ANALYZING ESG RISK PRICING USING AN EXTENDED FAMA–FRENCH THREE–FACTOR MODEL: EVIDENCE FROM ASEAN-5 EQUITY MARKETS

BACHELOR THESIS

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STATEMENT OF THESIS ORIGINALITY

The undersigned, Shinta Wahyu Hapsari, declares that the bachelor thesis entitled: **ANALYZING ESG RISK PRICING USING AN EXTENDED FAMA-FRENCH THREE-FACTOR MODEL: EVIDENCE FROM 5-ASEAN EQUITY MARKETS,** is the result of my writing. I hereby declare that in this bachelor thesis there is no whole or part of other people's writings that I took by copying or imitating in the form of a series of sentences or symbols that show the ideas or opinions or thoughts of other authors, which I admit as if they were ny writing, and/or there is no part of all of the writing that I copy, imitate, or take from other people's writings without giving acknowledgement of the original author.

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ABSTRACT

CAPM and the Fama–French Three-Factor Model (FF3) remain unable to fully capture all risk sources relevant to investors. Environmental, Social, and Governance (ESG) disclosure has increasingly become a consideration in investment decisions, yet research examining ESG disclosure as an additional variable within an Extended FF3 in ASEAN-5 capital markets remains limited. This study examines whether ESG Disclosure Score has incremental explanatory power for excess stock return beyond the three FF3 factors (market risk premium, size factor, value factor) among non-financial companies in ASEAN-5. This study uses panel data regression on 315 non-financial companies in Indonesia, Malaysia, Singapore, Thailand, and the Philippines, with monthly observations from January 2020 to December 2025 (22,680 observations). ESG Disclosure Score is lagged by one year (t-1) to mitigate look-ahead bias. The model is estimated using the Common Effect Model (Pooled OLS), selected based on the Chow test and Lagrange Multiplier test, with robust standard errors clustered at the firm level. Results show that market risk premium, size factor, and value factor have a significant positive effect on excess stock return, consistent with FF3 theory. ESG Disclosure Score has a significant negative effect, indicating investors accept lower expected returns for shares with better ESG disclosure. Adding ESG Disclosure Score yields a statistically significant, though small, incremental R-squared, with results consistent both with and without country dummies.

Keywords: ESG Disclosure Score, Fama–French Three-Factor Model, excess stock return, ESG asset pricing, ASEAN-5.

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ABSTRAK

CAPM dan Fama–French Three-Factor Model (FF3) belum sepenuhnya mampu menangkap seluruh sumber risiko yang relevan bagi investor. Environmental, Social, and Governance (ESG) disclosure semakin menjadi perhatian investor dalam pengambilan keputusan investasi, namun penelitian yang menguji ESG disclosure sebagai variabel tambahan dalam Extended FF3 di pasar modal ASEAN-5 masih terbatas. Penelitian ini bertujuan menguji apakah ESG Disclosure Score memiliki kemampuan penjelasan tambahan terhadap excess stock return di luar tiga faktor FF3 (market risk premium, size factor, value factor) pada perusahaan non-keuangan ASEAN-5. Penelitian ini menggunakan regresi data panel pada 315 perusahaan non-keuangan di Indonesia, Malaysia, Singapura, Thailand, dan Filipina, dengan periode observasi Januari 2020 hingga Desember 2025 (22.680 observasi). ESG Disclosure Score menggunakan lag satu tahun (t-1) untuk mengurangi look-ahead bias. Model diestimasi menggunakan Common Effect Model (Pooled OLS), dipilih berdasarkan Chow test dan Lagrange Multiplier test, dengan robust standard error terkluster pada tingkat perusahaan. Hasil menunjukkan market risk premium, size factor, dan value factor berpengaruh positif signifikan terhadap excess stock return, konsisten dengan teori FF3. ESG Disclosure Score berpengaruh negatif signifikan, mengindikasikan investor bersedia menerima expected return lebih rendah untuk saham dengan pengungkapan ESG lebih baik. Penambahan ESG Disclosure Score memberikan peningkatan incremental R-squared yang signifikan meski relatif kecil, dan hasilnya tetap konsisten baik dengan maupun tanpa dummy negara.

Kata Kunci: ESG Disclosure Score, Fama–French Three-Factor Model, excess stock return, ESG asset pricing, ASEAN-5.

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MOTTO AND DEDICATIONS

فَٱصۡبِرۡۖ إِنَّ وَعۡدَ ٱللَّهِ حَقّٞۖ

"So be patient, for the promise of Allah certainly is true"

[Rum, 30:60]

"The knowledge that has not come down to us is larger than the knowledge that has"

(Ibn Khaldun, The Muqaddimah)

"What stands in the way becomes the way"

(Marcus Aurelius)

This thesis is dedicated to myself, my beloved parents, my sibling, my family, my friends, and everyone who has supported me throughout the process of completing this thesis.

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FOREWORDS

All praise and gratitude are devoted to Allah for grace and countless blessings, which have enabled the author to complete this thesis entitled **"ANALYZING ESG RISK PRICING USING AN EXTENDED FAMA-FRENCH THREE-FACTOR MODEL: EVIDENCE FROM 5-ASEAN EQUITY MARKET."** This thesis is a requirement that must be fulfilled by the author in order to complete the undergraduate program in Accounting, Faculty of Economics and Business, Diponegoro University.

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The author realizes that this thesis is not perfect and welcomes any constructive suggestions and criticism for improvement. The author hopes this thesis can be useful for those who need it. Finally, the author would like to thank all parties for their support throughout this process.

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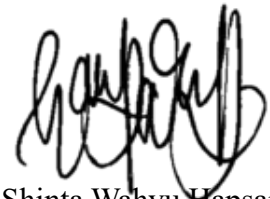

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CHAPTER I

INTRODUCTION

1.1 Background

Capital market investment decisions have long rested on a basic tension between the return an investor hopes to earn and the risk that must be accepted to earn it. Harry M. Markowitz (1952) was the first scholar to translate this tension into a rigorous, quantitative framework known as Modern Portfolio Theory (MPT). In his approach, risk is captured through the variance, or standard deviation, of returns, and demonstrated that investors can construct an optimal portfolio through an optimization process to achieve an efficient combination of expected return and risk. This concept is now widely known as the efficient frontier in modern financial literature (Markowitz, 1952).

MPT, however, stops short of specifying exactly how an individual asset's systematic risk translates into its expected return. William F. Sharpe (1964) closed that gap with the Capital Asset Pricing Model (CAPM), which divides total risk into two components: 1) systematic risk, which pervades the entire market and cannot be removed through diversification, and 2) firm-specific (idiosyncratic) risk, which diversification can eliminate. CAPM gauges an asset's exposure to broad market swings through the beta coefficient (β) (Sharpe, 1964). Research published in the Review of Financial Studies indicates that CAPM remains the most widely taught risk-

return framework in finance curricula, with practitioners still relying on it extensively when calculating the cost of capital (Dessaint et al., 2020).

Even so, Fama and French (1993) provide empirical evidence that CAPM leaves a considerable share of cross-sectional stock-return variation unexplained, particularly variation linked to firm size and the book-to-market ratio. To remedy this, they developed the Fama–French Three-Factor Model (FF3), supplementing market risk with two additional variables, SMB (Small Minus Big) and HML (High Minus Low). Because these two variables pick up return patterns that CAPM overlooks entirely, the resulting model explains stock-return variation considerably better.

Empirical evidence from ASEAN-5 capital markets shows that although the five countries belong to the same regional bloc, stock return performance across countries exhibits considerable disparity. Throughout 2024, for instance, Singapore's Straits Times Index (STI) recorded a gain of 17.0%, marking its best annual performance in a decade, while Malaysia's Kuala Lumpur Composite Index (KLCI) also strengthened by 13.0%, driven by domestic economic recovery. In contrast, Indonesia's Jakarta Composite Index (JCI) weakened slightly by 2.65%, and Thailand's Stock Exchange of Thailand (SET) Index declined by 1.1%, while the Philippines Stock Exchange Index (PSEi) staged a strong recovery toward the 7,500-point level in the third quarter before retreating again by year-end (ASEAN Exchanges, 2025). This simultaneous disparity in stock return performance within a single region indicates that stock return movements in ASEAN-5 are influenced by a combination of country-specific macroeconomic and regulatory factors, alongside systematic risk factors and

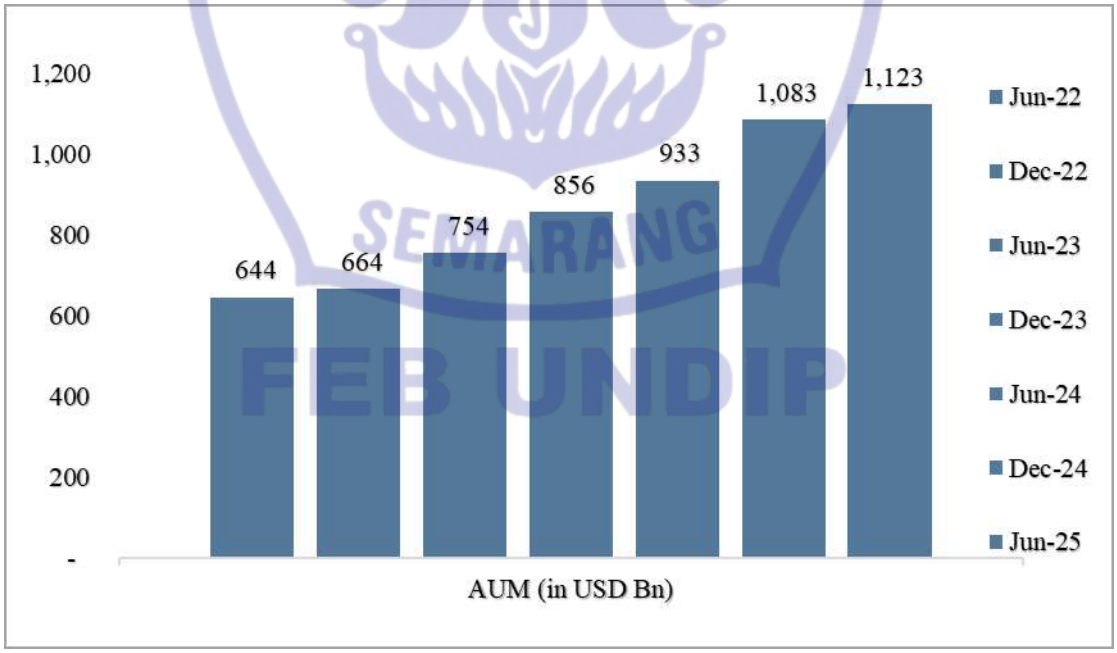
firm-level characteristics that transcend national borders. Nevertheless, this study does not aim to compare market performance across countries individually; rather, it focuses on firm-level determinants that explain the cross-sectional variation in excess stock return across the ASEAN-5 region as a whole, treating country-specific differences as a control factor within the panel data regression model.

To analyze the determinants of stock return variation consistently across countries with differing interest rates and currencies, this study employs excess stock return, the difference between actual stock return and the risk-free rate, as the dependent variable. The use of excess return, rather than raw return, is consistent with the CAPM framework (Sharpe, 1964) and the Fama-French Three-Factor Model (Fama & French, 1993) discussed earlier, both of which focus on the additional compensation (risk premium) investors earn above the risk-free rate, rather than on absolute return levels alone. This approach allows the study to more precisely test whether a firm characteristic, including ESG disclosure, provides an incremental risk premium beyond the baseline compensation for the time value of money and market risk already captured through the market risk premium, SMB, and HML variables.

The development of this multifactor model indicates that certain firm characteristics may be related to the formation of stock returns. Consequently, modern asset pricing literature has begun to explore whether non-traditional characteristics, such as Environmental, Social, and Governance (ESG), hold additional relevance in explaining expected returns after traditional risk factors have been accounted for (Pástor et al., 2021).

Companies today are expected not only to generate economic value but also to demonstrate credible performance in environmental, social, and governance (ESG) aspects. What began as a normative expectation has evolved into a factor closely linked to a firm's long-term sustainability and competitiveness (United Nations Global Compact & International Finance Corporation, 2004). As concerns over ESG-related risks increase, these factors have become increasingly integrated into risk analysis and firm valuation. A key turning point was the 2015 Paris Agreement, which embedded sustainability into global policy and strengthened expectations regarding transition risk and ESG reporting standards, making ESG information more relevant in assessing firm risk and value (Naysary et al., 2025).

Figure 1.1 Sustainability and Climate MSCI's AUM Accelerates

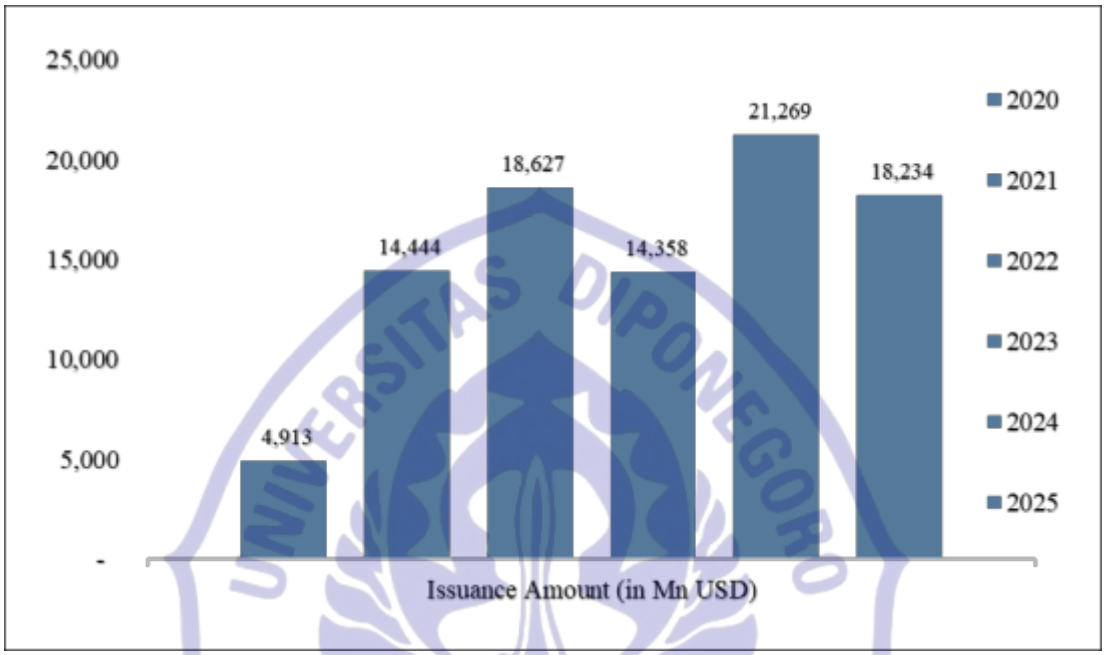


Source: MSCI Institute, 2025

The latest MSCI Institute report puts assets under management (AUM) benchmarked to MSCI Indexes at USD 1.123 billion for the second quarter of 2025, up 20% from USD 933 billion in the equivalent quarter a year earlier. Historical figures show this AUM expanding at a 20% compound annual growth rate (CAGR) between Q2 2022 and Q2 2025, a trend pointing to sustainability considerations playing an ever-larger role in index-based investing worldwide.

This trend has fed a parallel expansion of ESG research within the asset-pricing tradition. Pastor et al. (2021) built a theoretical framework describing how sustainability characteristics, working through sustainability risk and investor preferences, can move asset prices and expected returns. In the United States, follow-up empirical work links ESG characteristics and carbon risk to both the cost of capital and stock returns (Bolton & Kacperczyk, 2021; Chava, 2014; Ghoul et al., 2011). European firms with stronger ESG performance tend to carry less risk (Sassen et al., 2016), and in China, firms with stronger ESG performance proved more resilient through crisis periods (Broadstock et al., 2021). ESG more broadly and globally, being folded into asset pricing and investment performance considerations at an increasing rate (Naffa & Fain, 2020; Pedersen et al., 2021).Taken together, these findings point to ESG characteristics mattering for stock returns. However, evidence testing that relevance specifically within an asset-pricing framework for Southeast Asia, and ASEAN in particular, remains relatively limited, Yet, ASEAN is considered one of the fastest-growing sustainable finance markets (Climate Bonds Initiative, 2022).

Figure 1.2 Issuance of Labelled ASEAN GSS-Linked Bonds



Source: ASEAN Capital Markets Forum, 2026

The ASEAN Capital Markets Forum (ACMF) documents a 30% CAGR, over 2020-2025, in the issuance of sustainability-labelled instruments that align with the ASEAN Green, Social, and Sustainability Standards. The increase in the value of sustainable finance instrument issuances in ASEAN indicates that sustainable finance in the region is becoming increasingly active in supporting the financing of projects related to environmental, social, and sustainability aspects. These developments indicate that ESG is increasingly becoming a consideration in investment activities across the ASEAN region. As capital flows toward sustainable instruments and activities increase, ESG is no longer viewed solely as a non-financial issue but has the potential to become relevant information in investment decision-making. This raises

the question: Are ESG characteristics also showing up in how stock prices and expected returns get formed in ASEAN capital markets?

