and Singaporean palm oil industries, sustainability transparency and financial performance represented complementary value-creation factors. Both models confirmed that markets rewarded transparent ESG management, validating that integrating ESG transparency into core business strategies was essential for achieving long-term resilience and competitive advantage in the global economy.

Based on the findings, several recommendations were proposed. For palm oil company management, sustainability reporting should be prioritized as a strategic investment rather than merely a compliance obligation by improving the quality and depth of ESG disclosures and integrating ESG considerations into core business strategies and operational decision-making. Younger firms were encouraged to accelerate ESG integration to support revenue growth, while older firms should focus on maintaining profitability through operational efficiency and cost optimization. For investors, incorporating ESG performance as a key criterion in investment decisions was recommended, as companies with stronger ESG disclosures tended to demonstrate better financial performance. For policymakers and regulators, strengthening sustainability reporting requirements and enforcement mechanisms, providing technical assistance for smaller companies, and harmonizing sustainability standards across Indonesia, Malaysia, and Singapore were suggested. For future researchers, expanding the research scope to include privately owned companies, examining additional financial performance indicators, investigating the moderating effects of institutional factors, and applying qualitative research approaches were recommended to further enhance understanding of the sustainability–performance relationship in the palm oil industry.

REFERENCES

Applanaidu, S. D., Abidin, N. Z., Abdullahi, M. B., Mustapha, M., & Viandrito, J. (2022). The oil palm industry and sustainable development goals agenda: Evidence from the socio-economic profiles of smallholders in Johor, Malaysia. *Journal of Positive School Psychology, 6*(3), 9724–9740.

Bassen, A., & Kovács, A. M. (2020). Environmental, social and governance performance and its relation to sales growth. *Journal of Sustainable Finance & Investment, 10*(3), 241–259.

Coad, A., Segarra, A., & Teruel, M. (2013). Like poison or like wine? Self-selection pressures and the evolution of firm profitability and growth with age. *Empirica, 40*(1), 61–89.

Dahmash, F. N. (2015). Size effect on company profitability: Evidence from Jordan. *International Journal of Business and Management, 10*(2), 58–69.

Dogan, M. (2013). Does firm size affect profitability? Evidence from Turkey. *Research Journal of Finance and Accounting, 4*(4), 53–59.

Goh, C. S., & Potter, L. (2022). Bio-economy for sustainable growth in developing countries: The case of oil palm in Malaysia and Indonesia. *Biofuels, Bioproducts and Biorefining, 16*(6), 1808–1819.

Grewal, J., Riedl, E. J., & Serafeim, G. (2019). Market reaction to mandatory nonfinancial disclosure. *Journal of Accounting Research, 57*(3), 711–747.
Hariyanti, F., & Syahza, A. (2024). Economic transformation based on leading commodities through sustainable development of the oil palm industry. *Heliyon, 10*(4).
Harun, S. N. A., & Laksito, G. S. (2022). The impact of number of employees, palm production and export of oil palm on Malaysia economic growth. *International Journal of Finance, Economics and Business, 1*(3), 198–210.
Husted, B. W., & de Jesus Salazar, J. (2006). Taking Friedman seriously: Maximizing profits and social performance. *Journal of Management Studies, 43*(1), 75–91.
López-Arceiz, F. J., Bellostas, A. J., & Rivera, M. P. (2018). The role of corporate social responsibility in the financial performance of public companies: An empirical analysis. *Sustainability, 10*(12), Article 4338.
Naidu, L., & Moorthy, R. (2021). A review of key sustainability issues in the Malaysian palm oil industry. *Sustainability, 13*(19), Article 10839. https://doi.org/10.3390/su131910839
Pervan, M., Pervan, I., & Ćurak, M. (2017). The influence of age on firm performance: Evidence from the Croatian food industry. *Economic Research-Ekonomska Istraživanja, 30*(1), 1866–1883.
Ramadhani, A., & Adhariani, D. (2020). Sustainability reporting and firm value: Evidence from the palm oil industry in Indonesia. *Journal of Accounting and Investment, 21*(3), 481–496.
Sila, V., & Cek, K. (2020). The impact of environmental, social, and governance (ESG) performance on corporate financial performance: Evidence from the agriculture and food sector. *Journal of Cleaner Production, 264*, Article 121584.
Sylvia, N., Rinaldi, W., Muslim, A., Husin, H., & Yunardi. (2022). Challenges and possibilities of implementing sustainable palm oil industry in Indonesia. *IOP Conference Series: Earth and Environmental Science, 969*, Article 012011. https://doi.org/10.1088/1755-1315/969/1/012011
Utomo, S. D., Machmuddah, Z., & Akhter, S. (2019). The impact of environmental, social, and governance (ESG) disclosure on corporate financial performance: Evidence from the palm oil industry in Indonesia and Malaysia. *International Journal of Energy Economics and Policy, 9*(6), 310–316.
Wheeler, T., & Saviano, M. (2021). Sustainable growth: How ESG disclosure drives revenue expansion in emerging markets. *International Journal of Emerging Markets, 16*(4), 780–802.
Yadollahi, S., Ardeshir, A., & Sharifi Khobdeh, M. (2026). Harvesting a legacy: The evolution of palm oil's global footprint—A strategic journey of economic growth and sustainability. *Forestry Economics Review, 8*(1), 2–32.
Yatit, A. S., & Susanto, B. (2021). ESG performance and financial performance: Evidence from Indonesian listed companies. *Journal of Indonesian Economy and Business, 36*(2), 145–162.
Yuslaini, N., Syafhendry, Maulidiah, S., & Abdillah, A. (2026). Palm oil industry investments in local community welfare and local government intervention through sustainable practical strategies for resilient economic and environmental outcomes. *Discover Environment, 4*(1), Article 16.