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AUTHORS	Ferikawita M. Sembiring  Frido S. Simatupang 
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Ferikawita M. Sembiring, Dr., Associate Professor, Faculty of Economics and Business, Jenderal Achmad Yani University, Indonesia. (Corresponding author)

Frido S. Simatupang, Assistant Professor, Faculty of Economics and Business, Jenderal Achmad Yani University, Indonesia.



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Ferikawita M. Sembiring (Indonesia), Frido S. Simatupang (Indonesia)

MARKET CONDITIONS, FIRM SIZE, AND SUSTAINABILITY: AN EXPLORATORY STUDY OF ASSET RETURNS IN INDONESIA

Abstract

This study examines the associations of market conditions, firm size, and sustainability performance with asset returns in the Indonesian capital market. As investment activity has expanded in the post-COVID-19 period, identifying the factors associated with asset returns has become increasingly important for investors and corporate decision-makers. Using the Capital Asset Pricing Model (CAPM) as the theoretical foundation, this study incorporates firm-specific financial and sustainability characteristics into an integrated empirical framework to examine their associations with asset returns.

Using a balanced panel dataset of 108 firm-year observations, the study employs a panel regression model. Market conditions are represented by the market excess return, firm size by the natural logarithm of total assets, and sustainability performance by the LSEG ESG Score (formerly Refinitiv ESG Score).

The findings indicate that market excess return and sustainability performance are positively associated with asset returns, while firm size is not statistically significant. Additional analysis shows that when market excess return is excluded from the model, firm size remains statistically insignificant, whereas sustainability performance remains positively and statistically significantly associated with asset returns. Furthermore, the model's explanatory power declines substantially when market excess return is excluded, indicating that market excess return provides considerable incremental explanatory information beyond firm-specific financial and sustainability characteristics. Overall, the findings suggest that market conditions are an important factor associated with variations in asset returns, while sustainability performance remains an important firm-specific characteristic associated with asset returns even when market excess return is excluded from the model.

Keywords

asset return, CAPM, firm size, market excess return, sustainability performance

JEL Classification

G12, L25, M14, G32

INTRODUCTION

The Indonesia Stock Exchange (IDX) plays a pivotal role in the national economy by facilitating corporate financing and investment, particularly in the post-COVID-19 period. Investors allocate funds to financial assets, particularly corporate stocks, expecting returns commensurate with the risks they bear. At the same time, listed companies seek to generate profits through their business operations by utilizing capital invested by shareholders. This interdependent relationship contributes to capital market development and economic growth.

Asset returns are closely associated with changes in stock prices, which reflect investors' valuation of firms under changing market conditions. Stock prices and returns are influenced by factors originating from both the external market environment and firm-specific characteristics. These factors shape investors' expectations and decisions, highlighting the importance of understanding the relative contribution of market-wide and firm-specific information in explaining variations in asset returns.

Market conditions represent an important external dimension that may influence asset returns through changes in overall stock market performance and investor expectations. The Capital Asset Pricing Model (CAPM) provides an established theoretical foundation for understanding the relationship between market-wide conditions, systematic exposure, and expected asset returns. In empirical applications, market excess return provides information about the market component of returns and can represent prevailing market conditions. However, evolving market dynamics and investor behavior raise the question of whether market conditions continue to provide substantial explanatory information for asset returns when considered together with firm-specific characteristics.

Firm size has long received considerable attention in the asset-pricing and investment literature and may reflect differences in resources, operating scale, information availability, and investors' perceptions of risk and growth opportunities. Meanwhile, sustainability performance has increasingly emerged as another relevant consideration in investment decisions. It reflects firm-specific non-financial characteristics associated with environmental, social, and governance practices and may provide investors with information beyond conventional financial indicators. Examining these factors jointly therefore provides an opportunity to assess the relative explanatory contribution of market-wide and firm-specific characteristics to asset returns.

Previous studies have frequently examined market-related factors, firm size, and sustainability-related characteristics separately or within different empirical settings. Consequently, relatively limited evidence is available regarding their associations with asset returns when considered simultaneously, particularly in emerging capital markets such as Indonesia. Moreover, the increasing relevance of sustainability raises the question of whether sustainability performance provides explanatory information beyond market-wide conditions and conventional firm-specific characteristics.

Against this background, this study examines the associations of market conditions, firm size, and sustainability performance with asset returns in the Indonesian capital market using an exploratory panel-data framework. The CAPM provides the theoretical foundation, while market conditions are represented by market excess return, firm size by the natural logarithm of total assets, and sustainability performance by the LSEG ESG Score (formerly Refinitiv ESG Score). In addition to the full specification, an alternative model excluding market excess return is examined to assess whether firm-specific characteristics, particularly sustainability performance, continue to provide explanatory information in the absence of the market-level variable. This approach provides a cautious assessment of the relative explanatory contribution of market-wide and firm-specific characteristics without treating the empirical specification as a direct test of the CAPM.

1. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Asset returns are a primary consideration for investors in evaluating investment opportunities, making the identification of factors associated with returns important for capital allocation decisions. The Capital Asset Pricing Model (CAPM), introduced by Sharpe (1964), provides an established theoretical foundation for understanding the relationship between systematic market exposure and expected asset returns. Under the CAPM,

systematic risk is conventionally captured by beta and represents the component of risk that cannot be eliminated through diversification. However, this study does not estimate individual firm beta or interpret the coefficient on market excess return as beta. Instead, market excess return is employed as an empirical representation of market-wide return conditions and examined as one source of explanatory information for variations in asset returns.