Research on ESG within the framework of asset pricing in the ASEAN region remains relatively limited. Most previous studies have focused on global markets or specific countries. The relationship between carbon risk and stock returns has been tested using a sample of global companies dominated by developed markets (Bolton & Kacperczyk, 2021), while the integration of ESG into asset pricing models has been tested separately in the Indonesian (Mulialim & Madyan, 2023) and Chinese (Lu, 2025) markets. These findings provide evidence that ESG factors have the potential to influence stock returns; however, studies examining the relevance of ESG to stock returns within the ASEAN region remain scarce.

Given the development of ESG in the ASEAN region and the still limited empirical evidence at the regional level, this study examines the role of ESG within the asset pricing framework in ASEAN stock markets, with the focus narrowed to ASEAN-5: Indonesia, Malaysia, Singapore, Thailand, and the Philippines. This grouping shows up repeatedly in the international literature on ASEAN capital markets and financial integration (Majid et al., 2008; Corbacho, 2020), and is recognized as home to the region's leading equity markets (Hersugondo et al., 2022). In addition to having relatively more developed capital markets, the ASEAN-5 countries also exhibit varying levels of ESG development, information disclosure quality, and investor characteristics. These conditions make the ASEAN-5 a relevant context for testing

whether ESG is consistently priced in by investors in the formation of expected stock returns.

However, empirical evidence on the role of ESG within the Fama-French framework in ASEAN markets remains limited. Therefore, this study is positioned as a replication study by adopting the empirical framework developed by Lu (2025), which examines the role of ESG factors within the Fama-French Three-Factor Model in explaining stock returns in the Chinese market. The Author extends this framework through contextual variation by applying it to the ASEAN-5 equity markets over the period January 2020 to December 2025.

Furthermore, ESG disclosure data from 2019 to 2024 are utilized to construct a lagged ESG variable (t−1), and the Extended Fama–French Three-Factor Model is employed to assess whether ESG characteristics carry a systematic risk premium in shaping expected stock returns. By doing so, this study aims to evaluate the consistency of ESG–return relationships across different market environments, particularly in emerging markets with distinct institutional characteristics compared to China. Accordingly, this study is titled **"Analyzing ESG Risk Pricing Using an Extended Fama–French Three-Factor Model: Evidence from ASEAN-5 Equity Markets."**

1.2 Research Questions

Based on the research background described above, the research problems are formulated as follows:

a) Do the market risk premium, the size factor (SMB), and the value factor (HML) affect excess stock returns in the ASEAN-5 stock markets?

b) Does ESG disclosure have an impact on excess stock returns after accounting for the market risk premium, the size factor (SMB), and the value factor (HML) in the ASEAN-5 capital markets?

c) Does the inclusion of ESG disclosures improve the ability of the Fama-French Three-Factor Model to explain excess stock returns in the ASEAN-5 capital markets?

1.3 Research Objectives

Based on the problems identified and the empirical gaps in the literature, this study aims to:

a) Examining the effects of the market risk premium, the size factor (SMB), and the value factor (HML) on excess stock returns in the ASEAN-5 capital markets.

b) Examining the effect of ESG disclosure on excess stock returns after accounting for the market risk premium, SMB, and HML in the ASEAN-5 capital markets.

c) To analyze whether the inclusion of ESG disclosure improves the ability of the Fama-French Three-Factor Model to explain excess stock returns in the ASEAN-5 capital markets.

1.4 Research Contributions

This study aims to add something on both the theoretical and empirical sides of the asset-pricing literature. More specifically, its intended contributions are the following:

1.4.1 Theoretical contributions

a) By evaluating what role ESG characteristics play inside the Fama–French Three-Factor Model framework for the ASEAN-5 region, this study broadens the asset-pricing literature.

b) It also builds a conceptual account of how ESG disclosure, treated as a non-traditional characteristic, can enter an asset-pricing model as an extra variable without touching the underlying FF3 factors or turning ESG disclosure into a factor-mimicking portfolio.

1.4.2 Empirical contributions

a) This study supplies empirical evidence on whether ESG disclosure carries pricing relevance for variation in excess stock return throughout the ASEAN-5 region.

b) It further checks whether adding ESG disclosure lifts the explanatory power of the Fama–French Three-Factor Model.

1.4.3 Practical contributions

a) The intent is that investors and capital-market practitioners in the ASEAN-5 region gain something practical here, namely a reason to weigh ESG characteristics alongside risk analysis and investment strategy.

1.5 Systematics of Writing

For readability, this thesis is laid out across five chapters that link together into one continuous line of argument, structured as follows:

CHAPTER I INTRODUCTION

This chapter lays out the research background, the problem formulation, the objectives, the intended contributions, and how the thesis is organized, giving an initial sense of the study's context and direction.

CHAPTER II LITERATURE REVIEW

This chapter sets out the theoretical foundation and reviews the literature bearing on the research topic, closing with the hypotheses that will later be tested empirically.

CHAPTER III RESEARCH METHOD

This chapter covers the research approach and design, the data sources and types used, how each variable is operationally defined, and the analytical techniques applied when testing the hypotheses.

CHAPTER IV RESULTS AND ANALYSIS

This chapter reports the empirical results drawn from the data analysis and discusses the findings against the backdrop of the theoretical framework and earlier studies.

CHAPTER V CONCLUSION AND SUGGESTION

This chapter presents the results of the empirical analysis derived from data processing and discusses the research findings by relating them to the theoretical framework and previous research.

CHAPTER II

LITERATURE REVIEW

This chapter discusses the literature review underlying this research, which consists of: (i) the theoretical foundation related to capital market theory, Efficient Market Hypothesis, and asset pricing theory, particularly the Fama–French Three-Factor Model and ESG concept, (ii) previous studies related to ESG and stock return, (iii) conceptual framework, and (iv) hypothesis development based on previous empirical studies.

2.1 Theoretical Foundation

This section explains the theories and concepts underlying this research, including Efficient Market Hypothesis, asset pricing theory, Fama–French Three-Factor Model, and ESG concept. These theories are used to explain the relationship between ESG characteristics and stock return within the asset pricing framework.

2.1.1 Modern Portfolio Theory

Modern Portfolio Theory (MPT), one of the pillars of contemporary finance, was introduced by Harry Markowitz in a 1952 article titled "Portfolio Selection," published in The Journal of Finance. At its core, the theory argues that sound investment decisions cannot be based on chasing the highest possible return alone; the risk attached to that return must be factored in as well (Markowitz, 1952).

Prior to MPT, prevailing investment wisdom held that investors would simply choose whichever asset offered the highest expected return, a rule that, taken to its

logical conclusion, would mean concentrating an entire fund in one single top-performing asset. In practice, however, investors typically hold diversified portfolios spanning multiple assets. Markowitz (1952) drew on precisely this observation to challenge return-maximization as a complete investment guide, contending that it could not explain why investors so plainly account for risk alongside return.

Markowitz (1952) holds that a rational investor's decisions are governed by two considerations: expected return and risk. Expected return refers to the gain an investor anticipates, whereas risk is conventionally proxied by the variance or standard deviation of returns. Balancing these two considerations enables an investor to identify the asset combination offering the highest attainable return for any given level of risk.

The theory also places particular weight on diversification. Markowitz demonstrates that a portfolio's total risk depends not merely on the risk of each asset held individually, but on the degree to which those assets' returns move together. By combining assets whose returns are not perfectly correlated, an investor can lower portfolio risk while giving up comparatively little expected return, a principle that later became foundational to subsequent asset-pricing models, among them the Capital Asset Pricing Model and the Fama–French Three-Factor Model.

2.1.2 Efficient Market Hypothesis

The Efficient Market Hypothesis (EMH) is concerned with how information becomes embedded in stock prices, positing that prices already incorporate all available information and thus leave investors little scope to consistently outperform the market.

In other words, any new and relevant piece of information is absorbed by market participants almost instantly and is reflected in the price without delay (Fama, 1970).

Market efficiency is closely bound up with the random-walk hypothesis, which holds that stock-price movements are essentially unpredictable. Because new information arrives without warning and investors act on it through trading almost immediately, prices adjust quickly and cannot reliably be forecast from historical price patterns alone (Bodie et al., 2018). Market efficiency is conventionally split into three forms. Under weak-form efficiency, prices already incorporate all historical data, including past prices and trading volumes, so technical analysis based solely on historical patterns cannot consistently generate abnormal returns. Semi-strong form efficiency broadens this to encompass all publicly available information, such as financial statements, corporate announcements, and economic news. Strong-form efficiency goes furthest, asserting that prices reflect every piece of information available, whether public or private (Fama, 1970).

Although EMH offers a coherent theoretical explanation for how prices absorb information, a considerable body of empirical research has uncovered market anomalies, including the size and value effects, indicating that certain firm characteristics do in fact influence stock returns. Such evidence is what motivated researchers to build more comprehensive asset-pricing models, of which the Fama–French Three-Factor Model is a leading example, since it incorporates size and value alongside market risk to explain return variation (Fama & French, 1993).

In this study, the EMH is relevant because ESG disclosure constitutes public information available to investors. Based on the semi-strong form of the efficient market hypothesis, public information should already be reflected in stock prices and thus no longer provide additional information for consistently generating abnormal returns (Fama, 1970). However, a number of studies indicate that ESG characteristics still have the potential to influence expected stock returns through investor preferences or sustainability risks (Pástor et al., 2021; Bolton & Kacperczyk, 2021). That could well be true in ASEAN-5 as well, given several factors: sustainability reports typically need time before investors have fully digested them, so ESG information does not land in prices instantly, analyst and institutional-investor coverage in the region still lags developed markets, and ESG disclosure standards and quality continue to differ from one ASEAN-5 country to the next. EMH therefore serves here as a lens for asking whether ESG disclosure is already fully priced in, or still carries information relevant to how expected returns get formed.

2.1.3 Capital Asset Pricing

Developed by William F. Sharpe, the Capital Asset Pricing Model (CAPM) establishes a link between risk and an asset's expected return within the capital market. Its core proposition holds that an asset's return moves together with its systematic risk relative to the broader market, and that, under this framework, investors are compensated solely for the risk that diversification cannot eliminate (Sharpe, 1964).

In CAPM, a stock's risk is measured using beta (β), a measure of how sensitive a stock's return is to changes in the market return. Beta reflects a stock's systematic risk relative to the market as a whole. A beta greater than one indicates that the stock's return tends to be more sensitive to market movements, while a beta below one indicates comparatively lower risk. The relationship between systematic risk and expected return under CAPM can be expressed through the following equation:

$$E(R_i) = R_f + \beta_i(E(R_m) - R_f)$$

$E(R_i)$ is the stock's expected return, R_f is the risk-free rate, $E(R_m)$ is the expected market return, and β_i denotes the stock's systematic risk relative to the market (Sharpe, 1964).

A key implication of CAPM is that investors are rewarded exclusively for bearing systematic risk, since this is the component diversification cannot remove. Firm-specific risk, on the other hand, vanishes once a portfolio has been sufficiently diversified and therefore commands no additional return compensation (Sharpe, 1964).

While CAPM's depiction of the risk-return relationship is elegantly parsimonious, a considerable body of empirical research reveals that it falls short in explaining the return variation observed in real markets. Certain firm characteristics, among them firm size and the book-to-market ratio, have been found to correlate with stock returns, a discovery that spurred the development of more comprehensive asset-pricing models, most notably the multifactor model devised by Eugene Fama and Kenneth French (Fama & French, 1993).

2.1.4 Fama-French Three-Factor Model

Eugene Fama and Kenneth French constructed the Fama–French Three-Factor Model (FF3) as an extension of CAPM, designed to explain the portion of stock-return variation that market risk alone cannot account for. The model emerged from their finding that certain firm characteristics move together with stock returns in a systematic manner (Fama & French, 1993).

In addition to market risk, Fama and French identified two further factors that help account for variation in stock returns: firm size and the book-to-market ratio. Smaller companies tend to generate stronger returns than larger ones, and firms with higher book-to-market ratios similarly tend to post stronger performance. These two patterns gave rise to a three-factor model built around market risk, firm size, and firm value, expressed as follows:

$$R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + s_i SMB_t + h_i HML_t + \varepsilon_{it}$$

R_{it} is the stock return of firm i in period t, R_{ft} is the risk-free rate in period t, and R_{mt} is the market return in period t. The factor SMB_t (Small Minus Big) represents the return difference between small and large firms, while HML_t (High Minus Low) represents the return difference between firms with high and low book-to-market ratios. The coefficients β_i, s_i, and h_i denote the stock return's sensitivity to each risk factor.

Compared with CAPM, this model gives a fuller account of return variation by drawing on market, size, and value factors together. Here, FF3 is the baseline asset-pricing model, extended only through the addition of the ESG Disclosure Score, to

check whether ESG characteristics add any explanatory power once the market risk premium, SMB, and HML are already accounted for.

2.1.5 Stakeholder Theory

Stakeholder Theory holds that a firm's responsibilities extend far beyond its shareholders to encompass everyone affected by its operations, including employees, customers, suppliers, government bodies, the wider public, and the environment. A firm's long-term sustainability is largely shaped by how effectively it manages these relationships and obligations (Freeman, 1984). Viewed through this lens, ESG disclosure functions simply as the mechanism through which firms communicate to investors and other stakeholders how they are managing their environmental, social, and governance footprint.

Seen in this light, Environmental, Social, and Governance (ESG) practices serve as one mechanism for easing such conflicts. The governance dimension of ESG relates to greater transparency and accountability, whereas the environmental and social dimensions signal a firm's commitment to sustainability and to those affected by its decisions. Strong ESG practice can, following this reasoning, reduce agency costs and strengthen investor confidence.

2.1.6 Environmental, Social, and Governance (ESG)

Environmental, Social, and Governance (ESG) serves as a framework for evaluating firm performance along three dimensions: how a company manages the environmental impact of its operations, how it handles its relationships with stakeholders, and the quality of its governance practices. The environmental dimension encompasses matters such as emissions, energy consumption, and resource

management; the social dimension covers a firm's dealings with employees, customers, and the broader community, including labor welfare and social responsibility; and the governance dimension addresses the structures and practices, transparency, accountability, and management oversight, that underlie how a firm is run (Gillan et al., 2021).

In recent years, ESG has come to play an increasingly prominent role in investor decision-making, based on the premise that ESG information conveys aspects of a firm's risk and quality that conventional financial metrics fail to capture (Pástor et al., 2021).

2.1.7 ESG Disclosure Score

The ESG Disclosure Score measures the extent to which a company discloses information about its environmental, social, and governance practices, reflecting how much it shares regarding sustainability, social responsibility, and governance with investors and other stakeholders. Investors have shown growing interest in ESG disclosure in recent years, based on the premise that it conveys information about firm quality and long-term risk beyond what conventional financial data reveal. A higher score can likewise signal stronger corporate transparency, which supports investor decision-making (Gillan et al., 2021).

The decision to adopt the ESG Disclosure Score as this study's central measure is further grounded in Voluntary Disclosure Theory, which conceives of disclosure as a mechanism for narrowing the information gap between firms and investors (Verrecchia, 2001). More extensive disclosure is thought to lower the cost of

capital by reducing both perceived systematic risk and estimation risk, which conceptually translates into a lower expected return within an asset-pricing framework (Lambert et al., 2007). Dhaliwal et al. (2011) find supporting evidence that starting voluntary CSR reporting lowers the cost of equity capital, particularly for firms with strong social performance, which suggests disclosure itself moves investors' required return regardless of how substantively strong that performance actually is. This lines up with the broader disclosure-cost of capital literature, where more disclosure tends to go with a lower cost of equity capital via less information asymmetry (Leuz and Verrecchia, 2000; Botosan, 1997).

2.1.8 ESG in Asset Pricing

A growing strand of literature indicates that ESG characteristics are relevant to explaining stock-return variation within asset-pricing frameworks. ESG extends beyond a firm's environmental, social, and governance obligations to also shape how investors perceive a firm's risk, information quality, and future prospects (Pástor et al., 2021). In this study, ESG is not constructed as a portfolio factor but is instead measured at the firm level through the ESG Disclosure Score.

Two principal mechanisms connect ESG disclosure to expected return within an asset-pricing setting. Under the first, the risk-based mechanism, firms that disclose little on ESG matters tend to be perceived as bearing greater regulatory, reputational, operational, or information-asymmetry risk, prompting investors to require a higher return as compensation. Firms disclosing more extensively, by contrast, tend to be

perceived as lower-risk and less informationally uncertain, allowing investors to accept a lower required return (Pástor et al., 2021; Bolton & Kacperczyk, 2021).

Thus, whether through the risk-based channel or the investor preference channel, ESG disclosure is expected to have a negative relationship with expected stock returns. In the risk-based channel, higher ESG disclosure is associated with lower perceived risk, thereby reducing the required return. In the preference channel, investor preference for companies with better ESG characteristics increases demand and stock prices, thereby reducing future expected returns. Therefore, this study estimates that ESG disclosure has a negative effect on excess stock returns.

