

# Analyzing How ESG-Integrated Smart Beta Strategies Perform in the ASEAN Stock Market

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## Abstract

This study investigates the performance of Environmental, Social, and Governance (ESG)-integrated smart beta strategies in the ASEAN stock market, including Vietnam, Singapore, Philippines, Indonesia, Malaysia, and Thailand, from 2015 to 2023. Amidst growing global interest in sustainable investment practices, this research aims to bridge the gap in knowledge concerning the efficacy of combining ESG criteria with smart beta strategies within the unique economic and regulatory landscapes of the ASEAN region. Utilizing data sourced from Bloomberg, the study employs a quantitative approach, comparing the risk-adjusted returns of ESG-integrated smart beta portfolios against traditional market capitalization-weighted indices. The findings indicate that ESG-integrated smart beta strategies generally enhance portfolio performance in terms of Sharpe ratios and reduce portfolio risk, as measured by standard deviation across several ASEAN markets. However, the effectiveness varies significantly across different markets and factors, highlighting the importance of tailored investment strategies that consider local market dynamics. This research contributes to the academic literature by offering new insights into the applicability of ESG and smart beta strategies in emerging markets, providing valuable implications for both institutional and retail investors aiming to optimize portfolio performance while adhering to sustainability standards.

**Keywords:** ASEAN Stock Markets, ESG Integration, Smart Beta Strategies, Sustainable Investing

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## การวิเคราะห์กลยุทธ์สมาร์ตเบต้าที่บูรณาการ ESG ในตลาดหุ้นอาเซียน

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### บทคัดย่อ

การศึกษานี้ตรวจสอบผลการดำเนินงานของกลยุทธ์สมาร์ตเบต้าที่บูรณาการกับหลักการด้านสิ่งแวดล้อม สังคม และธรรมาภิบาล (ESG) ในตลาดหุ้นอาเซียน ครอบคลุมประเทศเวียดนาม สิงคโปร์ ฟิลิปปินส์ อินโดนีเซีย มาเลเซีย และไทย ตั้งแต่ปี 2558 ถึง 2566 ในขณะที่มีความสนใจทั่วโลกเพิ่มขึ้นในเรื่องการลงทุนอย่างยั่งยืน การวิจัยนี้มุ่งเน้นที่จะเชื่อมต่อช่องว่างของความรู้เกี่ยวกับประสิทธิภาพของการรวมเกณฑ์ ESG กับกลยุทธ์สมาร์ตเบต้าในภูมิภาคเศรษฐกิจและการกำกับดูแลที่เฉพาะเจาะจงของภูมิภาคอาเซียน โดยใช้ข้อมูลที่มาจาก Bloomberg การศึกษานี้ใช้วิธีการทางปริมาณเปรียบเทียบผลตอบแทนที่ปรับความเสี่ยงแล้วของพอร์ตการลงทุนสมาร์ตเบต้าที่บูรณาการกับ ESG กับดัชนีที่ใช้น้ำหนักราคาตลาดแบบดั้งเดิม ผลการศึกษานี้แสดงให้เห็นว่า กลยุทธ์สมาร์ตเบต้าที่บูรณาการปัจจัย ESG โดยทั่วไปแล้วช่วยเพิ่มประสิทธิภาพของพอร์ตการลงทุนในแง่ของอัตราส่วนชาร์ป (Sharpe ratio) และช่วยลดความเสี่ยงของพอร์ตการลงทุน ซึ่งวัดได้จากค่าส่วนเบี่ยงเบนมาตรฐานในตลาดอาเซียนหลายแห่ง อย่างไรก็ตาม ประสิทธิภาพของกลยุทธ์มีความแตกต่างกันอย่างมากในตลาดที่ต่างกันและปัจจัยที่แตกต่างกัน ซึ่งเน้นย้ำถึงความสำคัญของการปรับเปลี่ยนกลยุทธ์การลงทุนให้เข้ากับสภาพตลาดแต่ละประเทศ งานวิจัยนี้มีส่วนช่วยเติมเต็มองค์ความรู้ทางวิชาการโดยนำเสนอข้อมูลเชิงลึกใหม่เกี่ยวกับความเป็นไปได้ในการประยุกต์ใช้ ESG กับกลยุทธ์สมาร์ตเบต้าในตลาดเกิดใหม่ ซึ่งสำคัญและเป็นประโยชน์ต่อนักลงทุนทั้งสถาบันและนักลงทุนรายย่อยที่ต้องการเพิ่มประสิทธิภาพของพอร์ตการลงทุนในขณะเดียวกันก็ยังคงยึดมั่นในมาตรฐานด้านความยั่งยืน