Market conditions may influence asset returns through changes in overall stock market performance, investor expectations, risk perceptions,

and asset valuations. In empirical asset-pricing research, market excess return, calculated as the difference between market return and the risk-free rate, provides information about the market component of returns. However, the development of multifactor asset-pricing models, particularly Fama and French (1993, 2015), further demonstrates the relevance of firm-related characteristics beyond market-based variables. Subsequent studies likewise indicate that firm-specific characteristics may provide additional explanatory information for asset returns (Atodaria et al., 2021; Jan et al., 2021; Rutkowska-Ziarko et al., 2022; Alaoui Taib & Benfeddoul, 2023; Karima et al., 2023; Tang, 2024; Chahuán-Jiménez et al., 2025; Sagar et al., 2025). These developments provide a basis for examining market-wide and firm-specific characteristics jointly. Accordingly, examining market excess return alongside firm-specific characteristics provides an opportunity to assess whether market-wide conditions remain informative for asset returns within the Indonesian capital market.

Beyond market-wide conditions, firm-specific characteristics may also provide information relevant to asset returns. Firm size has received considerable attention in the asset-pricing and investment literature because it reflects differences in operating scale, financial resources, information availability, and access to external financing. Previous studies have measured firm size using market capitalization (Sembiring, 2024), total assets (Saputra & Nuzula, 2024; Loan et al., 2024), or the natural logarithm of total assets (Rahmah et al., 2024; Tiranda et al., 2025). This study uses the natural logarithm of total assets as a broad measure of firm resources and operating scale. From the perspective of Signaling Theory (Spence, 1973), observable firm characteristics may reduce information asymmetry by conveying information to external stakeholders. Firm size may therefore signal financial capacity, operational stability, access to resources, and the ability to withstand economic fluctuations, potentially influencing investor expectations and firm valuation. Brigham and Houston (2018) similarly emphasize the role of financial resources and access to financing in supporting firms' stability and operations. Empirical evidence, however, remains mixed. Positive associations have been reported by Ghazali et al.

(2022), Jan et al. (2021), and Khandelwal et al. (2023), while Sembiring (2024) finds firm size informative in the Indonesian market under normal and anomalous conditions. In contrast, Alaoui Taib and Benfeddoul (2023), Akgun et al. (2021), and Pandey et al. (2021) find limited additional explanatory power after market-related factors are considered, while Anuno et al. (2023) report a negative association. These differences may reflect variations in markets, samples, measurement, and observation periods.

In addition to market and conventional firm characteristics, sustainability performance has increasingly become relevant to investment decisions because ESG practices may provide information concerning firms' long-term strategies, risk management, governance, stakeholder relationships, and operational resilience. ESG indicators represent the environmental, social, and governance dimensions of corporate sustainability (Baier et al., 2020; Rohman et al., 2025), while stronger ESG integration may support stakeholder relationships, resilience, and long-term value creation (Soeprajitno et al., 2024). The relationship between sustainability performance and asset returns can be explained through Legitimacy Theory (Dowling and Pfeffer, 1975), which suggests that firms seek alignment between their activities and prevailing social values and expectations. Stronger sustainability practices may therefore strengthen legitimacy, stakeholder trust, and corporate reputation while supporting transparency, risk management, and operational efficiency. Sustainability performance can also be understood through Signaling Theory (Spence, 1973), as ESG practices may provide observable signals of responsible management, long-term value creation, and risk management, thereby reducing information asymmetry and strengthening investor confidence.

Empirical evidence on sustainability performance and asset returns remains mixed. Positive associations have been reported for firms in China and Japan during the COVID-19 pandemic (Zhou et al., 2022; Liu et al., 2023), while Trisnowati et al. (2022) find that ESG scores significantly affect stock returns in Indonesia after controlling for macroeconomic influences. Similar positive evidence is reported by Naeem et al. (2022), Aydoğmuş et al. (2022), Chang and Lee (2022), Giannopoulos et

al. (2022), Pulino et al. (2022), Yu and Xiao (2022), and AlfariZZi et al. (2024). Other studies, however, report negative or insignificant relationships, including Khandelwal et al. (2023), Mulialim and Madyan (2023), Rahmah et al. (2024), and Rasyad et al. (2024). ESG research has also employed different standardized data sources, including the Nasdaq ESG Reporting Guide (Mukti et al., 2025) and Refinitiv ESG data (Tiranda et al., 2025). These mixed findings suggest that the relationship between sustainability performance and asset returns remains context-dependent.

Within Indonesia, the IDX has developed sustainability-oriented indices such as the IDX ESG Leaders Index; however, index inclusion does not imply identical sustainability performance across firms. Therefore, the LSEG ESG Score (formerly Refinitiv ESG Score) is used as the empirical measure of sustainability performance, while the IDX ESG Leaders Index serves as the sampling frame. This distinction is important because the index identifies the firms included in the study, whereas the LSEG ESG Score provides the firm-level sustainability measure used in the empirical analysis.

Taken together, market excess return represents market-wide return conditions, whereas firm size and sustainability performance represent firm-specific characteristics. Examining these variables simultaneously allows their associations with asset returns to be assessed within a unified exploratory panel-data framework. In addition to the full specification including market excess return, firm size, and sustainability performance, an alternative specification excluding market excess return is estimated to examine whether firm-specific characteristics, particularly sustainability performance, continue to provide explanatory information in the absence of the market-level variable. This comparison is not intended as a direct empirical test of the CAPM because individual firm beta is not estimated; rather, it provides exploratory evidence regarding the relative explanatory contribution of market-wide and firm-specific information.

Based on the CAPM theoretical foundation and the literature discussed above, market excess return is expected to be positively associated with asset returns. Firm size may provide additional firm-

specific information through financial capacity, operating scale, and information signals, leading to the expectation of a positive association with asset returns. Sustainability performance may likewise provide information concerning firms' long-term strategies, risk management, legitimacy, and responsible management, suggesting a positive association with asset returns. Finally, considering the complementary roles of market-wide and firm-specific characteristics, the three explanatory variables are expected to be jointly associated with asset returns.