Taken together, the theories outlined above form an integrated conceptual framework underlying this study's research model. Modern Portfolio Theory (Markowitz, 1952) establishes the foundational premise that investment decisions must consider the trade-off between risk and return, which was subsequently operationalized quantitatively through CAPM (Sharpe, 1964) as a linear relationship between systematic risk (beta) and expected return. The Efficient Market Hypothesis (Fama, 1970) complements this framework by assuming that stock prices reflect available information, including the market risk premium embedded in CAPM, while also providing the theoretical basis for testing whether non-traditional information such as ESG disclosure is already fully reflected in prices or still carries incremental relevance. Because CAPM proved insufficient in fully explaining stock return variation, Fama and French (1993) developed a three-factor model that incorporates size and value as additional risk factors beyond market risk.

Meanwhile, Stakeholder Theory (Freeman, 1984) provides the conceptual foundation for why non-financial information such as ESG is relevant to firms and investors, positing that corporate sustainability depends on managing relationships with all stakeholders, not shareholders alone. The ESG in Asset Pricing framework then bridges Stakeholder Theory with quantitative asset pricing models (CAPM and FF3) through the risk-based channel and the investor preference channel, which explain the mechanisms by which ESG characteristics can influence perceived risk and expected stock return (Pástor et al., 2021; Bolton & Kacperczyk, 2021). Accordingly, this study integrates MPT, CAPM, EMH, and FF3 as the quantitative asset pricing framework, with Stakeholder Theory serving as the conceptual foundation for the relevance of ESG, to form the Extended Fama-French Three-Factor Model that incorporates ESG Disclosure Score as an additional variable in explaining excess stock return.

2.2 Previous Research

There is still limited research that specifically examines ESG disclosure as an additional firm-level variable within an Extended Fama–French Three-Factor Model in ASEAN-5 capital markets. However, several previous studies related to ESG, expected return, and asset pricing can be used as references and comparison materials. Previous studies are presented as follows:

1. Luboš Pástor et al. (2021)

   Pastor et al. (2021) build an equilibrium asset-pricing model that traces how sustainability characteristics, together with investor preferences for green assets, can move asset prices and expected returns, and find that stocks with

stronger ESG characteristics tend toward lower expected returns as investor demand for sustainable assets climbs. The paper matters as a theoretical anchor for ESG in asset pricing, though it stops short of testing the relationship empirically on any specific company sample.

2. Gillan et al. (2021)

   Gillan et al. (2021) review the literature connecting ESG to corporate finance, firm risk, cost of capital, firm value, stock return, and investor preference among the topics covered, and find that ESG tends to go with lower risk and cost of capital, though its link to expected return has yet to settle into a consistent pattern. The review is useful for establishing that ESG carries financial weight, but it stops short of testing ESG disclosure specifically as an added variable inside an Extended Fama–French Three-Factor Model.

3. Bolton & Kacperczyk (2021)

   Bolton and Kacperczyk (2021) ask whether carbon risk gets priced by investors, using carbon emissions as their proxy for environmental risk, and find that firms emitting more carbon tend to post higher expected returns, evidence of a carbon risk premium. That backs the broader claim that sustainability-risk exposure can carry pricing relevance, though the study's lens stays fixed on carbon risk rather than ESG disclosure taken as a whole.

4. Albuquerque et al. (2020)

   Albuquerque et al. (2020) look at how environmental and social (ES) scores relate to U.S. firms' stock performance through the COVID-19 crisis, finding

that firms with higher ES scores weathered the crisis with better returns, lower volatility, and stronger operating performance. That points to sustainability bolstering firm resilience, though the study stops short of testing ESG directly inside a Fama–French asset-pricing framework.

5. Broadstock et al. (2021)

   Broadstock et al. (2021) test how ESG performance relates to return and risk among CSI300-listed Chinese firms across the COVID-19 pandemic, finding that stronger-ESG firms tended toward better returns and lower risk, particularly on the environmental and governance fronts. The study underscores ESG's relevance to returns under crisis conditions, though it stays confined to the Chinese market and the pandemic window.

6. Mulialim & Madyan (2023)

   Mulialim and Madyan (2023) look at how ESG factors into excess stock return via an asset-pricing lens applied to the Indonesian market, a study made relevant by folding ESG directly into the Fama–French Three-Factor Model framework. They find ESG adds information beyond what the standard factors explain. Because the sample is confined to Indonesia, though, it offers no regional evidence for ASEAN-5 as a whole.

7. Lu (2025)

   Lu (2025) tests whether adding an ESG score as an extra variable sharpens the Fama–French Three-Factor Model's ability to explain returns for China A-share firms across 2018-2023, finding that ESG lifts the model's explanatory

power via a higher R-squared. The study is relevant for its use of an Extended Fama–French Three-Factor Model, though its Chinese-firm sample cannot speak to ESG's role in an ASEAN setting.

8. Jonathan Dol (2021)

   Dol (2021) tests how the ESG score, and its individual E, S, and G components, affect excess stock return for Russell 1000 Index firms using a Fama–French approach, and turns up mixed results: some ESG dimensions come out significant, others do not hold up consistently. The study pairs the Fama–French framework with ESG, which is useful, but its sample comes from the developed U.S. market, so the findings will not necessarily transfer to ASEAN-5, where market characteristics and ESG disclosure quality both differ.

Table 2.1 Previous Research

No.	Title	Research Variables	Sample & Method	Research Findings
1.	Sustainable Investing in Equilibrium (Pástor et al., 2021).	ESG investor preference, green characteristics, expected return, market equilibrium	**Sample:** No direct firm sample, as this is a theoretical paper. **Method:** Theoretical equilibrium asset pricing model.	1. Investor preference toward ESG affects stock prices and expected returns. 2. Green assets tend to have lower expected returns than brown assets. 3. ESG can influence equilibrium asset pricing through changes in investor demand for sustainable stocks.

2.	Firms and Social Responsibility: A Review of ESG and CSR Research in Corporate Finance. (Gillan et al., 2021)	ESG/CSR performance, stock return, firm value, cost of capital, firm risk, investor preference	**Sample:** Various ESG and corporate finance studies. **Method:** Literature review and conceptual review.	1. Most studies show that ESG is associated with lower firm risk and lower cost of capital. 2. ESG can influence investor demand, stock pricing, and expected returns. 3. The relationship between ESG and expected return remains inconclusive in the literature.
3.	Do Investors Care About Carbon Risk? (Bolton & Kacperczyk, 2021).	**Independent variable:** Carbon emissions/carbon intensity. **Dependent variable:** Stock return. **Control variables:** Market factor, size, value, momentum, profitability, investment factors.	**Sample:** Public companies in the United States. **Method:** Panel regression and asset pricing approach.	1. Firms with higher carbon emissions tend to have higher expected returns. 2. Investors require a risk premium for carbon risk exposure. 3. Carbon risk has become increasingly priced in equity markets as climate change concerns intensify
4.	Resiliency of Environmental and Social Stocks: An Analysis of the COVID-19 Market Crash. (Albuquerque et al., 2020).	**Independent variable:** Environmental and Social (ES) score. **Dependent variables:** Abnormal return, stock volatility, operating performance. **Control variables:** Firm size, leverage, Tobin's Q, cash holdings, ROE, dividend payout.	**Sample:** Public companies in the United States during the COVID-19 period. **Method:** Cross-sectional regression and difference-in-differences (DiD).	1. Firms with higher ES scores experienced better stock returns during the COVID-19 crisis. 2. Firms with higher ES scores showed lower stock volatility. 3. ESG improves corporate resilience during crisis periods.

5.	The Role of ESG Performance during Times of Financial Crisis: Evidence from COVID-19 in China. (Broadstock et al., 2021).	**Independent variable:** ESG score (E, S, G). **Dependent variables:** Stock return, cumulative abnormal return, stock volatility. **Control variables:** Leverage, book-to-market ratio, firm size.	**Sample:** CSI300 constituent firms in China during the COVID-19 pandemic. **Method:** Event study and empirical asset pricing model.	1. Firms with higher ESG performance achieved better stock returns during the COVID-19 pandemic. 2. ESG performance was associated with lower stock risk. 3. Environmental and governance dimensions had stronger positive effects on stock returns than the social dimension.
6.	How Does ESG Explain Excess Returns in Emerging Market? An Asset-Pricing Approach (Mulialim & Madyan, 2023).	**Independent variable:** ESG score. **Dependent variable:** Excess stock return. **Control variables:** Asset pricing factors.	**Sample:** Emerging market companies. **Method:** Asset pricing approach using regression analysis.	1. ESG was found to have an association with excess stock return in emerging markets. 2. ESG can provide additional information in explaining stock return within the asset pricing framework. 3. The findings indicate that ESG may be considered by investors in investment decision-making.
7.	Examination of the Enhanced Fama–French Three-factor Model Approach Based on ESG Individual Data (Lu, 2025).	**Independent variable:** ESG score. **Dependent variable:** Stock return. **Control variables:** Market risk premium (MRP), SMB, HML.	**Sample:** Companies listed on the Chinese A-share market during 2018–2023. **Method:** Regression	1. ESG improved the explanatory power of the Fama–French Three-Factor Model. 2. ESG helped explain stock return variations not captured by the traditional FF3 model.

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			analysis using extended Fama–French Three-Factor Model.	3. ESG performance was associated with investor trust and market recognition.
8.	Expanding the Fama & French Models with ESG scores: Evidence from the Russell 1000 index (Dol, 2021).	**Independent variable:** ESG score, Environmental score, Social score, Governance score. **Dependent variable**: Excess stock return. **Control variables:** Beta, market capitalization, book-to-market ratio.	**Sample:** Companies listed in the Russell 1000 Index during 2010–2020. **Method:** Fama–MacBeth regression and portfolio analysis using the Fama–French framework**.**	1. ESG showed mixed results on excess stock returns. 2. Social score had a positive significant effect on stock return in equal-weighted portfolios. 3. Governance score showed a negative significant effect on stock return. 4. Several ESG components were not statistically significant across different model specifications.

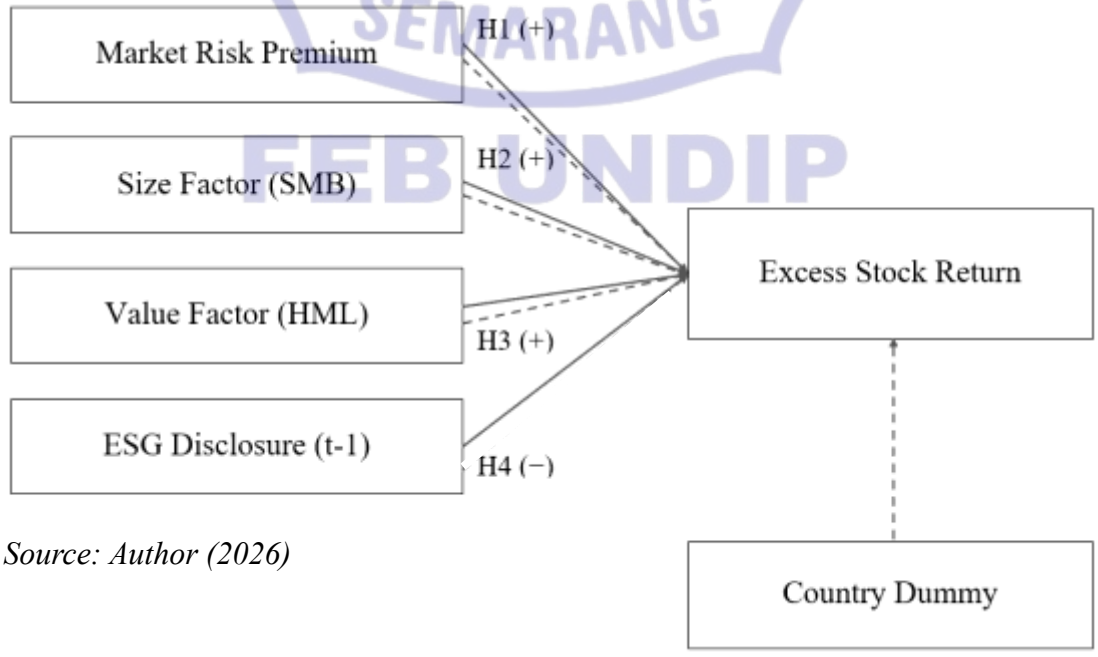
Based on the previous studies, ESG has been examined in relation to stock return, expected return, and asset pricing. Pástor et al. (2021) provides the theoretical foundation that ESG can affect asset prices and expected returns through investor preference and sustainability-related risk. Bolton & Kacperczyk (2021) show that carbon risk can be priced in the equity market. Albuquerque et al. (2020) and Broadstock et al. (2021) further demonstrate that ESG and ES scores are associated with stronger stock performance and lower risk during crisis periods, particularly around the COVID-19 pandemic, in the United States and Chinese markets respectively. Meanwhile, Mulialim & Madyan (2023), Lu (2025), and Dol (2021)

examine ESG within the Fama–French framework. However, most previous studies focus on theoretical models, developed markets, crisis periods, or single-country samples such as the United States, Indonesia, and China. In addition, prior studies generally use ESG score, ESG performance, or carbon emissions, whereas this study uses lagged ESG Disclosure Score as a firm-level ESG characteristic. Therefore, this study addresses the gap by examining whether ESG disclosure has incremental pricing relevance for excess stock return after controlling for the three baseline FF3 factors in ASEAN-5 equity markets. The study does not construct a separate ESG factor-mimicking portfolio.

2.3 Conceptual Framework

This study's conceptual framework rests on asset-pricing theory and on earlier work connecting stock returns to ESG, with the Fama–French Three-Factor Model serving as the baseline.

Figure 2.1 Conceptual Framework



Source: Author (2026)

Within this model, the market risk premium captures the compensation investors demand for bearing systematic market risk (Sharpe, 1964), while SMB and HML pick up, respectively, how firm size and the book-to-market ratio affect stock returns. On top of these three factors, a growing body of literature ties ESG information to stock returns, which is the reason this study leans on the ESG Disclosure Score as its main proxy. Voluntary Disclosure Theory (Verrecchia, 2001) holds that more disclosure narrows the information gap between firms and investors, which pulls down the cost of equity capital (Lambert et al., 2007; Dhaliwal et al., 2011). Heavier ESG disclosure can also signal lower non-financial risk on the regulatory, reputational, and operational fronts, a pattern that fits both the risk-based channel and the investor-preference channel documented in the ESG asset-pricing literature (Bolton & Kacperczyk, 2021; Pástor et al., 2021)

Because the sample draws on five ASEAN countries that differ in institutional setup, regulation, and capital-market maturity, a country dummy enters the model as a control variable, meant to soak up cross-country heterogeneity that the three FF3 factors leave untouched.

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2.4 Hypothesis

2.4.1 Market Risk Premium and Excess Stock Return

Asset-pricing theory posits that investors require a higher return to compensate for market risk that cannot be diversified away, risk represented here by the market risk premium, defined as the gap between the market return and the risk-free rate. Sharpe (1964), through the Capital Asset Pricing Model (CAPM), links a

stock's expected return to its systematic risk, and Fama and French (1993) subsequently confirm that market excess return continues to account for the bulk of stock-return variation within the Fama–French Three-Factor Model. Empirical studies in Asian and ASEAN markets further confirm this relevance. Foye (2018) and Ekaputra and Sutrisno (2020) find that market risk premium remains the dominant factor in explaining stock return variation in Asian emerging markets, even when compared to more complex models such as the Fama-French Five-Factor Model.

The market risk premium is particularly relevant in ASEAN-5 given that the region's equity markets remain sensitive to changing macroeconomic conditions, market volatility, and shifts in investor capital flows. As the market risk investors face increases, so too does the return they demand in compensation, implying that the market risk premium should be positively related to excess stock return. This reasoning underlies the following hypothesis:

H1: The market risk premium has a positive effect on excess stock return.

2.4.2 Size Factor (SMB) and Excess Stock Return

Among the core factors within the Fama–French Three-Factor Model, the size factor is intended to capture the return gap between small and large firms, and is measured via SMB (Small Minus Big), the return spread between small-cap and large-cap portfolios. Fama and French (1993) document that small firms outperform large ones, a pattern they attribute to the greater risk small firms carry. The relevance of the size factor in the Asian market context is further supported by Foye (2018) and Ekaputra and Sutrisno (2020), who find that SMB remains a significant factor in

explaining stock return variation in Asian emerging markets, including Indonesia and Singapore.

Small firms generally contend with more limited access to funding, lower stock liquidity, narrower business diversification, and heightened sensitivity to economic shifts, characteristics that are especially relevant in ASEAN-5 given the considerable variation in firm size and liquidity across the region's capital markets. Investors consequently tend to demand a higher expected return on small-firm stocks to compensate for this additional risk, leading to the following hypothesis:

H2: The size factor (SMB) has a positive effect on excess stock return.