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## 1. Introduction

Over the past few decades, the global investment community has seen a surge in interest in ESG principles and smart beta strategies. Environmental, Social, and Governance (ESG) is a framework that helps stakeholders understand how an organization is managing risks and opportunities related to environmental, social, and governance criteria (Peterdy, 2023). ESG investing refers to a set of standards for a company's behavior used by socially conscious investors to screen potential investments, focusing on environmental, social, and governance criteria. On the other hand, Smart beta strategies emphasize the use of alternative index construction rules to traditional market capitalization-based indices, aiming to enhance returns and reduce risks by considering factors such as volatility, liquidity, value, quality, size, and momentum. These strategies aim to outperform market cap-weighted indices by focusing on certain performance factors, potentially reducing portfolio risk (Chow et al., 2011). By not weighing investments strictly according to market cap, Smart Beta strategies can provide the benefits of active management with lower costs, as they are rules-based and not actively managed. They offer investors a means to diversify their investments across various factors, which may help in smoothing out performance over time. Additionally, Smart Beta strategies are typically transparent, systematic, and can be tailored to meet specific investment objectives or reflect personal values, including ESG considerations (Amenc & Goltz, 2013).

While both ESG and smart beta strategies have been researched extensively in developed markets, the ASEAN stock market remains under-explored (Monga et al., 2022; Ielasi et al., 2020). Understanding the performance of ESG-integrated smart beta strategies in this region is crucial for investors, policymakers, and corporations alike. This study aims to bridge the gap in the literature by analyzing how ESG-integrated smart beta strategies perform in the ASEAN stock market, providing valuable insights that could influence investment practices and policy-making in the region.

Research into the application of ESG principles and Smart Beta strategies in the ASEAN stock market is notably scarce. While numerous studies suggest a positive correlation between ESG practices and corporate financial performance (Alessandrini & Jondeau, 2019; Paul, 2017), other research presents no significant evidence of sustainability contributing to profitability (Mollet & Ziegler, 2014; Cubas-Díaz & Sedano, 2018; Humphrey & Lee, 2011; Capelle-Blancard & Monjon, 2010). This inconsistency raises questions about the efficacy of combining

ESG considerations with Smart Beta strategies in enhancing investment returns. Furthermore, the distinctive economic conditions, cultural elements, and regulatory frameworks of the ASEAN region may influence the effectiveness and adoption of ESG-integrated Smart Beta strategies differently compared to developed markets, presenting a unique challenge in understanding their true impact within these markets (Suttipun, 2023; Makhdalena et al., 2021).

Given the limited research on the ASEAN market and the ambiguity of existing findings, this paper aims to conduct a quantitative evaluation of ESG-integrated Smart Beta strategies within the ASEAN stock markets to determine their effect on risk-adjusted return. The performance of these strategies will be compared against traditional market capitalization-weighted portfolios. Additionally, this study will examine the risk-return profiles of the strategies to discern their potential advantages or disadvantages for investors, offering critical insights into their viability in the ASEAN context.

Then, the research questions of this study focus on two key questions. First, does ex-post ESG rebalancing influence the risk-adjusted performance of an equity portfolio based on a smart beta strategy? Second, does ex-ante ESG screening affect the risk-adjusted performance of an equity portfolio following a smart beta approach? This research seeks to bridge the gap in knowledge regarding ESG-integrated Smart Beta strategies in the ASEAN region, a subject not thoroughly explored in existing scholarly works. Providing a detailed analytical evaluation, this report is designed to aid both institutional and retail investors in making informed portfolio allocation decisions specifically tailored to the ASEAN markets. The methodologies utilized and the insights gained from this study are intended to serve as a groundwork for analogous research in other emerging markets.