This study aims to investigate whether market excess return, firm size, and sustainability performance are associated with asset returns, both individually and jointly.

Accordingly, the hypotheses are formulated as follows:

- H1: Market excess return is positively associated with asset returns.*
- H2: Firm size is positively associated with asset returns.*
- H3: Sustainability performance is positively associated with asset returns.*
- H4: Market excess return, firm size, and sustainability performance are jointly associated with asset returns.*

2. METHODOLOGY

This study employs an observational quantitative research design using panel data. The population consists of companies included in the IDX ESG Leaders Index during the observation period. The IDX ESG Leaders Index was selected because it is an official sustainability-oriented index developed by the Indonesia Stock Exchange (IDX) to represent companies demonstrating relatively strong sustainability performance. The index is constructed based on a methodology established by the IDX, incorporating ESG Risk Ratings provided by Morningstar Sustainalytics, ESG controversy assessments, stock liquidity, and financial performance. Accordingly, restricting the sam-

pling frame to the IDX ESG Leaders Index is consistent with the objective of this study, which is to examine the associations of market excess return, firm size, and sustainability performance with asset returns among companies operating within a sustainability-oriented investment context.

Purposive sampling was employed to obtain a balanced and consistent panel dataset. Companies were included in the final sample if they (1) remained constituents of the IDX ESG Leaders Index throughout the 2020–2025 observation period, (2) had Refinitiv ESG Scores, currently known as LSEG ESG Scores, available for each year of the observation period, and (3) had complete financial statement and stock price data required to estimate all research variables. Although the IDX ESG Leaders Index comprises a maximum of 30 constituent companies in each review period, its composition is periodically revised. Consequently, only 18 companies remained consistently included throughout the 2020–2025 observation period while also satisfying all data-availability requirements. The final sample therefore consists of 18 companies observed over six consecutive years, yielding 108 firm-year observations for empirical analysis.

The data used in this study were obtained from publicly available sources, including financial statements, annual reports, sustainability reports, and stock price information published by the Indonesia Stock Exchange and the respective companies. Sustainability performance was measured using Refinitiv ESG Scores, currently known as LSEG ESG Scores, which provide standardized assessments of corporate environmental, social, and governance performance based on publicly disclosed information. It is important to distinguish the roles of the two ESG-related sources used in this study: the IDX ESG Leaders Index serves exclusively as the sampling frame, whereas the LSEG ESG Score serves as the empirical measure of sustainability performance in the regression models.

The study examines three explanatory variables and one dependent variable. First, market excess return represents market-wide return conditions relative to the risk-free rate. Market return (R_m) is measured using the return of the Composite Stock Price Index (CSPI), while the risk-free rate (R_f) is

represented by the Bank Indonesia Rate. The market return is calculated as:

$$R_m = \frac{CSPI_t - CSPI_{t-1}}{CSPI_{t-1}}. \quad (1)$$

Monthly market returns are calculated for each month of the observation year and then averaged to obtain the annual market return. Market excess return is subsequently calculated as:

$$\text{Market Excess Return} = R_m - R_f. \quad (2)$$

In this study, market excess return is treated as an empirical measure of market-wide return conditions and is not interpreted as a direct estimate of individual firms' systematic risk or CAPM beta.

The second explanatory variable is firm size, which is measured as the natural logarithm of total assets. Total assets represent the overall scale of a firm's resources and provide a broad measure of firm size. Accordingly, firm size is calculated as:

$$\text{Firm Size} = \ln(\text{Total Assets}). \quad (3)$$

The third explanatory variable is sustainability performance, which is represented by the LSEG ESG Score (formerly Refinitiv ESG Score). The score provides a standardized assessment of corporate environmental, social, and governance performance based on publicly disclosed information, allowing sustainability performance to be compared across firms and over time.

The dependent variable is asset return, represented by stock excess return ($R_i - R_f$). Individual stock return (R_i) is calculated based on the stock price of each sampled company as follows:

$$R_i = \frac{P_{i,t} - P_{i,t-1}}{P_{i,t-1}}. \quad (4)$$

Monthly stock returns are calculated for each month of the observation year and then averaged to obtain the annual stock return. The resulting measure represents the average annual stock price return based on monthly observations throughout the year. The stock return measure is price-based and does not incorporate dividend distributions. Stock excess return is subsequently calculated as:

$$\text{Stock Excess Return} = R_i - R_f. \quad (5)$$

To examine the associations between market excess return, firm size, sustainability performance, and asset returns, two alternative empirical specifications are estimated. The first specification includes all three explanatory variables:

$$AR_{i,t} = \alpha + \beta_1 MER_t + \beta_2 SIZE_{i,t} + \beta_3 ESG_{i,t} + e_{i,t}, \quad (6)$$

where $AR_{i,t}$ represents the asset return of firm (i) in year (t), MER_t represents market excess return in year (t), $SIZE_{i,t}$ represents firm size, $ESG_{i,t}$ represents sustainability performance, and $e_{i,t}$ represents the error term.

The second specification excludes market excess return while retaining firm size and sustainability performance:

$$AR_{i,t} = \alpha + \beta_1 SIZE_{i,t} + \beta_2 ESG_{i,t} + e_{i,t}. \quad (7)$$

Comparing these two specifications provides exploratory evidence regarding the relative explanatory contribution of market-wide and firm-specific characteristics. In particular, it allows the study to examine whether sustainability performance remains associated with asset returns when the market-level variable is excluded and whether the inclusion of market excess return provides additional explanatory information beyond firm size and sustainability performance. This comparison is not interpreted as a direct empirical test of the CAPM because individual firm beta is not estimated. Rather, the CAPM provides the theoretical foundation for considering the relevance of market-wide return conditions, while the empirical analysis examines their associations with asset returns within a broader panel-data framework incorporating firm-specific financial and sustainability characteristics.