2.4.3 Value Factor (HML) and Excess Stock Return

In addition to firm size, Fama and French (1993) demonstrate that the book-to-market ratio also contributes to explaining return variation. Within the Fama–French Three-Factor Model, the value factor is measured via HML (High Minus Low), representing the return spread between high and low book-to-market stocks. Firms with high book-to-market ratios are conventionally termed value stocks, while those with low ratios are termed growth stocks. Similar findings are also confirmed by Foye (2018) and Ekaputra and Sutrisno (2020), who show that HML continues to contribute significantly to explaining stock return variation in Asian markets, including Indonesia and Singapore, as part of the Fama-French Three-Factor Model framework.

Value stocks tend to carry greater fundamental risk, weaker growth prospects, or comparatively less favorable market conditions relative to growth stocks, prompting investors to demand a higher return for holding them. Within the ASEAN-5 context,

HML captures the return differences arising from these value characteristics across the region's equity markets, giving rise to the following hypothesis:

H3: The value factor (HML) has a positive effect on excess stock return.

2.4.4 ESG Factor and Excess Stock Return

Asset-pricing scholarship increasingly regards non-financial information, particularly Environmental, Social, and Governance (ESG) considerations, as a factor investors weigh alongside conventional financial risk measures. In this study, ESG is proxied through the ESG Disclosure Score, an indicator of how extensively a firm discloses ESG-related information, and it is added to the model as a firm-level characteristic variable layered onto the baseline FF3 rather than as a portfolio factor equivalent to MRP, SMB, or HML.

Theoretically, two mechanisms tie ESG disclosure to excess stock return. Under the risk-based mechanism, firms that disclose little ESG information tend to be perceived as carrying elevated regulatory, reputational, operational, and information-asymmetry risk, leading investors to demand higher compensation. Firms that disclose more, in contrast, tend to be perceived as less risky and less uncertain, so their required return is correspondingly lower (Bolton & Kacperczyk, 2021; Pástor et al., 2021). Under the investor-preference mechanism, investors may simply gravitate toward firms with stronger ESG attributes, and this preference drives up both demand and share price for heavily ESG-disclosing stocks, which in turn depresses their subsequent expected return. Both mechanisms point in the same direction: a negative relationship between ESG disclosure and excess stock return (Pástor et al., 2021). Empirical findings from

Mulialim and Madyan (2023) in the Indonesian market further support this proposition, showing that ESG provides significant additional information in explaining excess stock return when incorporated into the Fama-French Three-Factor Model framework.

Studies treating ESG disclosure as an extra variable inside an Extended Fama–French Three-Factor Model, specifically for ASEAN-5, remain thin on the ground, which is why this study asks whether prior-year ESG disclosure affects excess stock return once the market risk premium, SMB, and HML are already in the model. A significant ESG disclosure coefficient would point to incremental pricing relevance at the firm level, not the emergence of a standalone ESG risk factor. That reasoning gives the following hypothesis:

H4: ESG disclosure has a negative effect on excess stock return.

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CHAPTER III

RESEARCH METHODS

3.1 Research Variables and Operational Definition

3.1.1 Dependent Variable

3.1.1.1 Excess Stock Return

The dependent variable here is excess stock return. Within an asset-pricing lens, stock return captures what an investor earns from holding a given stock, and this study specifically uses excess stock return, the gap between stock return and the risk-free rate, an approach common in asset-pricing models for measuring return net of the risk-free benchmark (Fama & French, 1993). Stock return itself comes from the monthly change in stock price, via the formula below:

$$R_{i,c,t} = \frac{P_{i,c,t} - P_{i,c,t-1}}{P_{i,c,t-1}}$$

Excess stock return then follows from this equation:

$$ER_{i,c,t} = R_{i,c,t} - R_{f,c,t}$$

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Description:

$R_{i,c,t}$ = the stock return of firm i in country c in period t

$R_{f,c,t}$ = the risk-free rate of country c in period t

$ER_{i,c,t}$ = *excess stock return* of firm i in country c in period t

$P_{i,c,t}$ = the stock price of firm i in country c in period t

$P_{i,c,t-1}$ = the stock price of firm i in country c in period t in the preceding period

Stock prices here are monthly closing prices pulled from the Bloomberg Terminal.

3.1.2 Independent Variable

3.1.2.1 ESG Disclosure Score

The primary independent variable in this study, the ESG Disclosure Score, is sourced from the Bloomberg Terminal and reflects the breadth of a firm's disclosure on environmental, social, and governance matters to investors and other stakeholders. Within the framework of this study, ESG disclosure operates as a firm-level characteristic that can influence how investors perceive a firm's risk, transparency, and sustainability (Pástor et al., 2021).

Bloomberg derives its ESG Disclosure Score from the information a firm discloses in its annual report, sustainability report, and other corporate documents, on a scale from 0 to 100, with higher values indicating broader disclosure. To mitigate look-ahead bias, this study uses the ESG Disclosure Score at t-1 to explain monthly returns in year t, applied consistently across each monthly observation for a given firm within that year, requiring ESG data from the year preceding the return period to properly align the analysis.

3.1.3 Control Variable

3.1.3.1 Market Risk Premium

As the first factor in the baseline FF3, the market risk premium captures how systematic market risk feeds into excess stock return. Asset-pricing theory reads it as the compensation investors demand for market risk that diversification cannot remove (Sharpe, 1964), measured as the gap between the market return and the risk-free rate via the equation below:

$$MRP_{c,t} = RM_{c,t} - RF_{c,t}$$

Description:

$MRP_{c,t}$ = *market risk premium* of country c in period c, t

$RM_{c,t}$ = the market return of country c in period c, t

$RF_{c,t}$ = *risk-free rate* of country c in period c, t

The market return here comes from the monthly return on each ASEAN-5 country's main stock index, while the risk-free rate uses the matching risk-free return for that same country and period, which makes the market risk premium country-month specific by construction.

3.1.3.2 Size Factor (SMB)

Second among the baseline FF3 factors is the size factor, measured through SMB (Small Minus Big) and built from six portfolios formed via an independent 2x3 sort on firm size and the book-to-market ratio: S/L, S/N, S/H, B/L, B/N, and B/H (Fama & French, 1993).

Each ASEAN-5 country gets its own portfolios, formed separately. Firms split into Small (S) and Big (B) groups by median market capitalization, while the book-to-market ratio splits into Low (L), Neutral (N), and High (H) groups based on each country's 30th and 70th percentiles. Crossing these two classifications produces six portfolios, and each portfolio's monthly return is computed via the value-weighted method, with each stock's weight set by its market capitalization, in line with Fama and French's (1993) methodology. SMB follows from this equation:

$$SMB_{c,t} = \frac{[(S/L)_{c,t} + (S/N)_{c,t} + (S/H)_{c,t}]}{3} - \frac{[(B/L)_{c,t} + (B/N)_{c,t} + (B/H)_{c,t}]}{3}$$

Where:

c denotes country and t denotes the month of observation

S/L , S/N, and S/H = the returns of the Small-firm portfolios in the Low, Neutral, and High book-to-market groups.

B/L , B/N, and B/H = the returns of the Big-firm portfolios in the Low, Neutral, and High book-to-market groups.

SMB = the difference between the average return of the three Small portfolios and the average return of the three Big portfolios.

Portfolio membership here gets fixed at each annual rebalancing and stays in place for computing monthly returns until the next rebalancing point. Whatever market capitalization and accounting information feeds into the sorting has to predate the return period being explained, so as to avoid look-ahead bias (Fama & French, 1993).

3.1.3.3 Value Factor (HML)

Third among the baseline FF3 factors is the value factor, measured through HML (High Minus Low), built from the same six 2x3 portfolios used for SMB and capturing the return gap between high and low book-to-market stocks (Fama & French, 1993). HML follows from this equation:

$$HML_{c,t} = \frac{[(S/H)_{c,t} + (B/H)_{c,t}]}{2} - \frac{[(S/L)_{c,t} + (B/L)_{c,t}]}{2}$$

Where:

c denotes country and t denotes the month of observation

S/H and B/H = the return of the high book-to-market portfolio

S/L and B/L = the return of the low book-to-market portfolio

HML = the difference between the average return of the high and low portfolios.

HML portfolios here get rebalanced annually using book-to-market ratio data, with portfolio returns computed monthly via the value-weighted method, matching how the SMB factor is built.

3.1.3.4 Country Dummy

A country dummy enters the model as a control variable, meant to capture differences in average excess stock return across ASEAN-5 countries that the country-specific market risk premium, size factor, and value factor leave uncaptured, differences that might trace back to institutional factors, ESG disclosure regulation, or uneven capital-market maturity. Dummies get built for four of the five sample

countries, with whichever country has the most observations serving as the base category, to sidestep the dummy variable trap (Wooldridge, 2020). The country dummy is written as D, taking the value 1 when an observation comes from country k and 0 otherwise, with k = 1, 2, 3, 4 standing in for the four non-base countries.$D_{k,c}$

3.2 Population and Research Sample

This study's population spans every non-financial company listed across the ASEAN-5 capital markets, Indonesia, Malaysia, Singapore, Thailand, and the Philippines, over the January 2020-December 2025 observation window (with 2019-2024 ESG disclosure data feeding the lagged ESG variable). Financial-sector firms sit outside this population, since that sector's financial structure, regulation, and leverage all differ from the non-financial sector in ways that could throw off how consistently variables get measured in an asset-pricing model.

Sampling here follows the purposive sampling method, selecting a sample against specific criteria tied to the research objective (Saunders et al., 2019), an approach meant to guarantee that every firm carries the data needed to align prior-year ESG disclosure, build the FF3 factors via 2x3 portfolios, and compute monthly excess stock return. The sample criteria run as follows:

1. Non-financial companies listed in ASEAN-5 capital markets across the entire research period.

2. Companies with ESG disclosure score data available without gaps from 2019 through 2024, which is what allows the lagged ESG variable (t-1) to be built.
3. Companies with a complete monthly stock price series across the whole research period.
4. Companies with market capitalization and book-to-market equity ratio data available before the return period begins, needed for building the 2x3 (size and value) portfolios.

3.3 Types and Sources of Data

This study relies on secondary data pulled from the Bloomberg Terminal: monthly stock price, ESG Disclosure Score, market capitalization, book-to-market ratio, market return, and risk-free rate. Stock return, market return, and risk-free rate come in at monthly frequency, while the ESG Disclosure Score, market capitalization, and book-to-market ratio come in annually. Annual data from the year before the first return year is also required, since ESG disclosure and the portfolio-formation variables both enter the analysis with a lag, to head off look-ahead bias.

3.4 Data Collection Methods

Data collection followed the documentation method: gathering and processing secondary data tied to the research variables. The process started by identifying non-financial firms meeting the sample criteria, then collecting monthly stock price, ESG Disclosure Score, market capitalization, book-to-market ratio, market return, and risk-free rate data. The ESG Disclosure Score at t-1 was paired with year-t

monthly returns, and market capitalization plus book-to-market data fed the annual 2x3 portfolio sorting based on information available before each holding period. Every dataset then went through screening to check consistency across units, countries, and periods, and to confirm the observations were complete.

3.5 Data Analysis

Data analysis followed a quantitative approach centered on panel data regression, aimed at testing ESG's effect on stock return inside the Extended Fama–French Three-Factor Model framework. Stata handled the processing across several stages: descriptive statistics, panel data model selection, panel data regression analysis, and hypothesis testing.

3.5.1 Descriptive Statistical Test

The descriptive statistical test sketches out the data's broad characteristics, minimum, maximum, mean, and standard deviation for each research variable included, which helps clarify the data's distribution and general shape before regression testing begins (Wooldridge, 2020).

3.5.2 Model Significant Test

Panel data regression can be estimated through three alternative specifications: the Common Effect Model (CEM), the Fixed Effect Model (FEM), or the Random Effect Model (REM), making formal testing necessary to identify whichever specification best suits the characteristics of the data (Wooldridge, 2020). Model selection proceeds in stages here, using the Chow Test, the Hausman Test, and the Lagrange Multiplier Test, to arrive at the specification most suitable for this study.

3.5.2.1 Chow Test

The Chow test determines whether the Common Effect Model (CEM) or the Fixed Effect Model (FEM) provides the better fit, based on the following hypotheses:

H_0: the Common Effect Model is more appropriate

H_1: the Fixed Effect Model is more appropriate

Criteria:

a) If $p - value < 0.05$, H_0 is rejected and the Fixed Effect Model is selected.

b) If $p - value > 0.05$, H_0 is not rejected and the Common Effect Model is selected.

3.5.2.2 Lagrange Multiplier (LM)

The Lagrange Multiplier test is used to determine the more appropriate panel regression model between the Common Effect Model (CEM) and the Random Effect Model (REM). It is applied when the Chow test indicates that the Common Effect Model is preferable to the Fixed Effect Model. Its hypotheses are as:

H_0: the Common Effect Model is more appropriate

H_1: the Random Effect Model is more appropriate

Criteria:

a) If $p - value < 0.05$, H_0 is rejected and the Random Effect Model is selected.

b) If $p - value > 0.05$, H_0 is not rejected and the Common Effect Model is selected.

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3.5.2.3 Hausman Test

The Hausman test is used to determine the more appropriate panel regression model between the Fixed Effect Model (FEM) and the Random Effect Model (REM). Its hypotheses are as:

H_0: the Random Effect Model is more appropriate

H_1: the Fixed Effect Model is more appropriate

Criteria:

a) If $p - value < 0.05$, H_0 is rejected and the Fixed Effect Model is selected.

b) If $p - value > 0.05$, H_0 is not rejected and the Random Effect Model is selected.

3.5.3 Classic Assumption Test

Classical assumption tests check that the panel data regression model satisfies the Best Linear Unbiased Estimator (BLUE) criteria, so the resulting estimates come out valid, unbiased, and efficient (Gujarati and Porter, 2009). Here, that means running the multicollinearity test, the heteroscedasticity test, and the normality test.

3.5.3.1 Multicollinearity Test

The multicollinearity test examines whether the regression model's independent variables are excessively correlated with one another, a condition a properly specified model should avoid, since strong linear associations among predictors can destabilize coefficient estimates and inflate estimator variance (Wooldridge, 2020). The VIF test conducted here extends to the country dummy as well, verifying that its inclusion does not introduce multicollinearity with the country-

specific market risk premium, size factor, and value factor. The decision rule applied is as follows:

a) If VIF < 10, H0 is not rejected, indicating no multicollinearity.

b) If VIF ≥ 10, H0 is rejected, indicating multicollinearity.

3.5.3.2 Heteroscedasticity Test

The heteroscedasticity test examines whether residual variance remains constant across observations within the regression model, given that a properly specified model should exhibit constant residual variance, referred to as homoscedasticity (Gujarati and Porter, 2009). This study applies the Breusch-Pagan test to the pooled OLS model, using the following decision rule:

a) If Prob < chi-squared exceeds 0.05, H0 is not rejected, indicating no heteroscedasticity.

b) If Prob > chi-squared falls at or below 0.05, H0 is rejected, indicating heteroscedasticity.

Where heteroscedasticity is detected, this study addresses it by applying robust standard errors clustered at the firm level, thereby keeping the estimators consistent and the statistical tests dependable (Wooldridge, 2020).

3.5.3.3 Autocorrelation Test

The autocorrelation test evaluates whether a given period's residual is correlated with the residual from the preceding period, that is, time-series correlation, within the panel data regression model, since a properly specified model should be free of such correlation; its presence renders the estimator inefficient, though still unbiased,

and compromises confidence intervals and significance tests. This study applies the Wooldridge test for autocorrelation, using the following decision rule:

a) If the probability (Prob < F) exceeds 0.05, the model shows no autocorrelation problem.

b) If the probability (Prob > F) falls at or below 0.05, H0 is rejected, indicating an autocorrelation problem in the model.

3.5.3.4 Normality Test

The normality test examines whether the regression model's residuals are normally distributed, an assumption whose importance lies chiefly in ensuring the validity of inferential tests such as the t-test and F-test, especially in small samples (Gujarati and Porter, 2009). In large samples, however, a departure from normality is generally not a serious concern, owing to the Central Limit Theorem (Wooldridge, 2020). The hypotheses are as follows:

H_0: the residuals are normally distributed

H_1: the residuals are not normally distributed

Criteria:

a) If the probability exceeds 0.05, H0 is not rejected, indicating normally distributed residuals.

b) If the probability falls at or below 0.05, H0 is rejected, indicating residuals that are not normally distributed.