The scope of this research encompasses the stock markets of six ASEAN countries: Indonesia, Thailand, Singapore, Philippines, Vietnam, and Malaysia. The reason that these six countries are chosen for this research is that they are the only available market in the Bloomberg database. Although the Laos Securities Exchange Composite Index was available, it was not included because the number of listed stocks was too small for meaningful analysis.

The indices considered are FBMKLCI Index (FTSE Bursa Malaysia KLCI Index – Kuala Lumpur Composite Index) - Malaysia; STI (Straits Times Index) - Singapore; SET (Stock Exchange of Thailand Index) - Thailand; PCOMP (Philippines Stock Exchange PSEi Index)

- Philippines; JCI (Jakarta Stock Exchange Composite Index) - Indonesia; and VN-index (Ho Chi Minh Stock Index) - Vietnam. The period of study for this research is from 2015-2023.

## 2. Literature review

Extensive research on ESG investing reveals a divide in findings, with some studies showing that sustainable investing improves investment performance, while others suggest it may detract from it. Research on ESG performance in developing and emerging markets suggests that investing in ESG index funds can be profitable, with higher returns over longer time horizons (Volodina & Trachenko, 2023). (Gupta & Chaudhary, 2023) further supports this, finding that ESG indices outperform conventional indices in both developed and emerging markets, offering better risk-adjusted returns and downside risk protection. (Makhdalena et al., 2021) provides evidence of the positive impact of ESG on firm performance in developing countries, particularly in the ASEAN region. (Odell & Ali, 2016) emphasizes the benefits of considering ESG factors in these markets, including the potential for superior financial performance and the importance of active ownership.

Conversely, some research presents a less optimistic view on the impact of ESG integration. (Kurniawan & Rokhim, 2023) found a negative relationship between ESG performance and firm performance, with ownership structure playing a significant moderating role. (Rahma & Rokhim, 2022) reported a significant influence of ESG score on total risk, but not on systematic risk.

Smart beta strategies, which utilize alternative index construction rules, have also shown mixed results. (Raza & Ashraf, 2017) and (Cai et al., 2018) both found that smart beta strategies, including fundamental-weighting and equal-weighting, outperformed traditional market capitalization-weighted portfolios in various markets, including the ASEAN stock market. (Sherwood & Pollard, 2017) further supported this, showing that integrating ESG strategies into emerging market equities, including those in the ASEAN region, can lead to higher returns and lower downside risk. (Ielasi et al., 2020) added that the integration of ESG analysis into smart beta strategies can impact both return and risk statistics, with different levels of efficiency for each strategy. (Waspada et al., 2021) applied a smart beta portfolio model to the Indonesia Stock Exchange, finding that it can be an efficient method for predicting stock returns. These studies collectively suggest that ESG-integrated smart beta strategies can potentially

enhance performance in the ASEAN stock market.

However, (Amenc et al., 2015) and (Rompotis, 2019) both found that smart beta strategies, including those used in ETFs, do not consistently outperform the market. (Glushkov, 2015) further supports this by suggesting that the performance of smart beta ETFs is not significantly different from that of traditional cap-weighted benchmarks.

The integration of ESG criteria into smart beta strategies has produced varied outcomes. Several studies have underscored the beneficial aspects of integrating ESG criteria with Smart Beta strategies. (Raza & Ashraf, 2017) and (Sherwood & Pollard, 2017) suggest that ESG integration can lead to better risk-adjusted returns over the long term, attributing this to improved risk management and more sustainable business practices. Moreover, (Ielasi et al., 2020) and (Louraoui, 2020) demonstrate that high ESG scores can enhance a company's reputation and attract more investor attention, potentially boosting stock prices. The diversification benefits of Smart Beta strategies, which systematically select stocks based on specific factors such as volatility and momentum, are further enhanced when combined with ESG criteria. (Bender et al., 2017) and (Glushkov, 2015) report that such integrated strategies tend to outperform traditional market-cap weighted indices, offering a more robust investment approach.