The empirical analysis is conducted using EViews and includes panel-data regression, hypothesis testing using t-tests and the F-test, evaluation of model explanatory power using adjusted R-squared, and diagnostic testing. The statistical significance of individual explanatory variables is evaluated using the t-test, while the joint sig-

nificance of the explanatory variables is assessed using the F-test. Adjusted R-squared is used to evaluate the explanatory power of the estimated specifications. Diagnostic procedures include tests for multicollinearity and heteroskedasticity, together with additional assessments of the panel structure where appropriate. Finally, the findings from the two model specifications are compared and interpreted in relation to the relevant theoretical framework and previous empirical studies, with emphasis on statistical associations and relative explanatory information rather than causal claims beyond what can be supported by the research design.

3. RESULTS

Panel data regression analysis was conducted to examine the associations of market excess return, firm size, and sustainability performance with asset returns. Prior to estimating the regression models, panel specification tests were performed to determine the most appropriate estimator for each model.

Table 1. Chow test results on market excess return, firm size, sustainability, and asset return

Redundant Fixed Effects Tests			
Effect Test	Statistic	d.f	Prob.
Cross-section F	0.9303	(17,87)	0.5420
Cross-section Chi-square	18.0385	17	0.3864

The results of the Chow test are presented in Table 1. The cross-section Chi-square statistic is statistically insignificant (prob. > 0.05), indicating that the Lagrange Multiplier test should be conducted.

Table 2. Lagrange multiplier test results on market excess return, firm size, sustainability, and asset return

Lagrange Multiplier Tests for Random Effects			
Test Hypotheses			
	Cross-section	Time	Both
Breusch-Pagan	7.2041 (0.0073)	793.3359 (0.0000)	800.5400 (0.0000)*

Note: * Significant at α 1%.

The Lagrange Multiplier test results, reported in Table 2, indicate statistically significant random

Table 3. Statistical test results on market excess return, firm size, sustainability, and asset return

Test	Results		
Regression test	Y(Asset Return) = 0.0168 + 0.7778 (MER) – 0.0060 (SIZE) + 0.0013 (ESG)		
Determination test (Adjusted R²)	0.6288 = 62.88%		
t-test	Market Excess Return (MER)	Firm size (SIZE)	Sustainability (ESG)
	0.7778	–0.0060	0.0013
Prob.	(0.0000)*	(0.1159)	(0.0426)**
F test	61.4090		
Prob.	(0.0000)*		
Standard error of regression	0.1487		
Classical assumption tests:			
Multicollinearity test	MER – SIZE		–0.0180
	MER – ESG		0.1270
	SIZE – ESG		0.2348
	Conclusion: The correlation between variables is < 0.80, meaning that there is no multicollinearity		

Note: * Significant at α 1%, ** significant at α 5%.

effects (prob. < 0.05). Accordingly, the Random Effects Model (REM) was selected for the full specification.

Based on the selected Random Effects Model, the regression results are presented in Table 3. The coefficient of market excess return is positive at 0.7778 and statistically significant at the 1% level. Sustainability performance, measured by the LSEG ESG Score, also has a positive coefficient of 0.0013 and is statistically significant at the 5% level. In contrast, firm size has a negative coefficient of −0.0060 but is not statistically significant. The F-test indicates that the explanatory variables are jointly statistically significant at the 1% level. The adjusted R-squared is 0.6288, indicating that the model explains approximately 62.88% of the variation in asset returns. The regression standard error is 0.1486.

The diagnostic results indicate no evidence of problematic pairwise multicollinearity. The correlations between market excess return and firm size, market excess return and ESG performance, and firm size and ESG performance are −0.0180, 0.1270, and 0.2348, respectively, all below the commonly used threshold of 0.80.

To further examine the explanatory contribution of the market-level variable, a second specification was estimated by excluding market excess return while retaining firm size and sustainability performance. The same model selection procedure was applied as in the previous estimation.

Table 4. Chow test results on firm size, sustainability, and asset return

Redundant Fixed Effects Tests			
Effect Test	Statistic	d.f	Prob.
Cross-section F	1.9441	(17,88)	0.0239
Cross-section Chi-square	34.4372	17	0.0074*

Note: * Significant at α 1%.

Based on the results of the Chow test presented in Table 4, the cross-sectional chi-square probability is statistically significant. Therefore, the Hausman test was subsequently conducted to confirm whether the Fixed Effects Model is the most appropriate estimator.

Table 5. Hausman test results on firm size, sustainability, and asset return

Correlated random effects – Hausman test			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f	Prob.
Cross-section random	37.7745	2	0.0000*

Note: * Significant at α 1%.

As reported in Table 5, the Hausman test also produces a statistically significant probability value, confirming that the Fixed Effects Model is the appropriate estimation technique.

The estimation results based on the selected Fixed Effects Model are presented in Table 6. The results indicate that firm size has a positive coefficient of 0.0429 but is not statistically significant, whereas sustainability performance has a positive coefficient

Table 6. Statistical test results on firm size, sustainability, and asset return

Test	Results	
Regression test	Y(Asset Return) = −2.0140 + 0.0429 (SIZE) + 0.0226 (ESG)	
Determination test (Adjusted R²)	0.1580 = 15.80%	
t-test	Firm size (SIZE)	Sustainability (ESG)
	0.0429	0.0226
Prob.	(0.1277)	(0.0332)**
F test	2.0569	
Prob.	(0.0128)**	
Standard error of regression	0.2240	
Classical assumption tests:		
Multicollinearity test	SIZE – ESG	0.2348
	Conclusion: The correlation between variables is < 0.80, meaning that there is no multicollinearity	
Heteroscedasticity test	SIZE	Prob. 0.4680
	ESG	Prob. 0.0664
	Conclusion: Each variable has a probability value > 0.05, meaning that there is no heteroscedasticity problem	

Note: ** Significant at α 5%.

cient of 0.0226 and remains statistically significant at the 5% level. The overall F-test is statistically significant at the 5% level. However, the adjusted R-squared declines to 0.1580, indicating that the alternative specification explains approximately 15.80% of the variation in asset returns. The standard error of regression increases to 0.2240.