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3.5.4 Panel Data Regression Analysis

Hypothesis testing runs on two panel models sharing the same sample: Model 1, the baseline Fama–French Three-Factor Model, and Model 2, the Extended FF3, which folds in the lagged ESG Disclosure Score. The regression models here take this form:

1. Regression Equation Model 1 (Baseline FF3)

$$ER_{i,c,t} = \alpha + \beta_1 MRP_{c,t} + \beta_2 SMB_{c,t} + \beta_3 HML_{c,t} + \sum_{k=1}^{4} \gamma_k D_{k,c} + \varepsilon_{i,c,t}$$

2. Regression Equation Model 2 (Extended FF3)

$$ER_{i,c,t} = \alpha + \beta_1 MRP_{c,t} + \beta_2 SMB_{c,t} + \beta_3 HML_{c,t} + \beta_4 ESG_{i,t-1} + \sum_{k=1}^{4} \gamma_k D_{k,c} + \varepsilon_{i,c,t}$$

Description:

$ER_{i,c,t}$ = the excess stock return of firm i in country c in period t

α = the constant

$MRP_{c,t}$ = the market risk premium of country c in period t

$SMB_{c,t}$ = the size factor of country c in period t

$HML_{c,t}$ = the value factor of country c in period t

$ESG_{i,t-1}$ = the ESG Disclosure Score of firm i in period $t-1$

$\beta_1, \beta_2, \beta_3, \beta_4$ = regression coefficients

$D_{k,c}$ = the dummy for country k (k = 1, 2, 3, 4)

γ_k = the coefficient for the average excess-return difference between country k and the base country

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ε_{it} = error term

As a further check on how robust the results are, Model 2 also gets estimated without the country dummy, and the ESG Disclosure Score coefficient's consistency in direction, magnitude, and significance across both specifications is what determines whether ESG disclosure's effect on excess stock return holds up once cross-country heterogeneity is controlled for.

3.5.5 Robust Standard Error

Panel financial data tends toward heteroscedasticity and serial correlation, both of which can leave standard errors inconsistent, which is why this study clusters robust standard errors at the firm level, so coefficient inference stays reliable even where within-firm correlation persists over time (Wooldridge, 2020; Baltagi, 2021).

3.5.6 Hypothesis Test

3.5.6.1 t-Test

The t-test evaluates the partial effect of each individual variable on stock return, based on the following hypotheses:

$H_0 : \beta_i = 0$

$H_1 : \beta_i \neq 0$

Criteria:

a) If $p - value < 0.05$, H_0 is rejected and the independent variable is considered to have a significant effect on stock return.

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b) If $p - value > 0.05$, H_0 is not rejected and the independent variable is considered to have no significant effect on stock return.

3.5.6.2 F-Test

The F-test evaluates whether the explanatory variables in a regression model are jointly significant, applied here to both the baseline FF3 and the Extended FF3 to assess whether each specification has overall explanatory power. The hypotheses are as follows:

$H_0 : \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$

H_1 : at least one $\beta \neq 0$

Criteria:

a) If $p - value < 0.05$, H_0 is rejected and the regression model is considered jointly significant.

b) If $p - value > 0.05$, H_0 is not rejected and the regression model is considered not jointly significant.

3.5.6.3 Coefficient of Determination (R^2 and Adjusted R^2)

The coefficient of determination shows how well the independent variables explain variation in excess stock returns. Since Model 2 only adds one variable to Model 1, the key comparison should be based on the **change in adjusted R-squared** (or the appropriate panel R-squared), rather than raw R-squared, which can increase automatically with additional variables. The comparison is valid because both models use the same sample and estimation method (Wooldridge, 2020).

CHAPTER IV

RESULTS AND ANALYSIS

This chapter works through the interpretation of the study's findings across three parts: a description of the research objects, the data investigation, and interpretation of the findings themselves.

4.1 Description of Research Objects

Non-financial companies listed across the ASEAN-5 region, Indonesia, Malaysia, Singapore, Thailand, and the Philippines, make up the research object chosen for this study. The sample criteria run as follows:

1. Non-financial companies listed in ASEAN-5 capital markets across the entire research period.
2. Companies with ESG disclosure score data available without gaps from 2019 through 2024, which is what allows the lagged ESG variable (t-1) to be built.
3. Companies with a complete monthly stock price series across the whole research period.
4. Companies with market capitalization and book-to-market equity ratio data available before the return period begins, needed for building the 2x3 (size and value) portfolios.

After applying these criteria, the final sample lands at 315 companies, tracked monthly from January 2020 through December 2025 (72 months), for a total of 22,680 panel observations.

Table 4.1 Data Collection

Criteria	Number of Companies
Samples which provide non-financial companies listed on ASEAN-5 capital markets during the research period	3,644
Less: companies without complete ESG disclosure score data from 2019–2024	3,319
Less: companies without complete monthly stock price data during the research period	6
Less: companies without available market capitalization and book-to-market equity data prior to the return period	4
Final sample size (number of companies)	**315**
Number of observation periods (months)	72
Total observations (firm-month)	**22,680**

Source: Author (2026)

Table 4.2 Country Distribution

Country	Number of Companies	Percentage
Indonesia	65	21%
Malaysia	92	29%
Singapore	58	18%
Thailand	69	22%
Philippines	31	10%
Total	**315**	**100%**

Source: Author (2026)

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4.2 Data Analysis

4.2.1 Descriptive Statistical Test Analysis

The descriptive statistical analysis lays out a general picture of the research data through each variable's mean, median, maximum, minimum, and standard deviation over the observation period, with results presented in the table below:

Table 4.3 Descriptive Statistics of Research Variables

Variable	N	Mean	Std. Dev	Min	Max
Excess Return	22,680	-0.003638	0.100684	-0.455251	0.761447
MRP	22,680	-0.001014	0.043613	-0.218655	0.177477
SMB	22,680	0.001666	0.046029	-0.127178	0.209703
HML	22,680	-0.000231	0.055891	-0.310183	0.215099
ESG Lag (score 1-100)	22,680	52.026	11.734	14.46	85.23

Source: Output Data Stata 17, processed secondary data in 2026

Table 4.3 shows sample companies posting an average excess stock return of -0.36% per month over the research period, alongside a 10.07% standard deviation, a sign of fairly wide return variation both across firms and over time. MRP averages -0.10%, ranging from -21.87% to 17.75%, which tracks how volatile ASEAN-5 market conditions were, global market swings included. SMB comes in positive on average (0.17%), suggesting small-firm portfolios edged out large-firm portfolios slightly on average, while HML averages negative (-0.02%). The ESG Disclosure Score averages 52.03, spanning 14.46 to 85.23, which points to fairly wide variation in ESG disclosure across the sample companies.

Looking at the coefficient of variation (standard deviation over the mean), the ESG Disclosure Score shows the least relative variation across firms (CV of roughly 0.23), whereas MRP, SMB, and HML all show much higher CVs, simply because their means sit close to zero, which naturally makes these risk-factor variables more volatile over time than the ESG disclosure score, which stays comparatively stable year to year. The excess-return range, roughly -45.53% to 76.14%, also flags extreme observations (outliers) in certain firm-months, a pattern that lines up with the non-normal residual distribution the normality test in Table 4.8 turns up, though it remains tolerable given how large the sample is.

4.2.2 Model Significance Test

Choosing the best-fitting panel regression model runs through the Chow Test, the Lagrange Multiplier (LM) Test, and the Hausman Test, with results laid out in the table below.

Table 4.4 Model Significance Test Result

Test	Test Statistic	Prob-value	Decision
Chow Test	F(314, 22361) = 0.62	1.0000	Fail to reject H_0 → CEM selected
LM Test (Breusch-Pagan)	chibar2(01) = 0.00	1.0000	Fail to reject H_0 → CEM selected
Hausman Test (supplementary)	chi2(4) = 136.33	0.0000	Reject H_0 → FEM indicated (not used as final criterion)

Source: Stata 17 output, processed data, 2026

1. The Chow test comes back with a Prob > F of 1.0000 (above 0.05), so H0 cannot be rejected and the Common Effect Model (CEM) wins out over the Fixed Effect Model (FEM). The LM test (Breusch-Pagan) returns a chibar2(01) of 0.00, with a probability of 1.0000 (also above 0.05), so H0 again survives and CEM again beats out REM. With both the Chow test and the LM test consistently landing on the Common Effect Model, this study settles on the Common Effect Model (Pooled OLS) as its final estimation choice.
2. As one more check, the Hausman test still gets reported, purely to show how FEM and REM compare: it returns a chi2(4) of 136.33 with a probability of 0.0000 (below 0.05), which, viewed in isolation, would favor the Fixed Effect Model over the Random Effect Model. But since the Hausman test never actually pits a model against the Common Effect Model, this result leaves the study's final model choice unchanged. The Common Effect Model (Pooled OLS) stands as the main model, resting on the Chow and LM tests' consistent verdict, in keeping with standard panel-data model-selection practice (Gujarati and Porter, 2009).

4.2.3 Classical Assumption Test Analysis

4.2.3.1 Multicollinearity Test (Variance Inflation Factor)

The multicollinearity test confirms there is no excessive correlation among the regression model's independent variables, even after the country dummy joins as a control, with the VIF test results shown in the table below.

Table 4.5 Variance Inflation Factor Test Result

Variable	VIF	1/VIF
MRP	1.05	0.9549
SMB	1.12	0.8966
HML	1.15	0.8688
ESG Lag	1.09	0.9170
Country Dummy: Indonesia	1.37	0.7281
Country Dummy: Philippines	1.21	0.8288
Country Dummy: Singapore	1.35	0.7408
Country Dummy: Thailand	1.41	0.7085
Mean VIF	**1.22**	**-**

Source: Stata 17 output, processed data, 2026

Every independent variable, the four country dummies included, comes in with a VIF under 10 and an average VIF of 1.22. Under the standard threshold used in econometric work, a VIF under 10 rules out any serious multicollinearity problem among this model's independent variables, meaning the country dummy does not duplicate information already carried by the country-specific market risk premium, size factor, and value factor.

4.2.3.2 Heteroskedasticity Test

The heteroscedasticity test checks for unequal residual variance across observations in the regression model, running the Breusch-Pagan/Cook-Weisberg test with H0 set at constant, homoscedastic, residual variance.

Table 4.6 Heteroskedasticity Test Results (Breusch-Pagan/Cook-Weisberg)

Test	Chi2(1)	Prob > chi2
Breusch-Pagan / Cook-Weisberg test	5,948.19	0.0000

Source: Stata 17 output, processed data, 2026

The test returns a chi2(1) of 5,948.19 with a probability of 0.0000 (below 0.05), so H0 is rejected, pointing to a heteroscedasticity problem in this study's regression model. To handle that, the study clusters robust standard errors at the firm level across every Common Effect Model estimation, which keeps coefficient inference reliable despite heteroscedasticity and any within-firm correlation over time (Wooldridge, 2020).

4.2.3.3 Autocorrelation Test

The autocorrelation test checks whether one period's residual correlates with the one before it, inside the panel data regression model, using the Wooldridge test with H0 set at no first-order autocorrelation. Results appear in the table below.

Table 4.7 Autocorrelation Test Results

Test	F(1, 314)	Prob > F
Wooldridge test	273.251	0.0000

Source: Stata 17 output, processed data, 2026

The test returns an F(1, 314) of 273.251 with a probability of 0.0000 (below 0.05), so H0 is rejected, pointing to an autocorrelation problem in this study's regression model. The fix, as before, is clustering robust standard errors at the firm level across every Common Effect Model estimation, which keeps coefficient inference

reliable against autocorrelation and any lingering heteroscedasticity in the panel data (Wooldridge, 2020).

4.2.3.4 Normality Test

The normality test checks whether the regression model's residuals follow a normal distribution, via the skewness-kurtosis test (sktest), with results shown below.

Table 4.8 Normality Test Results (Skewness-Kurtosis Test)

Variable	Obs	Pr(skewness)	Pr(kurtosis)	Prob > chi2
Residual	22,680	0.0000	0.0000	.

Source: Stata 17 output, processed data, 2026

Table 4.8 returns a probability of 0.0000 for both skewness and kurtosis under the skewness-kurtosis test (below 0.05), so H0 is rejected: this study's regression residuals are not normally distributed. Non-normal residuals are, in fact, typical for stock-return data (Fama, 1965), and the regression results still hold up for a few reasons:

1. The dataset is large enough (22,680 observations) that the Central Limit Theorem kicks in, keeping the test results reliable (Gujarati and Porter, 2009; Wooldridge, 2020).
2. Normality is not actually a strict requirement for trusting OLS regression results; it mainly matters when the sample is small (Gujarati and Porter, 2009).
3. This study already clusters robust standard errors by firm, so the t-test and F-test results stay reliable regardless (Wooldridge, 2020).

4.2.4 Panel Data Regression

Following the model-selection results, this study runs the Common Effect Model (Pooled OLS) with robust standard errors clustered at the firm level, estimating two models: Model 1, the baseline Fama–French Three-Factor Model, and Model 2, the Extended FF3 with the ESG Disclosure Score added, both carrying the country dummy as an extra control for cross-country heterogeneity within ASEAN-5. Malaysia serves as the base country (reference category) since it contributes the most observations and companies to the sample, 92 companies and 6,624 observations. Both models' estimation results appear in the table below.

Table 4.10 Panel Data Regression Result

Variable	Model 1 (Baseline FF3 + Dummy)	Model 2 (Extended FF3+Dummy)
MRP	1.399454*** (0.039482)	1.399938*** (0.039408)
SMB	0.247631*** (0.007550)	0.243978*** (0.007478)
HML	0.208004*** (0.012277)	0.208662*** (0.012373)
ESG Lag (t-1)	-	-0.000262*** (0.0000243)
Dummy - Indonesia	-0.007070*** (0.000161)	-0.007958*** (0.000450)
Dummy - Philippines	0.002969*** (0.000118)	0.002872*** (0.000420)
Dummy - Singapore	-0.002379*** (0.000266)	-0.003221*** (0.000478)
Dummy - Thailand	0.007295*** (0.0000555)	0.008731*** (0.000429)
Constant	-0.002577*** (0.0000988)	0.011076*** (0.001295)
Number of Observations	22,680	22,680
Number of Companies (clusters)	315	315

R^2	0.4143	0.4151
Adjusted R^2	0.4141	0.4149
F-statistic	F(7,22,672) = 995.32***	F(8,314) = 1,203.72***

Source: Stata 17 output, processed data, 2026

The table above shows the MRP, SMB, and HML coefficients holding fairly steady between Model 1 (1.3995; 0.2476; 0.2080) and Model 2 (1.3999; 0.2440; 0.2087) once the lagged ESG variable joins the model, stability that signals adding ESG does not introduce omitted-variable bias into the three Fama–French factors, and that these factors' relationship with excess return holds up regardless of model specification (Wooldridge, 2020).

Every country dummy coefficient comes out statistically significant ($p < 0.01$) in both models, confirming that average excess return really does differ systematically across ASEAN-5 countries even once the market risk premium, size factor, value factor, and ESG disclosure are controlled for, which validates including the country dummy as a control variable here. In Model 2, for instance, Indonesia's average excess return runs 0.80 percentage points per month below Malaysia's (the base), while Thailand's runs 0.87 percentage points above it, holding everything else constant. The Model 2 regression equation, Extended FF3 with country dummy, based on the Common Effect Model estimation, can be written as follows:

$$ER_{i,c,t} = 0.01108 + 1.3999\ MRP_{c,t} + 0.2440\ SMB_{c,t} + 0.2087\ HML_{c,t} - 0.0003\ ESG_{i,t-1} - 0.0080\ D_{Indonesia} + 0.0029\ D_{Philippines} - 0.0032\ D_{Singapore} + 0.0087\ D_{Thailand} + \varepsilon_{i,c,t}$$

As a further robustness check, Model 2 also gets estimated without the country dummy, with the ESG Disclosure Score coefficient compared across both specifications in the table below.

Table 4.11 Robustness Check Result

Variable	Model 2 without Country Dummy	Model 2 with Country Dummy
MRP	1.394446*** (0.039209)	1.399938*** (0.039408)
SMB	0.242782*** (0.007514)	0.243978*** (0.007478)
HML	0.209013*** (0.012434)	0.208662*** (0.012373)
ESG Lag (t-1)	-0.000132*** (0.0000353)	-0.000262*** (0.0000243)
Constant	0.004269** (0.001904)	0.011076*** (0.001295)
R^2	0.4122	0.4151
Adjusted R^2	0.4120	0.4149
F-statistic	F(4,314) = 2,181.53***	F(8,314) = 1,203.72***

Source: Stata 17 output, processed data, 2026

The robustness check turns up something worth noting: the ESG Disclosure Score coefficient not only stays negative and significant across both specifications, its magnitude and statistical significance actually grow once the country dummy enters the model, moving from -0.000132 (t = -3.73) to -0.000262 (t = -10.78), nearly double. That increase tracks alongside a rise in the model's explanatory power too, with

Adjusted R-squared climbing from 0.4120 (without the country dummy) to 0.4149 (with it), which suggests the earlier estimate, absent any control for cross-country heterogeneity, actually understated ESG disclosure's effect on excess return (biased toward zero), since country-to-country variation unrelated to ESG, differing regulation, capital-market maturity, and institutional characteristics across ASEAN-5, was getting folded into the ESG coefficient estimate (Wooldridge, 2020). The negative effect of ESG disclosure on excess return found here therefore holds up as robust, and grows statistically stronger once cross-country heterogeneity is controlled for, if anything.