However, the integration of ESG into Smart Beta strategies is not without its challenges. (Alessandrini & Jondeau, 2019) points out the potential for ESG-compliant stocks to become overvalued, creating a price bubble due to an "ESG premium." Issues of data accuracy and potential manipulation are also critical, as highlighted by (Volodina & Trachenko, 2023), where the reliability of ESG data and the risk of greenwashing pose significant risks to investors. Furthermore, (Rehman et al., 2016) and (Sugiarto et al., 2020) note the lack of standardized ESG metrics, which complicates the comparison across companies and industries and could limit the effectiveness of these strategies.

## **2.1 Overview of Smart Beta Investing**

Smart beta investing has its roots in the evolution of investment theory and practice, building on several key financial concepts. Modern portfolio theory (MPT), developed by Markowitz (1952), introduced the idea that an optimal portfolio has the best possible expected level of

return for its level of risk (defined as variance). This theory suggests that diversification can lead to risk reduction without a proportional decrease in expected returns (Markowitz, 1952). Further, capital asset pricing model (CAPM), expanding on MPT, was introduced by Sharpe, Lintner, and Mossin (independently in the mid-1960s. This model explains how securities should be priced in the market, considering the risk-free rate of return, the expected market return, and the beta of the securities (which measures the expected change in return with respect to a change in the market return) (Sharpe, 1964; Lintner, 1965; Mossin, 1966).

**Capitalization-Weighted Indices:** The common method for index funds has been to weight securities by their market capitalization. This approach assumes that the market is efficient and that the largest-cap companies will impact the performance of the overall index more than a small-cap company will. However, this method often leads to concentration in a few large stocks, potentially increasing systemic risk and missing out on opportunities in smaller companies.

Smart beta strategies evolved as a challenge to traditional capitalization-weighted indices and the efficient market hypothesis, suggesting that exploiting market inefficiencies through alternative weighting methods like size, low volatility, momentum, quality, value, and dividend yields could lead to higher returns, which is contrary to the efficient market hypothesis (EMH). Evidence from (Monga et al., 2022) supported that smart beta investing results in a better risk-return profile on an absolute and risk-adjusted basis. Smart beta investment strategies take a hybrid approach, positioned between passive index tracking and active stock picking. These strategies are grounded in the Fama and French three-factor model, which expanded upon the Capital Asset Pricing Model (CAPM) by including company size and value factors in addition to the market risk factor. A research paper by (Alessandrini & Jondeau, 2019) also showed that applying an ESG screening to an otherwise passive portfolio improves the ESG scores and Sharpe ratios.

## **2.2 Theoretical Framework of Smart Beta Factors**

This study incorporates five factor-based smart beta exposures: value, momentum, minimum volatility, quality, and growth.

Value investing focuses on companies with high intrinsic value, where the stock is selling at a market price below the true value. Book value, dividends, sales, and earnings are associated with stocks with low prices and their fundamentals (Monga et al., 2022). This factor measures how well value stocks (those with low valuation) outperform growth stocks. Stocks with a low price-to-book (P/B) ratio are overweighted, while those with a high P/B ratio are underweighted. This is because stocks trading at lower P/B ratios may be undervalued by the market, presenting an opportunity for greater returns as their prices potentially increase upon market correction. In contrast, stocks with higher P/B ratios could be overvalued, risking a price decline as the market adjusts. Another aspect of research on the value premium examines it through the lens of behavioral biases. Investors tend to project future growth based on growth stocks with past positive news and to overreact to past negative news about value stocks, which leads to increased returns for value stocks (Lakonishok et al., 1994).