The diagnostic results for the second specification indicate no evidence of problematic multicollinearity, with a correlation of 0.2348 between firm size and sustainability performance. The reported heteroskedasticity probabilities are 0.4680 for firm size and 0.0664 for sustainability performance, both above the 5% significance level. Thus, the available diagnostic results do not indicate heteroskedasticity at the 5% significance level.

To facilitate a clearer comparison between the two model specifications, the main estimation results are summarized in Table 7.

The comparison between the two specifications provides additional evidence regarding the relative explanatory contribution of market-wide and firm-specific characteristics. In the full specification, market excess return and sustainability performance are positively and statistically significantly associated with asset returns, whereas firm size is not statistically significant. When market excess return is excluded, firm size remains statistically insignificant, while sustainability performance remains positive and statistically significant. At the same time, adjusted R-squared declines from 62.88% to 15.80%, while the standard error of regression increases from 0.1486 to 0.2240. These changes indicate that market excess return provides substantial incremental explanatory information for asset returns within the sample. Importantly, the persistence of the significant ESG association indicates that sustainability performance retains explanatory relevance even in the absence of the market-level variable.

Table 7. Comparison of the full model and the model excluding market excess return

Variable / Statistic	Full Model (Including Market Excess Return)	Model Excluding Market Excess Return
Market Excess Return	Positive, significant (1%)	–
Firm Size	Not significant	Not significant
Sustainability (ESG Score)	Positive, significant (5%)	Positive, significant (5%)
Overall Model (F-test)	Significant (1%)	Significant (5%)
Adjusted R ²	62.88%	15.80%
Standard Error of Regression	Lower	Higher

4. DISCUSSION

The empirical findings provide evidence that both market-wide return conditions and firm-specific sustainability characteristics are associated with asset returns among the sampled companies. The findings, however, should be interpreted cautiously in light of the exploratory nature of the empirical design. In particular, market excess return is used as an empirical measure of market-wide return conditions rather than as a direct estimate of individual firms' systematic risk. Because firm-level CAPM beta is not estimated, the coefficient on market excess return should not be interpreted as beta or as a direct measure of the price of systematic risk.

The positive and statistically significant association between market excess return and asset returns indicates that market-wide return conditions contain substantial explanatory information for variations in asset returns. The estimated coefficient of 0.7778 indicates a positive association between market excess return and asset returns within the full specification. This finding is broadly consistent with the theoretical rationale of the CAPM, which emphasizes the relevance of market-wide conditions to expected returns, and with previous asset-pricing research emphasizing the importance of market-related information in explaining asset returns (Fama & French, 1993, 2015; Atodaria et al., 2021; Rutkowska-Ziarko et al., 2022; Karima et al., 2023; Tang, 2024; Sembiring, 2024). Nevertheless, because the present study does not estimate firm-specific beta, this finding should be interpreted as evidence of an association with market-wide return conditions rather than as a direct empirical confirmation of the CAPM.

Firm size is not statistically significant in the full specification. This result suggests that firm scale does not provide statistically significant additional explanatory information for asset returns after market excess return and sustainability performance are considered simultaneously. One possible explanation is that the sample is restricted to companies that remained consistently included in the IDX ESG Leaders Index, potentially reducing heterogeneity in firm characteristics. Within this relatively specific group of firms, differences in total asset size may therefore provide limited additional information once market-wide conditions and sus-

tainability performance are considered. This finding is broadly consistent with studies reporting limited significance of firm size under particular empirical specifications, including Akgun et al. (2021) and Alaoui Taib and Benfeddoul (2023), although it differs from studies documenting a conventional size effect.

Sustainability performance provides a different result. The positive and statistically significant coefficient of ESG performance in the full specification indicates that higher LSEG ESG Scores are associated with higher asset returns after accounting for market excess return and firm size. This finding suggests that sustainability-related information may contain firm-specific information that is not fully captured by market-wide return conditions. From the perspective of Signaling Theory, stronger ESG performance may serve as a signal of management quality, transparency, risk management, and long-term strategic orientation, potentially reducing information asymmetry between firms and investors. Legitimacy Theory likewise suggests that stronger sustainability practices may strengthen corporate legitimacy and stakeholder confidence, which may contribute to favorable investor perceptions. The finding is consistent with empirical evidence reporting positive associations between ESG performance and financial outcomes, including Alfarizzi et al. (2024).

An important finding emerges from the alternative specification excluding market excess return. Sustainability performance remains positive and statistically significant, whereas firm size remains statistically insignificant. This persistence is important because it indicates that the association between sustainability performance and asset returns is not eliminated when the market-level variable is excluded. In other words, ESG performance continues to provide explanatory information at the firm level beyond the market-wide variable included in the full specification. This finding strengthens the relevance of sustainability performance within the empirical framework because its statistical association with asset returns is not dependent on the inclusion of market excess return.