4.2.5 Hypothesis Test

Hypothesis testing here runs in three stages: the joint significance test (F-test), the partial significance test (t-test), and the coefficient of determination test (R-squared and Adjusted R-squared), all using panel data regression with robust standard errors clustered at the firm level.

4.2.5.1 F-test

The F-test checks whether all the model's variables are jointly significant (Wooldridge, 2020); a Prob > F below 0.05 means H0 is rejected and the model counts as a good fit, jointly significant.

Table 4.12 F-test Result

Model	F-statistic	df	Prob > F	Description
(1)	995.32	(7,22672)	0.0000	Significant
(2)	1,203.72	(8,314)	0.0000	Significant

Source: Stata 17 output, processed data, 2026

Note: Model 1's F-statistic comes from the non-clustered robust standard error specification, since the cluster-robust specification cannot produce an F-statistic here, owing to rank deficiency, a common outcome when clustering happens at the same level as variables that stay time-invariant within that cluster (Cameron and Miller, 2015).

Table 4.12 shows both models coming out jointly significant ($p < 0.01$), which means every variable in each model, the country dummy included, jointly affects excess return in a significant way, and both models show good overall fit (Gujarati and Porter, 2009).

4.2.5.2 t-test

The t-test checks each variable's partial effect on the dependent variable, holding the rest of the model's variables constant (ceteris paribus), and is used here to gauge each regression coefficient's significance (Wooldridge, 2020). Test rule: a probability (p-value) under 0.05 means the independent variable carries a significant partial effect on excess return (H0 rejected, H1 accepted).

Table 4.13 t-Test Result

Variable	Coefficient	Std. Error	t-value	P>|t|	Result
MRP	1.399938	0.039408	35.52	0,000	Significant (+)
SMB	0.243978	0.007478	32.63	0,000	Significant (+)
HML	0.208662	0.012373	16.86	0,000	Significant (+)
ESG Lag	-0.000262	0.0000243	-10.78	0,000	Significant (-)
Dummy Indonesia	-0.007958	0.000450	-17.69	0,000	(control)

Dummy Philippines	0.002872	0.000420	6.84	0,000	(control)
Dummy Singapore	-0.003221	0.000478	-6.74	0,000	(control)
Dummy Thailand	0.008731	0.000429	20.34	0,000	(control)
Constant	0.011076	0.001295	8.55	0,000	Significant

Source: Stata 17 output, processed data, 2026

Table 4.13 shows every variable in the model carrying a statistically significant effect on excess return, most significant at the 1% level ($p < 0.01$), with the constant significant at the 5% level ($p < 0.05$). The country dummy coefficients get reported as part of the model's estimation output, but are not tested through any separate formal hypothesis, since the country dummy functions purely as a control variable rather than one of the variables named in this study's hypotheses.

1. **Market Risk Premium and Excess stock return**

   MRP comes in with a coefficient of 1.399938, a t-statistic of 35.52, and a p-value of 0.000 ($p < 0.01$), confirming a positive and significant effect on excess return, in keeping with the Capital Asset Pricing Model's claim that return compensates for systematic risk (Sharpe, 1964).

2. **Size Factor (SMB) and Excess Stock Return**

   SMB comes in with a coefficient of 0.243978, a t-statistic of 32.63, and a p-value of 0.000 ($p < 0.01$), confirming a positive and significant effect on excess return, consistent with the size effect (Fama and French, 1993).

3. **Value Factor (HML) and Excess Stock Return**

HML comes in with a coefficient of 0.208662, a t-statistic of 16.86, and a p-value of 0.000 ($p < 0.01$), confirming a positive and significant effect on excess return, consistent with the value premium Fama and French describe (Fama and French, 1993).

4. **ESG Disclosure Score (Lagged) and Excess Stock Return**

   The lagged ESG coefficient, -0.000262, with a t-statistic of -10.78 and a p-value of 0.000 ($p < 0.01$), backs H4: prior-year ESG Disclosure Score carries a negative and significant effect on excess stock return once the market risk premium, size factor, value factor, and cross-country heterogeneity within ASEAN-5 are controlled for, an effect whose significance actually beats the specification without the country dummy ($t = -3.73$), as the earlier robustness check showed. The Interpretation of Research Results section below takes up the theoretical mechanisms behind this finding in more depth.

4.2.5.3 Coefficient of Determination (R^2 and Adjusted R^2)

The coefficient of determination (R-squared) runs 0.4143 for Model 1 and climbs to 0.4151 for Model 2, an increase showing that folding the ESG Disclosure Score into a model already controlling for the market risk factors (MRP, SMB, HML) and cross-country heterogeneity (country dummy) does add some explanatory power for excess-return variation, small as that addition is, just 0.00085, or 0.085 percentage points.

Adjusted R-squared runs 0.4141 for Model 1 and 0.4149 for Model 2, an increase that tracks R-squared's pattern and signals that the ESG Disclosure Score contributes extra explanatory power for excess-return variation even once every other control variable in the model, the country dummy included, is accounted for. An additional F-test confirms this increase is significant: $F(1,314) = 116.25$, Prob > F = 0.0000 (below 0.05), showing that adding the ESG Disclosure Score statistically improves the model's explanatory power in a meaningful way, even though the improvement itself is economically modest (Gujarati and Porter, 2009).

4.3 Interpretation of Research Results

This section reads the estimation results from Model 1 and Model 2 (with the country dummy) directly against the research problems set out in Chapter I.

4.3.1 The Effect of MRP, SMB, and HML on Excess Stock Return

Both Model 1 (Baseline FF3) and Model 2 (Extended FF3) show the market risk premium, size factor (SMB), and value factor (HML) consistently carrying a positive and significant effect on excess stock return ($p < 0.01$ for all three variables in both models), holding even once cross-country heterogeneity within ASEAN-5 is controlled for via the country dummy. That answers the first research problem: all three Fama–French factors do affect excess stock return in ASEAN-5 capital markets, a finding that lines up with the Capital Asset Pricing Model (Sharpe, 1964) and the Fama–French Three-Factor Model (Fama and French, 1993), both of which treat systematic market risk, firm size, and the book-to-market ratio as enduring determinants of stock returns, ASEAN-5's emerging-market setting included.

4.3.2 The Effect of ESG Disclosure after Accounting for MRP, SMB, and HML

Model 2's estimation results put the ESG Disclosure Score (t-1) at a coefficient of -0.000262, with a t-statistic of -10.78 and a p-value of 0.000 (below 0.05), once the market risk premium, size factor, value factor, and country dummy are controlled for. That answers the second research problem: ESG disclosure does affect excess stock return, incrementally to the three Fama–French factors, in a negative direction, an effect that survives even after cross-country heterogeneity within ASEAN-5 is statistically controlled for.

The robustness check reveals that the statistical significance of the ESG disclosure effect actually increases once the country dummy is added to the model (the t-statistic rising in magnitude from -3.73 to -10.78), implying that the earlier specification, lacking a country-level control, had understated the true effect because cross-country variation unrelated to ESG was being absorbed into the coefficient. The negative sign observed here is first consistent with Voluntary Disclosure Theory (Verrecchia, 2001), the principal theoretical rationale for selecting the ESG Disclosure Score in this study: more extensive disclosure narrows the information gap separating firms from investors, thereby lowering the cost of equity capital, which is conceptually equivalent to a reduced expected return (Lambert et al., 2007). Corroborating this, Dhaliwal et al. (2011) show that the initiation of voluntary CSR reporting reduces the cost of equity capital irrespective of how strong the underlying performance genuinely is, consistent with the wider disclosure-cost of capital literature (Leuz and Verrecchia, 2000; Botosan, 1997). Beyond this disclosure-based rationale, the direction of the

effect is also consistent with two theoretical mechanisms drawn from the ESG asset-pricing literature. The risk-based mechanism suggests that firms disclosing more extensively on ESG are perceived as carrying lower regulatory, reputational, and information-asymmetry risk, allowing investors to accept a lower required return (Bolton and Kacperczyk, 2021; Pastor et al., 2021). The investor-preference mechanism suggests that investor demand for firms exhibiting strong ESG characteristics raises share prices, thereby depressing subsequent expected return (Pastor et al., 2021). This finding is also consistent with the results reported by Mulialim and Madyan (2023) for Indonesia and by Lu (2025) for China. Nonetheless, the relatively modest magnitude of the coefficient indicates that, although the effect is statistically significant and grows stronger after controlling for country, it remains economically marginal when set against the market risk premium (1.3999), the size factor (0.2440), and the value factor (0.2087), a pattern consistent with Gillan et al.'s (2021) conclusion that ESG's relationship with expected return tends to be directionally consistent without necessarily being economically large.

4.3.3 The Contribution of ESG Disclosure to the Explanatory Power of the Fama–French Three-Factor Model

Comparing Model 1 against Model 2 shows R-squared climbing from 0.4143 to 0.4151 once the ESG Disclosure Score enters, with Adjusted R-squared rising from 0.4141 to 0.4149, an increase confirmed significant by a further F-test: $F(1,314) = 116.25$, $p = 0.0000$ (below 0.05). That answers the third research problem: adding ESG disclosure does significantly sharpen the Fama–French Three-Factor Model's ability to

explain excess stock return, even once the model controls for cross-country heterogeneity within ASEAN-5, though the incremental explanatory power gained stays modest at 0.085 percentage points. The finding backs the broader argument that ESG disclosure carries incremental pricing relevance beyond the three traditional risk factors and cross-country institutional characteristics (Lu, 2025), while also confirming that the market risk premium, size, and value remain the chief determinants of variation in excess stock return across ASEAN-5 (Fama and French, 1993; Sharpe, 1964).

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Table 4.14 Summary of Classical Assumption and Hypothesis Test

Item	Model 1	Model 2
Independent Variables	MRP, SMB, HML	MRP, SMB, HML, ESG Lag
Dependent Variable	Excess Stock Return	Excess Stock Return
Effect Model	Common Effect Model (Pooled OLS)	Common Effect Model (Pooled OLS)
1. Classical Assumption Test		
Normality	Not Normal	Not Normal
Multicollinearity (VIF)	No Problem (VIF < 10)	No Problem (VIF < 10)
Heteroscedasticity	Present (✓)	Present (✓)
Autocorrelation	N/A**	N/A**
2. Panel Data Model Selection		
Chow Test	CEM preferred (Prob>F=1.0000)	CEM preferred (Prob>F=1.0000)
LM Test	CEM preferred (Prob>chibar2=1.0000)	CEM preferred (Prob>chibar2=1.0000)
3. Hypothesis Test		
T-Test – MRP	Positive influence (H1 accepted)	Positive influence (H1 accepted)
T-Test – SMB	Positive influence (H2 accepted)	Positive influence (H2 accepted)
T-Test – HML	Positive influence (H3 accepted)	Positive influence (H3 accepted)
T-Test – ESG Lag	–	Negative influence (H4 accepted)
F-Test	Significantly influential F(3,314)=2752.85***	Significantly influential F(4,314)=2181.53***
Coefficient of Determination (R^2)	0.4119 (Low-Moderate)	0.4122 (Low-Moderate)

Source: Stata 17 output, processed data, 2026

** *A formal test for autocorrelation (Wooldridge test) could not be performed due to command limitations in the Stata version used; however, this issue is mitigated through the use of cluster-robust standard errors.*

CHAPTER V

CONCLUSION AND SUGGESTION

5.1 Conclusions

This study sets out to test how the Market Risk Premium (MRP), Size Factor (SMB), Value Factor (HML), and lagged ESG Disclosure Score (t-1) affect excess stock return for non-financial companies across ASEAN-5 between January 2020 and December 2025, applying an Extended Fama–French Three-Factor Model estimated via the Common Effect Model (Pooled OLS) with robust standard errors clustered at the firm level. The model choice rests on the Chow test and LM test results, which consistently favor the Common Effect Model over either the Fixed Effect Model or the Random Effect Model. From the data collection, analysis, and interpretation carried out, the following conclusions emerge:

1. The Market Risk Premium (MRP) carries a positive and significant effect on excess stock return, a finding that lines up with the Capital Asset Pricing Model and the Fama–French Three-Factor Model, both of which treat systematic market risk as the chief determinant of stock returns across ASEAN-5.
2. The Size Factor (SMB) carries a positive and significant effect on excess stock return, with smaller companies in the sample tending toward higher returns, compensation for the extra risk built into their characteristics.

3. The Value Factor (HML) carries a positive and significant effect on excess stock return, with high book-to-market stocks (value stocks) outperforming low book-to-market stocks (growth stocks).
4. The prior-year ESG Disclosure Score (t-1) carries a negative and significant effect on excess stock return, though the coefficient's magnitude stays relatively small (-0.0003). Companies disclosing more on ESG tend to face a slightly lower investor required return, consistent with both the risk-based channel and the investor-preference channel from the ESG asset-pricing literature, though the economic effect remains marginal next to the Fama–French factors.
5. Adding the ESG Disclosure Score to the baseline Fama–French Three-Factor Model lifts the model's explanatory power slightly (R-squared rising from 0.4143 to 0.4151), which points to non-financial information, ESG disclosure specifically, carrying incremental pricing relevance beyond the traditional financial risk factors, modest as that contribution is.

5.2 Limitations

This study is subject to several limitations:

1. Data availability is not evenly distributed across the observation period, as not all firms meet the sample selection criteria for every year. This results in an unbalanced dataset, which may reduce the number of observations and affect the consistency of the empirical results.

2. The extended Fama–French Three-Factor Model may not fully capture all relevant risk factors influencing stock returns. Furthermore, potential endogeneity issues may arise due to reverse causality or omitted variables in the relationship between ESG and stock returns.

5.3 Suggestions

Given these conclusions and limitations, a few suggestions follow for future research:

1. Future work could try alternative ESG proxies, such as ESG performance scores or ratings from other providers (Refinitiv, MSCI, or Sustainalytics, for instance), to offer a different angle on ESG as a pricing risk factor.
2. Future work could apply the Fama–French Five-Factor Model (adding profitability and investment factors) or run a Fama–MacBeth two-step regression as a robustness check on these findings, to see whether the results hold up under a different model specification.
3. Future work could widen the sample to include the financial sector or regions beyond ASEAN-5, testing how far these findings generalize and probing whether other factors, in different settings, would change the results.

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APPENDIX

APPENDIX A. COMPANY LIST

No.	Company Name	Stock Code	Country
1	Astra Agro Lestari Tbk	AALI	Indonesia
2	Aspirasi Hidup Indonesia Tbk	ACES	Indonesia
3	Adhi Karya (Persero) Tbk	ADHI	Indonesia
4	Alamtri Resources Indonesia Tbk	ADRO	Indonesia
5	AKR Corporindo Tbk	AKRA	Indonesia
6	Sumber Alfaria Trijaya Tbk	AMRT	Indonesia
7	Aneka Tambang Tbk	ANTM	Indonesia
8	Astra International Tbk	ASII	Indonesia
9	Alam Sutera Realty Tbk	ASRI	Indonesia
10	Astra Otoparts Tbk	AUTO	Indonesia
11	MNC Asia Holding Tbk	BHIT	Indonesia
12	Global Mediacom Tbk	BMTR	Indonesia
13	Bakrie & Brothers Tbk	BNBR	Indonesia
14	Barito Pacific Tbk	BRPT	Indonesia
15	Bumi Serpong Damai Tbk	BSDE	Indonesia
16	Charoen Pokphand Indonesia Tbk	CPIN	Indonesia
17	Ciputra Development Tbk	CTRA	Indonesia
18	Darma Henwa Tbk	DEWA	Indonesia
19	Darya-Varia Laboratoria Tbk	DVLA	Indonesia
20	Elang Mahkota Teknologi Tbk	EMTK	Indonesia
21	Erajaya Swasembada Tbk	ERAA	Indonesia
22	Gudang Garam Tbk	GGRM	Indonesia
23	DFI Retail Nusantara Tbk	HERO	Indonesia
24	Hexindo Adiperkasa Tbk	HEXA	Indonesia
25	HM Sampoerna Tbk	HMSP	Indonesia
26	Harum Energy Tbk	HRUM	Indonesia
27	Indofood CBP Sukses Makmur Tbk	ICBP	Indonesia
28	Indomobil Sukses Internasional Tbk	IMAS	Indonesia
29	Vale Indonesia Tbk	INCO	Indonesia
30	Indofood Sukses Makmur Tbk	INDF	Indonesia
31	Indah Kiat Pulp & Paper Tbk	INKP	Indonesia
32	Indocement Tunggal Prakarsa Tbk	INTP	Indonesia
33	Indosat Tbk	ISAT	Indonesia
34	Indo Tambangraya Megah Tbk	ITMG	Indonesia
35	Japfa Comfeed Indonesia Tbk	JPFA	Indonesia
36	Jasa Marga (Persero) Tbk	JSMR	Indonesia
37	Kino Indonesia Tbk	KINO	Indonesia
38	Kalbe Farma Tbk	KLBF	Indonesia
39	Lippo Karawaci Tbk	LPKR	Indonesia
40	Matahari Department Store Tbk	LPPF	Indonesia