**Momentum Factor:** Momentum investing presumes that if stocks have performed well for the past 12 months, they probably will continue outperforming the market for a short period in the future. Jagadeesh and Titman (1993) found that strategies involving purchasing stocks that had previously performed well and selling those that had underperformed yielded significant “abnormal” returns in the U.S. stock market between 1965 and 1989. Similarly, Fama and French (2012) noted the enduring nature of momentum returns from 1989 to 2011, identifying “momentum” as a distinct and enduring factor not explained by value or size effects.

For minimum volatility factor, we identify stocks that display a lower level of risk than the overall market. Low-volatility equities often outperform when the market is falling, and frequently lag when the market is rising. The Minimum Volatility Factor in smart beta strategies is designed to capture excess returns from stocks that exhibit lower volatility compared to the benchmark index average. This approach is based on the theory that fewer volatile stocks can provide better risk-adjusted returns over time.

Quality factor exposure refers to the tendency of high-quality companies, characterized by robust profitability, stable earnings, and low financial leverage, to generate superior risk-adjusted returns compared to lower-quality companies. This factor is predicated on the notion that high-quality firms are better equipped to withstand economic downturns and are less vulnerable to financial distress. Fama and French (1992, 2015) extended the asset pricing model to include profitability as a factor that explains stock returns, arguing that profitable

firms are likely to perform better because they effectively utilize their capital and generate higher earnings. This aligns with the efficient market hypothesis, suggesting that stock prices reflect all available information, including the financial health and profitability of firms. Modigliani and Miller's (1958) theories on capital structure emphasize the role of debt and equity in a firm's performance. High-quality firms typically exhibit low leverage, reducing their cost of capital and risk of bankruptcy, thereby offering safer investment prospects. According to the capital asset pricing model (CAPM) by Sharpe (1964), investors are compensated for the risk taken beyond the risk-free rate. Firms with stable earnings provide more predictable returns, reducing business risk and potentially lowering their expected return threshold, making them attractive to risk-averse investors.

Growth factor exposure is the strategy of targeting stocks that are expected to grow at an above-average rate compared to other companies. This typically includes companies with rising profits, revenues, or cash flows, and often these companies reinvest their earnings into the business rather than paying out dividends. Investors anticipate that these reinvestments will lead to future growth and an increase in the stock price. The growth factor is premised on the idea that these stocks will provide excess returns because their future potential is not yet fully reflected in their current stock prices. High Price-to-Earnings (P/E) ratio will be used as a signal indicator for growth smart beta strategy.

### **3. Methodology**

This study aims to determine how integrating ESG criteria affects the risk-return performance of smart beta portfolios by utilizing two different asset allocation methods. In both approaches, portfolios were built based on the first quartile of a market index and after screening and rebalancing, portfolios were compared with the same index and used as a benchmark.

The first method for ex-post ESG rebalancing involves selecting the top quintile of companies from a market index based on their performance in various smart beta strategies such as value, momentum, minimum volatility, quality, and growth. After the initial selection, these portfolios are rebalanced monthly, adjusting the weight of each company according to its current ESG scores. This approach is designed to capture dynamic changes in both market conditions and company-specific ESG performances. Since the portfolios are rebalanced monthly, the turnover rates are also high for this method.

The second method for ex-ante ESG screening starts by selecting companies based solely on their ESG scores, choosing the top quintile from the market index. The selected ESG-focused portfolios are then rebalanced annually using smart beta strategies to adjust the weights of the stocks. This method aligns with the annual updates of ESG scores and therefore, the portfolio turnover rates were also significantly lower. The drawback of this method is it may result in less responsiveness to short-term market dynamics.

By using both approaches, the study provides a comprehensive look at how ESG can be integrated into smart beta strategies at different stages of the portfolio construction process. This two-fold approach allows for a clearer analysis of ESG's effect on both portfolio risk and return, offering more robust insights than a single-method study would. Therefore, applying the two approaches, four portfolio categories were obtained: strictly smart beta, smart beta screened with ESG rebalancing, strictly ESG, and ESG-based with smart beta rebalancing.