The comparison between the two specifications further indicates that market excess return provides substantial incremental explanatory in-

formation. Adjusted R-squared decreases from 62.88% in the full specification to 15.80% when market excess return is excluded, while the standard error of regression increases from 0.1486 to 0.2240. These changes indicate that the market-level variable contributes considerably to the explanatory performance of the model. However, this result should not be interpreted as implying that sustainability performance is unimportant. Rather, the results indicate that market-wide and firm-specific information provide different sources of explanatory information for asset returns. Market excess return captures broad market conditions, whereas sustainability performance retains firm-specific informational relevance.

The findings therefore provide a more nuanced perspective on the relationship between market information and sustainability performance. Market-wide return conditions remain strongly associated with asset returns, while sustainability performance continues to exhibit a significant positive association even when the market-level variable is excluded. Sustainability performance therefore does not appear to replace market-wide information; instead, it provides an additional firm-level source of information that may be relevant to understanding variations in asset returns.

From a theoretical perspective, the findings are consistent with the broader logic of asset-pricing theory concerning the relevance of market-wide conditions, while also highlighting the informational role of firm-specific sustainability characteristics. The results are therefore better interpreted as exploratory evidence on the associations between market-wide and firm-specific characteristics and asset returns rather than as a direct test of the CAPM. This positioning is particularly appropriate because the empirical specification does not estimate individual firms' systematic risk through CAPM beta.

From a practical perspective, the findings suggest that investors may benefit from considering both market-wide conditions and firm-level sustainability information when evaluating investment opportunities. Market excess return provides substantial explanatory information regarding asset returns, while ESG performance retains significant informational relevance at the firm level. For corporate managers, the positive association between sustainability performance and asset returns suggests that stronger ESG performance may contribute to firms' attractiveness to investors. Nevertheless, sustainability performance should not be viewed as a substitute for broader market considerations.

CONCLUSION

This study examined the associations of market conditions, firm size, and sustainability performance with asset returns among companies consistently included in the IDX ESG Leaders Index during the 2020–2025 period. Using an exploratory panel-data framework, the study estimated a full specification incorporating market excess return, firm size, and sustainability performance and an alternative specification excluding market excess return.

The results indicate that market excess return is positively and statistically significantly associated with asset returns in the full specification, while firm size is not statistically significant. Sustainability performance, measured by the LSEG ESG Score, is positively and statistically significantly associated with asset returns. Importantly, sustainability performance remains positive and statistically significant when market excess return is excluded, whereas firm size remains statistically insignificant. These findings indicate that sustainability-related information retains explanatory relevance beyond the market-level variable.

The comparison between the two specifications further shows that excluding market excess return substantially reduces the explanatory performance of the model. Adjusted R-squared declines from 62.88% to 15.80%, while the standard error of regression increases from 0.1486 to 0.2240. This evidence indicates that market excess return provides substantial incremental explanatory information regarding

variations in asset returns within the sample. At the same time, the persistence of the ESG association demonstrates that sustainability performance retains firm-specific explanatory relevance even when the market-level variable is excluded.

The findings contribute to the literature by examining market-wide return conditions, firm size, and sustainability performance within a single exploratory panel-data framework. Rather than presenting the results as a direct test of the CAPM, the study uses the CAPM as a theoretical foundation for considering the relevance of market-wide return conditions and extends the analysis by incorporating firm-specific financial and sustainability characteristics. The findings suggest that market-wide and sustainability-related information may represent distinct sources of explanatory information for asset returns.

From a practical perspective, the findings suggest that investors may consider both market conditions and firm-level sustainability performance when evaluating investment opportunities. For corporate managers, the positive association between sustainability performance and asset returns suggests that stronger ESG performance may provide information that is relevant to investors' evaluations of firms. However, ESG performance does not eliminate the relevance of broader market conditions.

This study has several limitations. First, the sample is restricted to 18 companies that remained consistently included in the IDX ESG Leaders Index and satisfied the required data-availability criteria during 2020–2025, which may limit the generalizability of the findings. Second, the observation period covers six years, including the COVID-19 pandemic and the subsequent recovery period, which may have influenced market dynamics and investor behavior. Third, asset returns are measured using price-based stock returns and do not incorporate dividend distributions. Fourth, sustainability performance is represented by a single standardized measure, the LSEG ESG Score.

An additional limitation concerns the measurement of market-wide conditions. Market excess return is an annual market-level variable and therefore takes the same value across firms within each calendar year. Consequently, during the 2020–2025 observation period, the variable contains only six distinct annual realizations despite the 108 firm-year observations in the panel. This limited variation requires caution in interpreting the estimated association between market excess return and asset returns. In addition, because individual firm beta is not estimated, the empirical specification should not be interpreted as a direct test of the CAPM or as providing a firm-level estimate of systematic risk.

Future research could address these limitations by employing broader samples, longer observation periods, higher-frequency market measures, alternative sustainability measures, and multifactor asset-pricing frameworks such as the Fama–French models. Future studies could also directly estimate firm-level systematic risk through beta-based approaches. Such extensions may provide broader evidence regarding the interaction between market-wide conditions, firm-specific characteristics, sustainability performance, and asset returns, particularly in emerging capital markets.

AUTHOR CONTRIBUTIONS

Conceptualization: Ferikawita M. Sembiring, Frido S. Simatupang.

Formal analysis: Ferikawita M. Sembiring, Frido S. Simatupang.

Investigation: Ferikawita M. Sembiring, Frido S. Simatupang.

Methodology: Ferikawita M. Sembiring.

Resources: Ferikawita M. Sembiring, Frido S. Simatupang.

Software: Ferikawita M. Sembiring, Frido S. Simatupang.

Writing – original draft: Ferikawita M. Sembiring.

Writing – review & editing: Ferikawita M. Sembiring, Frido S. Simatupang.