41	PP London Sumatra Indonesia Tbk	LSIP	Indonesia
42	Mitra Adiperkasa Tbk	MAPI	Indonesia
43	Merdeka Copper Gold Tbk	MDKA	Indonesia
44	Mitra Keluarga Karyasehat Tbk	MIKA	Indonesia
45	Media Nusantara Citra Tbk	MNCN	Indonesia
46	Mayora Indah Tbk	MYOR	Indonesia
47	Perusahaan Gas Negara Tbk	PGAS	Indonesia
48	Bukit Asam Tbk	PTBA	Indonesia
49	PP (Persero) Tbk	PTPP	Indonesia
50	Ramayana Lestari Sentosa Tbk	RALS	Indonesia
51	Surya Citra Media Tbk	SCMA	Indonesia
52	Siloam International Hospitals Tbk	SILO	Indonesia
53	Sinar Mas Agro Resources and Technology Tbk	SMAR	Indonesia
54	Summarecon Agung Tbk	SMRA	Indonesia
55	Indo Acidatama Tbk	SRSN	Indonesia
56	Tower Bersama Infrastructure Tbk	TBIG	Indonesia
57	Timah Tbk	TINS	Indonesia
58	Pabrik Kertas Tjiwi Kimia Tbk	TKIM	Indonesia
59	Telkom Indonesia (Persero) Tbk	TLKM	Indonesia
60	Sarana Menara Nusantara Tbk	TOWR	Indonesia
61	Chandra Asri Pacific Tbk	TPIA	Indonesia
62	Tempo Scan Pacific Tbk	TSPC	Indonesia
63	United Tractors Tbk	UNTR	Indonesia
64	Unilever Indonesia Tbk	UNVR	Indonesia
65	Wijaya Karya Beton Tbk	WTON	Indonesia
66	AEON Co. (M) Berhad	AEON	Malaysia
67	Astro Malaysia Holdings Berhad	ASTRO	Malaysia
68	Axiata Group Berhad	AXIATA	Malaysia
69	Bumi Armada Berhad	BAB	Malaysia
70	Bermaz Auto Berhad	BAUTO	Malaysia
71	Berjaya Corporation Berhad	BC	Malaysia
72	Carlsberg Brewery Malaysia Berhad	CAB	Malaysia
73	CelcomDigi Berhad	CDB	Malaysia
74	Cahya Mata Sarawak Berhad	CMS	Malaysia
75	Duopharma Biotech Berhad	DBB	Malaysia
76	Dayang Enterprise Holdings Berhad	DEHB	Malaysia
77	Dialog Group Berhad	DLG	Malaysia
78	D&O Green Technologies Berhad	DOGT	Malaysia
79	DRB-Hicom Berhad	DRB	Malaysia
80	Eco World Development Group Berhad	ECW	Malaysia
81	Fraser & Neave Holdings Berhad	FNH	Malaysia
82	Frontken Corporation Berhad	FRCB	Malaysia
83	Gamuda Berhad	GAM	Malaysia
84	Genting Malaysia Berhad	GENM	Malaysia
85	Genting Plantations Berhad	GENP	Malaysia
86	Genting Berhad	GENT	Malaysia

87	Guan Chong Berhad	GUAN	Malaysia
88	Hap Seng Consolidated Berhad	HAP	Malaysia
89	Hap Seng Plantations Holdings Berhad	HAPL	Malaysia
90	Hartalega Holdings Berhad	HART	Malaysia
91	Heineken Malaysia Berhad	HEIM	Malaysia
92	Hong Leong Industries Berhad	HLI	Malaysia
93	IGB Real Estate Investment Trust	IGBREIT	Malaysia
94	IHH Healthcare Berhad	IHH	Malaysia
95	IJM Corporation Berhad	IJM	Malaysia
96	Inari Amertron Berhad	INRI	Malaysia
97	IOI Corporation Berhad	IOI	Malaysia
98	IOI Properties Group Berhad	IOIPG	Malaysia
99	KLCCP Stapled Group	KLCCSS	Malaysia
100	Kuala Lumpur Kepong Berhad	KLK	Malaysia
101	KPJ Healthcare Berhad	KPJ	Malaysia
102	Kossan Rubber Industries Berhad	KRI	Malaysia
103	Magnum Berhad	MAG	Malaysia
104	Maxis Berhad	MAXIS	Malaysia
105	Matrix Concepts Holdings Berhad	MCH	Malaysia
106	Mesiniaga Berhad	MESI	Malaysia
107	Mega First Corporation Berhad	MFCB	Malaysia
108	MI Technovation Berhad	MI	Malaysia
109	MISC Berhad	MISC	Malaysia
110	Malakoff Corporation Berhad	MLK	Malaysia
111	Malaysia Marine and Heavy Engineering Holdings Berhad	MMHE	Malaysia
112	Malaysian Pacific Industries Berhad	MPI	Malaysia
113	Malaysian Resources Corporation Berhad	MRC	Malaysia
114	Nestle (Malaysia) Berhad	NESZ	Malaysia
115	NexG Berhad	NEXG	Malaysia
116	Padini Holdings Berhad	PAD	Malaysia
117	PBS Berhad	PBSB	Malaysia
118	Petronas Chemicals Group Berhad	PCHEM	Malaysia
119	Pentamaster Corporation Berhad	PENT	Malaysia
120	PPB Group Berhad	PEP	Malaysia
121	Petronas Dagangan Berhad	PETD	Malaysia
122	Parkson Holdings Berhad	PKS	Malaysia
123	Press Metal Aluminium Holdings Berhad	PMAH	Malaysia
124	Puncak Niaga Holdings Berhad	PNH	Malaysia
125	Pos Malaysia Berhad	POSM	Malaysia
126	Petronas Gas Berhad	PTG	Malaysia
127	QL Resources Berhad	QLG	Malaysia
128	British American Tobacco (Malaysia) Berhad	ROTH	Malaysia
129	Sunway Construction Group Berhad	SCGB	Malaysia
130	Scientex Berhad	SCI	Malaysia
131	SD Guthrie Berhad	SDG	Malaysia
132	Sime Darby Property Berhad	SDPR	Malaysia

133	Seal Incorporated Berhad	SEAL	Malaysia
134	SAM Engineering & Equipment (M) Berhad	SEQB	Malaysia
135	Sime Darby Berhad	SIME	Malaysia
136	SKP Resources Berhad	SKP	Malaysia
137	S P Setia Berhad	SPSB	Malaysia
138	Sports Toto Berhad	SPTOTO	Malaysia
139	Sunway Real Estate Investment Trust	SREIT	Malaysia
140	Supermax Corporation Berhad	SUCB	Malaysia
141	Sunway Berhad	SWB	Malaysia
142	Telekom Malaysia Berhad	T	Malaysia
143	Time dotCom Berhad	TDC	Malaysia
144	Tenaga Nasional Berhad	TNB	Malaysia
145	Lotte Chemical Titan Holding Berhad	TTNP	Malaysia
146	UEM Sunrise Berhad	UEMS	Malaysia
147	Unisem (M) Berhad	UNI	Malaysia
148	United Plantations Berhad	UPL	Malaysia
149	Velesto Energy Berhad	VEB	Malaysia
150	ViTrox Corporation Berhad	VITRO	Malaysia
151	VS Industry Berhad	VSI	Malaysia
152	WCT Holdings Berhad	WCTHG	Malaysia
153	Westports Holdings Berhad	WPRTS	Malaysia
154	Yinson Holdings Berhad	YNS	Malaysia
155	YTL Corporation Berhad	YTL	Malaysia
156	YTL Power International Berhad	YTLP	Malaysia
157	Zetrix AI Berhad	ZETRIX	Malaysia
158	Ayala Corporation	AC	Philippines
159	Aboitiz Equity Ventures, Inc.	AEV	Philippines
160	Alliance Global Group, Inc.	AGI	Philippines
161	Ayala Land, Inc.	ALI	Philippines
162	Aboitiz Power Corporation	AP	Philippines
163	Apex Mining Company, Inc.	APX	Philippines
164	Bloomberry Resorts Corporation	BLOOM	Philippines
165	A Brown Company, Inc.	BRN	Philippines
166	Century Pacific Food, Inc.	CNPF	Philippines
167	DMCI Holdings, Inc.	DMC	Philippines
168	San Miguel Food and Beverage, Inc.	FB	Philippines
169	Globe Telecom, Inc.	GLO	Philippines
170	International Container Terminal Services, Inc.	ICT	Philippines
171	Integrated Micro-Electronics, Inc.	IMI	Philippines
172	JG Summit Holdings, Inc.	JGS	Philippines
173	Lepanto Consolidated Mining Company	LC	Philippines
174	Liberty Flour Mills, Inc.	LFM	Philippines
175	Macroasia Corporation	MAC	Philippines
176	Megaworld Corporation	MEG	Philippines
177	Petron Corporation	PCOR	Philippines
178	Puregold Price Club, Inc.	PGOLD	Philippines

178	Puregold Price Club, Inc.	PGOLD	Philippines
179	Philex Mining Corporation	PX	Philippines
180	Robinsons Retail Holdings, Inc.	RRHI	Philippines
181	Semirara Mining and Power Corporation	SCC	Philippines
182	SM Investments Corporation	SM	Philippines
183	SM Prime Holdings, Inc.	SMPH	Philippines
184	Vistamalls, Inc.	STR	Philippines
185	PLDT Inc.	TEL	Philippines
186	Universal Robina Corporation	URC	Philippines
187	Vista Land & Lifescapes, Inc.	VLL	Philippines
188	Wilcon Depot, Inc.	WLCON	Philippines
189	AIMS APAC REIT	AAREIT	Singapore
190	APAC Realty Ltd.	APAC	Singapore
191	Bumitama Agri Ltd.	BAL	Singapore
192	Bukit Sembawang Estates Ltd.	BS	Singapore
193	Banyan Tree Holdings Limited	BTH	Singapore
194	ComfortDelGro Corporation Limited	CD	Singapore
195	CDL Hospitality Trusts	CDREIT	Singapore
196	CapitaLand Integrated Commercial Trust	CICT	Singapore
197	City Developments Limited	CIT	Singapore
198	CapitaLand Ascendas REIT	CLAR	Singapore
199	CapitaLand Ascott Trust	CLAS	Singapore
200	CapitaLand China Trust	CLCT	Singapore
201	CapitaLand India Trust	CLINT	Singapore
202	China Sunsine Chemical Holdings Ltd.	CSSC	Singapore
203	Del Monte Pacific Limited	DELM	Singapore
204	DFI Retail Group Holdings Limited	DFI	Singapore
205	ESR-REIT	EREIT	Singapore
206	Frasers Centrepoint Trust	FCT	Singapore
207	Far East Hospitality Trust	FEHT	Singapore
208	Frasers Logistics & Commercial Trust	FLT	Singapore
209	Fraser and Neave, Limited	FNN	Singapore
210	Frasers Property Limited	FPL	Singapore
211	First Resources Limited	FR	Singapore
212	Genting Singapore Limited	GENS	Singapore
213	Golden Agri-Resources Ltd	GGR	Singapore
214	Hong Leong Asia Ltd.	HLA	Singapore
215	Hutchison Port Holdings Trust	HPHT	Singapore
216	Indofood Agri Resources Ltd.	IFAR	Singapore
217	Jardine Cycle & Carriage Limited	JCNC	Singapore
218	Keppel DC REIT	KDCREIT	Singapore
219	Keppel Infrastructure Trust	KIT	Singapore
220	Keppel Pacific Oak US REIT	KORE	Singapore
221	Lippo Malls Indonesia Retail Trust	LMRT	Singapore
222	Mapletree Industrial Trust	MINT	Singapore
223	Mermaid Maritime Public Company Limited	MMT	Singapore

224	Mapletree Pan Asia Commercial Trust	MPACT	Singapore
225	Manulife US Real Estate Investment Trust	MUST	Singapore
226	NetLink NBN Trust	NETLINK	Singapore
227	Oxley Holdings Limited	OHL	Singapore
228	OUE Limited	OUE	Singapore
229	OUE Real Estate Investment Trust	OUEREIT	Singapore
230	PropNex Limited	PROP	Singapore
231	Raffles Medical Group Ltd.	RFMD	Singapore
232	Sasseur Real Estate Investment Trust	SASSR	Singapore
233	SATS Ltd.	SATS	Singapore
234	Starhill Global Real Estate Investment Trust	SGREIT	Singapore
235	Singapore Airlines Limited	SIA	Singapore
236	SIA Engineering Company Limited	SIE	Singapore
237	Singapore Post Limited	SPOST	Singapore
238	Singapore Telecommunications Limited	ST	Singapore
239	Singapore Technologies Engineering Ltd	STE	Singapore
240	Seatrium Limited	STM	Singapore
241	UOL Group Limited	UOL	Singapore
242	Valuetronics Holdings Limited	VALUE	Singapore
243	Wilmar International Limited	WIL	Singapore
244	Wing Tai Holdings Limited	WINGT	Singapore
245	Ying Li International Real Estate Limited	YINGLI	Singapore
246	Yanlord Land Group Limited	YLLG	Singapore
247	Asia Aviation Public Company Limited	AAV	Thailand
248	Advanced Info Service Public Company Limited	ADVANC	Thailand
249	AAPICO Hitech Public Company Limited	AH	Thailand
250	Amata Corporation Public Company Limited	AMATA	Thailand
251	Amata VN Public Company Limited	AMATAV	Thailand
252	Airports of Thailand Public Company Limited	AOT	Thailand
253	Banpu Public Company Limited	BANPU	Thailand
254	Bangkok Chain Hospital Public Company Limited	BCH	Thailand
255	Bangchak Corporation Public Company Limited	BCP	Thailand
256	Beauty Community Public Company Limited	BEAUTY	Thailand
257	Bangkok Expressway and Metro Public Company Limited	BEM	Thailand
258	B.Grimm Power Public Company Limited	BGRIM	Thailand
259	Bumrungrad Hospital Public Company Limited	BH	Thailand
260	Berli Jucker Public Company Limited	BJC	Thailand
261	BTS Group Holdings Public Company Limited	BTS	Thailand
262	Central Plaza Hotel Public Company Limited	CENTEL	Thailand
263	Chularat Hospital Public Company Limited	CHG	Thailand
264	Ch. Karnchang Public Company Limited	CK	Thailand
265	CK Power Public Company Limited	CKP	Thailand
266	CP All Public Company Limited	CPALL	Thailand
267	CP Axtra Public Company Limited	CPAXT	Thailand
268	Charoen Pokphand Foods Public Company Limited	CPF	Thailand
269	Central Pattana Public Company Limited	CPN	Thailand

269	Central Pattana Public Company Limited	CPN	Thailand
270	Delta Electronics (Thailand) Public Company Limited	DELTA	Thailand
271	Diamond Building Products Public Company Limited	DRT	Thailand
272	Energy Absolute Public Company Limited	EA	Thailand
273	Eastern Polymer Group Public Company Limited	EPG	Thailand
274	Siam Global House Public Company Limited	GLOBAL	Thailand
275	Global Power Synergy Public Company Limited	GPSC	Thailand
276	Gunkul Engineering Public Company Limited	GUNKUL	Thailand
277	Hana Microelectronics Public Company Limited	HANA	Thailand
278	Haad Thip Public Company Limited	HTC	Thailand
279	IRPC Public Company Limited	IRPC	Thailand
280	Interlink Telecom Public Company Limited	ITEL	Thailand
281	Indorama Ventures Public Company Limited	IVL	Thailand
282	KCE Electronics Public Company Limited	KCE	Thailand
283	Land and Houses Public Company Limited	LH	Thailand
284	LPN Development Public Company Limited	LPN	Thailand
285	Major Cineplex Group Public Company Limited	MAJOR	Thailand
286	MBK Public Company Limited	MBK	Thailand
287	Namyong Terminal Public Company Limited	NYT	Thailand
288	Osotspa Public Company Limited	OSP	Thailand
289	Plan B Media Public Company Limited	PLANB	Thailand
290	Prima Marine Public Company Limited	PRM	Thailand
291	Pruksa Holding Public Company Limited	PSH	Thailand
292	PTT Exploration and Production Public Company Limited	PTTEP	Thailand
293	PTT Global Chemical Public Company Limited	PTTGC	Thailand
294	Quality Houses Public Company Limited	QH	Thailand
295	Ratch Group Public Company Limited	RATCH	Thailand
296	RS Public Company Limited	RS	Thailand
297	Singha Estate Public Company Limited	S	Thailand
298	Somboon Advance Technology Public Company Limited	SAT	Thailand
299	SC Asset Corporation Public Company Limited	SC	Thailand
300	Siam City Cement Public Company Limited	SCCC	Thailand
301	Sansiri Public Company Limited	SIRI	Thailand
302	SCGJWD Logistics Public Company Limited	SJWD	Thailand
303	Supalai Public Company Limited	SPALI	Thailand
304	Saha Pathana Inter-Holding Public Company Limited	SPI	Thailand
305	Star Petroleum Refining Public Company Limited	SPRC	Thailand
306	Sri Trang Agro-Industry Public Company Limited	STA	Thailand
307	STECON Group Public Company Limited	STECON	Thailand
308	TOA Paint (Thailand) Public Company Limited	TOA	Thailand
309	Thai Oil Public Company Limited	TOP	Thailand
310	Tata Steel Thailand Public Company Limited	TSTH	Thailand
311	Thoresen Thai Agencies Public Company Limited	TTA	Thailand
312	TTW Public Company Limited	TTW	Thailand
313	Thai Union Group Public Company Limited	TU	Thailand
314	Thai Vegetable Oil Public Company Limited	TVO	Thailand
315	WHA Utilities and Power Public Company Limited	WHAUP	Thailand