### **3.1 Data collection**

The dataset includes financial and ESG score data sourced from Bloomberg, covering a comprehensive set of companies listed in the major ASEAN market indices. The study period spans from 2015 to 2023, with portfolios constructed and rebalanced based on data available at the start of each period. Portfolio returns are calculated using local currency total returns for each country. The performance comparison assumes that an investor has direct access to each local market.

In addition, to maintain a clear focus on strategic performance, this research assumes that there are no transaction costs. The returns presented are therefore gross theoretical returns before any trading costs are factored in. This assumption isolates the impact of the investment strategy itself, allowing for a more direct comparison of the various portfolio construction methods. The challenge faced in the data collection process is the lack of availability of ESG data that is restricted in both cross-section and time-series. This specific limitation is not unique to our setting but is applied generally to research concerned with ESG.

### 3.2 Empirical Analysis Process

The empirical analysis will be conducted using two Bloomberg functions: Equity Screening (EQS) and Equity Strategy Backtesting (EQBT). EQS is a versatile tool designed for screening of companies that meet a customized set of criteria, so you can generate investment ideas, create lists of securities to follow, and validate trade ideas against historical performance.

EQBT is a comprehensive function that allows you to analyze the performance of a portfolio by launching its corresponding EQS analysis. EQBT enables the evaluation of potential investment strategies using past data. This backtesting function simulates how an investment strategy's criteria would have been performed historically by utilizing Bloomberg's extensive historical databases to calculate what the returns would have theoretically been. It is a critical tool for both fundamental and quantitative analysts in assessing the advantages of an investment strategy. The EQBT function also has the capability to adjust a portfolio's composition based on predefined rules. This backtest encompasses a defined historical period and involves systematic portfolio adjustments. EQBT provides risk and return statistics for financial portfolios, enabling comparison with standard benchmarks.

### 3.3 Factor selection

In the creation of portfolios, this study employs a series of factor attributes and selects stocks based on the established selection criteria outlined in Table 1.

**Table 1. Empirical Analysis Process**

	<b>Equity Screening (EQS)</b>	<b>Equity Screening Backtesting (EQBT)</b>
<b>First Approach: ex-post ESG rebalancing</b>	First quartile smart beta (strictly smart beta portfolio)	ESG rebalancing (smart beta screened with ESG rebalancing portfolio)
<b>Second Approach: ex-ante ESG screening</b>	First quartile ESG (strictly ESG portfolio)	Smart beta rebalancing (ESG-based with smart beta rebalancing portfolio)

The smart beta strategies applied for portfolio selection include:

- Value, aimed to identify companies that are potentially undervalued relative to their cash generation, sales efficiency, and dividend yield.
- Momentum, aimed to capture excess returns from stocks that have a positive trend in

the last 12 months.

- Minimum Volatility, aimed to capture excess returns from stocks with lower volatility than average to a benchmark index.
- Quality aims to identify companies that are profitable (high ROA), stable in their operations (low volatility in operating margins), and financially sound (low net debt relative to total capital).
- Growth aims to capture excess returns from stocks with increasing price expectations.

The construction of factors was done in Bloomberg Formula Builder (FORM), where you can analyze securities based on your own custom criteria. Value, quality, and momentum factors are multiple descriptors. The value factor is a cross-sectional average of three z-scored price fundamentals, which are free cash flow yield, sales revenue turnover to current market capitalization, and equity dividend yield, as mentioned in table 2 of any given firm at time t.

**Table 2. Methodology for Construction of Portfolios Based on Factor Exposures**

<b>Factor</b>	<b>Measure</b>	<b>Signal</b>
<b>Value (VAL)</b>	Free Cash Flow Yield, Sales Revenue Turnover to Current Market Capitalization, Equity Dividend Yield	High
<b>Momentum (MOM)</b>	Difference between Total Return over one year and Total Return over the previous month	High
<b>Minimum Volatility (LVOL)</b>	Annualized Volatility of Security's Return	Low
<b>Quality (QY)</b>	Return on Asset, Historical Standard Deviation of Operating Margin, Net Debt to Total Capitalization Ratio	High
<b>Growth (G)</b>	Price-to-Earnings Ratio	High

Z-scores are applied to standardize different data points for comparison across diverse datasets and remove any sectoral bias. Quality is a cross-sectional average of ROA, historical standard deviation of operating margin, and net debt to total capitalization ratio. Momentum is a cross-sectional average of the difference between the total return over one year and the total return over the previous month. Both quality and momentum factors are standardized using Z-score to remove any sectoral bias. After the construction of formulas is done, it is used to screen and rebalance the portfolio construction in EQS and EQBT.