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REFERENCES

1. Akgun, O. T., Mudge, T. J., & Townsend, B. (2021). How Company Size Bias in ESG scores impacts the small cap investor. *The Journal of Impact and ESG Investing*, 1(4), 31-44. <https://doi.org/10.3905/jesg.2021.1.022>
2. Alaoui Taib, A., & Benfeddoul, S. (2023). The empirical explanatory power of CAPM and the Fama and French three-five factor models in the Moroccan stock exchange. *International Journal of Financial Studies*, 11(1), Article 47. <https://doi.org/10.3390/ijfs11010047>
3. AlfariZZi, M. A., Purnamasari, I., & Abidin, Z. (2024). The effect of ESG score, valuation, and earning on stock price. *Kompartemen: Jurnal Ilmiah Akuntansi [Kompartemen: Scientific Journal of Accounting]*, 22(2), 316-328. <https://doi.org/10.30595/kompartemen.v22i2.23828>
4. Anuno, F., Madaleno, M., & Vieira, E. (2023). Using the Capital Asset Pricing Model and the Fama – French Three-Factor and Five-Factor Models to Manage Stock and Bond Portfolios: Evidence from Timor-Leste. *Journal of Risk and Financial Management*, 16(11), Article 480. <https://doi.org/10.3390/jrfm16110480>
5. Atodaria, Z., Shah, D., & Nandaniya, J. (2021). An empirical investigation of the CAPM and the Fama-French Three Factor Model in Indian stock market. *International Journal of All Research Education and Scientific Methods*, 9(5), 1454-1459. Retrieved from <https://www.ijaresm.com/an-empirical-investigation-of-the-capm-and-the-fama-french-three-factor-model-in-indian-stock-market>
6. Aydoğmuş, M., Gülay, G., & Ergun, K. (2022). Impact of ESG performance on firm value and profitability. *Borsa Istanbul Review*, 22, S119-S127. <https://doi.org/10.1016/j.bir.2022.11.006>
7. Baier, P., Berninger, M., & Kiesel, F. (2020). Environmental, social and governance reporting in annual reports: A textual analysis. *Financial Markets, Institutions and Instruments*, 29(3), 93-118. <https://doi.org/10.1111/fmii.12132>
8. Brigham, E. F., & Houston, J. F. (2018). *Fundamentals of financial management* (15th ed.). Cengage Learning.
9. Chahuán-Jiménez, K., Muñoz-Rojas, L., Muñoz-Pizarro, S., & Schulze-González, E. (2025). Comparison of the CAPM and Multi-Factor Fama-French Models for the Valuation of Assets in the Industries with the Highest Number of Transactions in the US Market. *International Journal of Financial Studies*, 13(3), Article 126. <https://doi.org/10.3390/ijfs13030126>
10. Chang, Y. J., & Lee, B. H. (2022). The impact of ESG activities on firm value: Multi-level analysis of industrial characteristics. *Sustainability*, 14(21), Article 14444. <https://doi.org/10.3390/su142114444>
11. Dowling, J., & Pfeffer, J. (1975). Organizational legitimacy: Social values and organizational behavior. *Pacific Sociological Review*, 18(1), 122-136. <https://doi.org/10.2307/1388226>
12. Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, 33(1), 3-56. [https://doi.org/10.1016/0304-405X\(93\)90023-5](https://doi.org/10.1016/0304-405X(93)90023-5)
13. Fama, E. F., & French, K. R. (2015). A five-factor asset pricing model. *Journal of Financial Economics*, 116(1), 1-22. <https://dx.doi.org/10.1016/j.jfineco.2014.10.010>
14. Ghozali, I., Wahyudi, S., Hersugondo, PrabuWono, A. S., & Pamungkas, I. D. (2022). Bid-ask spread on earnings management with good corporate governance as moderation variables: Banking sector in Indonesia. *WSEAS Transactions on Business and Economics*, 19, 386-395. <https://doi.org/10.37394/23207.2022.19.34>
15. Giannopoulos, G., Fagernes, R. V. K., Elmarzouky, M., & Hossain, K. A. B. M. A. (2022). The ESG Disclosure and the Financial Performance of Norwegian Listed Firms. *Journal of Risk and Financial Management*, 15(6), Article 237. <https://doi.org/10.3390/JRFM15060237>
16. Jan, S. U., Iqbal, S., & Aamir, A. (2021). Comparing CAPM and Fama-French for predicting stock returns: New evidence from Pakistan Stock Exchange. *Ilkogretim Online*, 20(3), 1748-1754. <https://doi.org/10.17051/ilkonline.2021.03.203>
17. Karima, L., Mimoun, B., & El Bouhadi, A. (2023). Fama and French five-factor asset pricing model: Evidence from Moroccan stock market. *International Journal of Economics and Finance Studies*, 15(1), 466-489. <https://doi.org/10.34109/ijefs.202315122>
18. Khandelwal, V., Sharma, P., & Chotia, V. (2023). ESG disclosure and firm performance: An asset-pricing approach. *Risks*, 11(6), Article 112. <https://doi.org/10.3390/risks11060112>
19. Liu, L., Nemoto, N., & Lu, C. (2023). The effect of ESG performance on the stock market during the COVID-19 pandemic – Evidence from Japan. *Economic Analysis*