APPENDIX B. ANALYZING DATA RESULT

Appendix B.1- Panel Data Setup (xtset)

```
. gen month_num = mofd(date)
(1,673 missing values generated)

.
. format month_num %tm

. xtset firm_id_num month_num

Panel variable: firm_id_num (unbalanced)
 Time variable: month_num, 2020m1 to 2025m12
         Delta: 1 month
```

Appendix B.2 Country Distribution

```
. tab country_num
```

country_num	Freq.	Percent	Cum.
Malaysia	6,624	29.21	29.21
Indonesia	4,680	20.63	49.84
Philippines	2,232	9.84	59.68
Singapore	4,176	18.41	78.10
Thailand	4,968	21.90	100.00
Total	22,680	100.00	

Appendix B.3 Descriptive Statistics

```
. summarize excess_return mrp smb hml esg_lag
```

Variable	Obs	Mean	Std. dev.	Min	Max
excess_ret~n	22,680	-.0036375	.1006841	-.4552512	.7614468
mrp	22,680	-.0010137	.043613	-.2186554	.1774769
smb	22,680	.001666	.0460286	-.1271784	.209703
hml	22,680	-.0002306	.0558912	-.3101833	.2150993
esg_lag	22,680	52.02641	11.73437	14.46	85.23

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Appendix B.4 Descriptive Statistics Cross-check (tabstat)

```
. tabstat excess_return mrp smb hml esg_lag, stat(mean sd min max) columns(statistics)
```

Variable	Mean	SD	Min	Max
excess_ret~n	-.0036375	.1006841	-.4552512	.7614468
mrp	-.0010137	.043613	-.2186554	.1774769
smb	.001666	.0460286	-.1271784	.209703
hml	-.0002306	.0558912	-.3101833	.2150993
esg_lag	52.02641	11.73437	14.46	85.23

Appendix B.5 Common Effect Model (Pooled OLS)

```
. reg excess_return mrp smb hml esg_lag
```

Source	SS	df	MS	Number of obs	=	22,680
				F(4, 22675)	=	3974.48
Model	94.7553254	4	23.6888314	Prob > F	=	0.0000
Residual	135.148231	22,675	.005960231	R-squared	=	0.4122
				Adj R-squared	=	0.4120
Total	229.903557	22,679	.010137288	Root MSE	=	.0772

excess_ret~n	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
mrp	1.394446	.0119984	116.22	0.000	1.370929	1.417964
smb	.2427818	.0117454	20.67	0.000	.21976	.2658037
hml	.2090134	.0098196	21.29	0.000	.1897663	.2282605
esg_lag	-.0001316	.0000438	-3.01	0.003	-.0002175	-.0000458
_cons	.004269	.0023358	1.83	0.068	-.0003094	.0088474

Appendix B.6 Chow Test (Fixed Effect Regression)

```
. xtreg excess_return mrp smb hml esg_lag, fe

Fixed-effects (within) regression               Number of obs      =     22,680
Group variable: firm_id_num                     Number of groups   =        315

R-squared:                                      Obs per group:
     Within  = 0.4165                                         min =         72
     Between = 0.0063                                         avg =       72.0
     Overall = 0.4044                                         max =         72

                                                F(4,22361)         =    3990.71
corr(u_i, Xb) = -0.1555                         Prob > F           =     0.0000
```

excess_ret~n	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
mrp	1.401119	.0120617	116.16	0.000	1.377478	1.424761
smb	.235049	.0118357	19.86	0.000	.2118501	.2582479
hml	.2102684	.0098684	21.31	0.000	.1909257	.2296112
esg_lag	-.0009011	.0000849	-10.61	0.000	-.0010675	-.0007347
_cons	.0443206	.0044487	9.96	0.000	.0356009	.0530404
sigma_u	.011531					
sigma_e	.07740793					
rho	.02170858	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(314, 22361) = 0.62                     Prob > F = 1.0000
```

Appendix B.7 Random Effect Model

```
. xtreg excess_return mrp smb hml esg_lag, re

Random-effects GLS regression                   Number of obs     =     22,680
Group variable: firm_id_num                     Number of groups  =        315

R-squared:                                      Obs per group:
     Within  = 0.4144                                         min =         72
     Between = 0.0047                                         avg =       72.0
     Overall = 0.4122                                         max =         72

                                                Wald chi2(4)      =   15897.93
corr(u_i, X) = 0 (assumed)                      Prob > chi2       =     0.0000

------------------------------------------------------------------------------
excess_ret~n | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         mrp |   1.394446   .0119984   116.22   0.000      1.37093    1.417963
         smb |   .2427818   .0117454    20.67   0.000      .2197612    .2658025
         hml |   .2090134   .0098196    21.29   0.000      .1897673    .2282595
     esg_lag |  -.0001316   .0000438    -3.01   0.003     -.0002175   -.0000458
       _cons |    .004269   .0023358     1.83   0.068     -.0003092    .0088471
-------------+----------------------------------------------------------------
     sigma_u |          0
     sigma_e |  .07740793
         rho |          0   (fraction of variance due to u_i)
------------------------------------------------------------------------------

.
. estimates store re_model

. quietly xtreg excess_return mrp smb hml esg_lag, re
```

Appendix B.8 Lagrange Multiplier Test

```
 xttest0

reusch and Pagan Lagrangian multiplier test for random effects

        excess_return[firm_id_num,t] = Xb + u[firm_id_num] + e[firm_id_num,t]

        Estimated results:
                         |       Var     SD = sqrt(Var)
                 ---------+-----------------------------
                excess_~n |    .0101373        .1006841
                        e |     .005992        .0774079
                        u |           0               0

        Test: Var(u) = 0
                                  chibar2(01) =      0.00
                              Prob > chibar2 =    1.0000
```

Appendix B.9 Hausman Test

```
. hausman fe_model re_model

                 ---- Coefficients ----
                 (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
                 fe_model     re_model       Difference       Std. err.
------------------------------------------------------------------------------
         mrp     1.401119     1.394446        .006673        .0012334
         smb      .235049     .2427818       -.0077329        .0014594
         hml     .2102684     .2090134        .0012551        .0009799
     esg_lag    -.0009011    -.0001316       -.0007694        .0000727
------------------------------------------------------------------------------
                           b = Consistent under H0 and Ha; obtained from xtreg.
            B = Inconsistent under Ha, efficient under H0; obtained from xtreg.

Test of H0: Difference in coefficients not systematic

    chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
            = 136.33
Prob > chi2 = 0.0000
```

Appendix B.10 Base Model for Classical Assumption Tests

```
. reg excess_return mrp smb hml esg_lag i.country_num

      Source |       SS           df       MS      Number of obs   =    22,680
-------------+----------------------------------   F(8, 22671)     =   2011.35
       Model |  95.4376317         8  11.929704   Prob > F        =    0.0000
    Residual |  134.465925    22,671  .005931186   R-squared       =    0.4151
-------------+----------------------------------   Adj R-squared   =    0.4149
       Total |  229.903557    22,679  .010137288   Root MSE        =    .07701

------------------------------------------------------------------------------
excess_ret~n | Coefficient  Std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
         mrp |   1.399938   .0119996   116.67   0.000     1.376418    1.423458
         smb |   .2439777   .0117336    20.79   0.000     .2209791    .2669763
         hml |   .2086616   .0098166    21.26   0.000     .1894205    .2279027
     esg_lag |  -.0002616   .0000455    -5.75   0.000    -.0003508   -.0001724
             |
 country_num |
   Indonesia |  -.0079583   .0014809    -5.37   0.000     -.010861   -.0050557
Philippines  |   .0028722   .0018858     1.52   0.128    -.0008242    .0065686
   Singapore |  -.0032209    .001533    -2.10   0.036    -.0062257   -.0002162
    Thailand |   .0087309    .001469     5.94   0.000     .0058517    .0116102
             |
       _cons |   .0110757   .0025572     4.33   0.000     .0060635     .016088
------------------------------------------------------------------------------
```

Appendix B.11 Multicollinearity Test (VIF)

```
. vif

    Variable |       VIF       1/VIF
-------------+----------------------
         mrp |      1.05    0.954887
         smb |      1.12    0.896607
         hml |      1.15    0.868783
     esg_lag |      1.09    0.916967
 country_num |
           2 |      1.37    0.728132
           3 |      1.21    0.828761
           4 |      1.35    0.740765
           5 |      1.41    0.708457
-------------+----------------------
    Mean VIF |      1.22
```

Appendix B.12 Heroskedasticity Test

```
. estat hettest

Breusch-Pagan/Cook-Weisberg test for heteroskedasticity
Assumption: Normal error terms
Variable: Fitted values of excess_return

H0: Constant variance

    chi2(1) = 5948.19
Prob > chi2 =  0.0000
```

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Appendix B.13 Autocorrelation Test (Wooldridge)

```
. xtserial excess_return mrp smb hml esg_lag

Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
    F(  1,     314) =    273.251
           Prob > F =     0.0000
```

Appendix B.14 Residual Prediction for Normality Test

```
. reg excess_return mrp smb hml esg_lag i.country_num
```

Source	SS	df	MS	Number of obs	=	22,680
				F(8, 22671)	=	2011.35
Model	95.4376317	8	11.929704	Prob > F	=	0.0000
Residual	134.465925	22,671	.005931186	R-squared	=	0.4151
				Adj R-squared	=	0.4149
Total	229.903557	22,679	.010137288	Root MSE	=	.07701

excess_ret~n	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
mrp	1.399938	.0119996	116.67	0.000	1.376418	1.423458
smb	.2439777	.0117336	20.79	0.000	.2209791	.2669763
hml	.2086616	.0098166	21.26	0.000	.1894205	.2279027
esg_lag	-.0002616	.0000455	-5.75	0.000	-.0003508	-.0001724
country_num						
Indonesia	-.0079583	.0014809	-5.37	0.000	-.010861	-.0050557
Philippines	.0028722	.0018858	1.52	0.128	-.0008242	.0065686
Singapore	-.0032209	.001533	-2.10	0.036	-.0062257	-.0002162
Thailand	.0087309	.001469	5.94	0.000	.0058517	.0116102
_cons	.0110757	.0025572	4.33	0.000	.0060635	.016088

```
.
. predict resid_model2, residuals
(1,673 missing values generated)
```

Appendix B.15 Normality Test

```
.
. sktest resid_model2

Skewness and kurtosis tests for normality
                                                    ------ Joint test ------
    Variable |       Obs   Pr(skewness)   Pr(kurtosis)   Adj chi2(2)  Prob>chi2
-------------+-------------------------------------------------------------------
resid_model2 |    22,680         0.0000         0.0000             .          .
```

Appendix B.16 Model 1 (Baseline FF3)

```
. reg excess_return mrp smb hml i.country_num, vce(cluster firm_id_num)

Linear regression                               Number of obs     =     22,680
                                                F(2, 314)         =          .
                                                Prob > F          =          .
                                                R-squared         =     0.4143
                                                Root MSE          =     .07707

                                   (Std. err. adjusted for 315 clusters in firm_id_num)
------------------------------------------------------------------------------
             |               Robust
excess_ret~n |      Coef.   Std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
         mrp |    1.399454   .039482    35.45   0.000     1.321772    1.477137
         smb |    .2476311   .0075502   32.80   0.000     .2327758    .2624864
         hml |    .2080042   .0122765   16.94   0.000     .1838495    .2321588
             |
 country_num |
   Indonesia |   -.0070697   .0001613  -43.82   0.000    -.0073871   -.0067522
Philippines  |    .0029693   .0001176   25.25   0.000     .0027379    .0032006
   Singapore |   -.0023787   .0002659   -8.95   0.000    -.0029019   -.0018556
    Thailand |    .0072953   .0000555  131.43   0.000     .0071861    .0074045
             |
       _cons |   -.0025769   .0000988  -26.08   0.000    -.0027713   -.0023825
------------------------------------------------------------------------------

.
. estimates store Model1
```

Appendix B.17 Model 2 (Extended FF3)

```
. reg excess_return mrp smb hml esg_lag i.country_num, vce(cluster firm_id_num)

Linear regression                               Number of obs     =     22,680
                                                F(8, 314)         =    1203.72
                                                Prob > F          =     0.0000
                                                R-squared         =     0.4151
                                                Root MSE          =     .07701

                                  (Std. err. adjusted for 315 clusters in firm_id_num)
------------------------------------------------------------------------------
             |               Robust
excess_ret~n |      Coef.   Std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
         mrp |    1.399938   .0394077    35.52   0.000     1.322401    1.477474
         smb |    .2439777   .0074777    32.63   0.000      .229265    .2586905
         hml |    .2086616   .0123726    16.86   0.000      .184318    .2330052
     esg_lag |   -.0002616   .0000243   -10.78   0.000     -.0003094   -.0002139
             |
 country_num |
   Indonesia |   -.0079583   .0004499   -17.69   0.000     -.0088435   -.0070732
Philippines  |    .0028722     .00042     6.84   0.000      .0020459    .0036985
   Singapore |   -.0032209   .0004776    -6.74   0.000     -.0041606   -.0022813
    Thailand |    .0087309   .0004292    20.34   0.000      .0078864    .0095754
             |
       _cons |    .0110757   .0012947     8.55   0.000      .0085283    .0136231
------------------------------------------------------------------------------
```

Appendix B.18 Robustness Check (No Country Dummy)

```
. reg excess_return mrp smb hml esg_lag, vce(cluster firm_id_num)

Linear regression                               Number of obs     =     22,680
                                                F(4, 314)         =    2181.53
                                                Prob > F          =     0.0000
                                                R-squared         =     0.4122
                                                Root MSE          =      .0772

                                  (Std. err. adjusted for 315 clusters in firm_id_num)
------------------------------------------------------------------------------
             |               Robust
excess_ret~n |      Coef.   Std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
         mrp |    1.394446   .0392089    35.56   0.000     1.317301    1.471592
         smb |    .2427818   .0075138    32.31   0.000      .227998    .2575657
         hml |    .2090134   .0124339    16.81   0.000      .184549    .2334777
     esg_lag |   -.0001316   .0000353    -3.73   0.000     -.000201   -.0000623
       _cons |     .004269   .0019036     2.24   0.026      .0005235    .0080145
------------------------------------------------------------------------------
```

Appendix B.19 Model 1 & 2 Summary

```
. esttab Model1 Model2, se star

------------------------------------------------------------
                      (1)             (2)
             excess_ret~n    excess_ret~n
------------------------------------------------------------
mrp                1.399***        1.400***
                  (0.0395)        (0.0394)

smb                0.248***        0.244***
                 (0.00755)       (0.00748)

hml                0.208***        0.209***
                  (0.0123)        (0.0124)

1.country_~m              0               0
                        (.)             (.)

2.country_~m     -0.00707***     -0.00796***
                (0.000161)      (0.000450)

3.country_~m      0.00297***      0.00287***
                (0.000118)      (0.000420)

4.country_~m     -0.00238***     -0.00322***
                (0.000266)      (0.000478)

5.country_~m      0.00730***      0.00873***
               (0.0000555)      (0.000429)

esg_lag                          -0.000262***
                                (0.0000243)

_cons            -0.00258***      0.0111***
               (0.0000988)       (0.00129)
------------------------------------------------------------
N                    22680           22680
------------------------------------------------------------
Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001
```

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Appendix B.20 Robustness Check Comparison

```
. esttab Model2_noDummy Model2, se star

------------------------------------------------------------
                      (1)             (2)
             excess_ret~n    excess_ret~n
------------------------------------------------------------
mrp                1.394***        1.400***
                  (0.0392)        (0.0394)

smb                0.243***        0.244***
                 (0.00751)       (0.00748)

hml                0.209***        0.209***
                  (0.0124)        (0.0124)

esg_lag        -0.000132***    -0.000262***
                (0.0000353)     (0.0000243)

1.country_~m                            0
                                        (.)

2.country_~m                    -0.00796***
                                (0.000450)

3.country_~m                     0.00287***
                                (0.000420)

4.country_~m                    -0.00322***
                                (0.000478)

5.country_~m                     0.00873***
                                (0.000429)

_cons              0.00427*        0.0111***
                  (0.00190)       (0.00129)
------------------------------------------------------------
N                    22680           22680
------------------------------------------------------------
Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001
```

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