- and Policy, 79, 702-712. <https://doi.org/10.1016/j.eap.2023.06.038>
20. Loan, B. T. T., Anh, T. T. L., & Hoang, T. (2024). ESG disclosure and financial performance: Empirical study of Vietnamese commercial banks. *Banks and Bank Systems*, 19(1), 208-220. [https://doi.org/10.21511/bbs.19\(1\).2024.18](https://doi.org/10.21511/bbs.19(1).2024.18)
 21. Mukti, A. H., Hariyanto, O. I. B., & Edward, O. T. (2025). Assessing the impact of financial risk and ownership structure on ESG disclosure: Insights from the energy sector in Indonesia. *Risks*, 13(12), Article 248. <https://doi.org/10.3390/risks13120248>
 22. Mulialim, C., & Madyan, M. (2023). How does ESG explain excess returns in emerging market? An asset-pricing approach. *Jurnal Manajemen Teori dan Terapan – Journal of Theory and Applied Management*, 16(2), 280-292. <https://doi.org/10.20473/jmtt.v16i2.48072>
 23. Naeem, N., Cankaya, S., & Bildik, R. (2022). Does ESG performance affect the financial performance of environmentally sensitive industries? A comparison between emerging and developed markets. *Borsa Istanbul Review*, 22, S128-S140. <https://doi.org/10.1016/j.bir.2022.11.014>
 24. Pandey, A., Mittal, A., & Mittal, A. (2021). Size effect alive or dead: Evidence from European markets. *Cogent Economics & Finance*, 9(1), Article 1897224. <https://doi.org/10.1080/23222039.2021.1897224>
 25. Pulino, S. C., Ciaburri, M., Magnanelli, B. S., & Nasta, L. (2022). Does ESG disclosure influence firm performance? *Sustainability*, 14(13), Article 7595. <https://doi.org/10.3390/su14137595>
 26. Rahmah, N. A., Purwotedi, U., & Handarini, D. (2024). The moderating role of profitability and firm size in ESG disclosure towards firm value. *International Journal of Education, Social Studies, and Management (IJESSM)*, 4(2), 700-719. <https://doi.org/10.52121/ijessm.v4i2.345>
 27. Rasyad, R. K., Afgani, K. F., & Ali, Q. (2024). Effects of ESG on firm performance and firm value: A study of Indonesian and Malaysian listed companies. *Journal Integration of Management Studies*, 2(1), 1-17. <https://doi.org/10.58229/jims.v1i2.118>
 28. Rohman, A., Purwanto, A., Nurkhin, A., & Mukhibad, H. (2025). The influence of governance, sustainability performance, and innovation on the performance of Indonesian manufacturing listed companies. *Investment Management and Financial Innovations*, 22(4), 184-196. [https://doi.org/10.21511/imfi.22\(4\).2025.15](https://doi.org/10.21511/imfi.22(4).2025.15)
 29. Rutkowska-Ziarko, A., Markowski, L., Pyke, C., & Amin, S. (2022). Conventional and downside CAPM: The case of London Stock Exchange. *Global Finance Journal*, 54, 100759. <https://doi.org/10.1016/j.gfj.2022.100759>
 30. Sagar, K., Sehgal, D., Jain, M. R., Gupta, L., Shrivastav, R. K., & Shah, P. (2025). Asset pricing anomalies: Comparative performance of CAPM, FF3FM, and FF5FM in the Indian equity market. *Investment Management and Financial Innovations*, 22(4), 197-208. [https://doi.org/10.21511/imfi.22\(4\).2025.16](https://doi.org/10.21511/imfi.22(4).2025.16)
 31. Saputra, A. D., & Nuzula, N. F. (2024). Board diversity, competitive advantage, firm size and firm value: A case on Indonesian materials industry. *PROFIT: Jurnal Administrasi Bisnis [PROFIT: Journal of Business Administration]*, 18(2), 231-244. <https://doi.org/10.21776/ub.profit.2024.018.02.7>
 32. Sembiring, F. M. (2024). Firm size, market risk, and return reversal anomalies during the COVID-19 pandemic. *Jurnal Manajemen [Journal of Management]*, 28(1), 45-63. <https://doi.org/10.24912/jm.v28i1.1488>
 33. Sharpe, W. F. (1964). Capital Asset Prices: A theory of market equilibrium under conditions of risk. *The Journal of Finance*, 19(3), 425-442. <https://doi.org/10.1111/j.1540-6261.1964.tb02865.x>
 34. Soeprajitno, R. R. W. N., Na'im, A., Kusuma, I. W., & Rakhman, F. (2024). Sustainability performance and earnings management: institutional and regulatory perspectives. *Cogent Business & Management*, 11(1), Article 2381663. <https://doi.org/10.1080/23311975.2024.2381663>
 35. Spence, M. (1973). Job market signaling. *The Quarterly Journal of Economic*, 87(3), 355-374. <https://doi.org/10.2307/1882010>
 36. Tang, Z. (2024). Risk-return analysis of equity portfolios: Comparison between CAPM and Fama-French three factor model. *Proceedings of the 3rd International Conference on Economic Development and Business Culture (ICEDBC 2023)* (pp. 227-237). Atlantis Press International BV. https://doi.org/10.2991/978-94-6463-246-0_28
 37. Tiranda, Y. P., Sembiring, F. M., & Simatupang, F. S. (2025). Environmental, Social, and Governance (ESG) disclosure and firm size as firm value estimators: The role of investment return. *Amkop Management Accounting Review (AMAR)*, 5(2), 906-915. <https://doi.org/10.37531/amar.v5i2.3171>
 38. Trisnowati, Y., Achsani, N. A., Sembel, R., & Andati, T. (2022). The effect of ESG score, financial performance, and macroeconomics on stock returns during the pandemic era in Indonesia. *International Journal of Energy Economics and Policy*, 12(4), 166-172. <https://doi.org/10.32479/ijeep.13212>
 39. Yu, X., & Xiao, K. (2022). Does ESG performance affect firm value? Evidence from a new ESG-scoring approach for Chinese enterprises. *Sustainability*, 14(24), Article 16940. <https://doi.org/10.3390/su142416940>
 40. Zhou, G., Liu, L., & Luo, S. (2022). Sustainable development, ESG performance and company market value: Mediating effect of financial performance. *Business Strategy and the Environment*, 31(7), 3371-3387. <https://doi.org/10.1002/bse.3089>