#### 4. Results

The analysis of returns indicates that the ex-post ESG rebalancing approach enhanced compounded performance for most smart-beta strategies across ASEAN markets. Specifically, in Vietnam, Singapore, Thailand, and Malaysia, this approach improved performance in three out of five strategies. In Indonesia, however, only two strategies benefited, while the Philippines saw improvements in four strategies. Conversely, the ex-ante ESG rebalancing approach showed that in the Philippines and Thailand, four out of five smart-beta rebalancing portfolios surpassed their initial ESG-screened counterparts. In Indonesia and Singapore, only two portfolios showed superior performance, while in Vietnam and Malaysia, only one and none of the portfolios, respectively, outperformed the initial ESG-screened portfolios.

From Figure 1, it is evident that two out of five smart-beta strategies exceeded benchmark returns in Vietnam, the Philippines, Indonesia, and Malaysia, while only one strategy surpassed the benchmark in Singapore. Remarkably, all five strategies outperformed the benchmark in Thailand. Although the majority of smart-beta strategies across ASEAN countries do not surpass the benchmark with the ex-post ESG rebalancing approach, they generally perform better when compared to standalone smart-beta approaches without ESG considerations.

**Figure 1. Ex-post ESG rebalancing approach compared with benchmark returns**



Note: VN-index (Ho Chi Minh Stock Index) – Vietnam; STI (Straits Times Index) - Singapore; SET (Stock Exchange of Thailand Index) - Thailand; PCOMP (Philippines Stock Exchange PSEi Index) - Philippines; JCI (Jakarta Stock Exchange Composite Index) - Indonesia; and FBMKLCI Index (FTSE Bursa Malaysia KLCI Index – Kuala Lumpur Composite Index) – Malaysia

However, the effectiveness of ESG rebalancing extends beyond profitability and into risk management. According to data presented in Table 3, ESG rebalancing may not consistently enhance profits but notably diminishes risk levels in several countries. Specifically, portfolios in Singapore, the Philippines, and Malaysia saw a reduction in risk as measured by standard deviation following ESG rebalancing. In contrast, portfolios in Vietnam experienced an increase in risk, as did three out of five smart-beta strategies in Thailand and Indonesia. The impact of ESG rebalancing on risk-adjusted returns can further be analyzed through the Sharpe ratio, highlighting the trade-off between risk and return in these strategies.

**Table 3. Standard deviation after ESG rebalancing – ASEAN markets**

Country	LVOL	LVOL ESG	VAL	VAL ESG	G	G ESG	QY	QY ESG	MOM	MOM ESG
<b>Vietnam</b>	10.50	18.28	15.19	34.79	20.03	20.62	15.38	24.12	19.81	29.18
<b>Singapore</b>	14.97	14.85	20.09	18.99	18.72	17.80	15.40	16.28	18.82	16.72
<b>Thailand</b>	9.16	14.11	15.06	20.72	20.24	19.82	16.83	17.60	23.26	20.77
<b>Philippines</b>	18.61	18.39	21.13	19.95	24.20	22.05	22.63	21.16	21.97	20.74
<b>Indonesia</b>	9.53	17.11	19.58	33.17	24.53	24.29	13.70	22.23	23.88	23.59
<b>Malaysia</b>	12.74	12.84	20.82	18.70	18.94	16.76	17.20	16.97	20.57	16.65

Note: Minimum Volatility (LVOL); Value (VAL); Growth (G); Quality (QY); and Momentum (MOM)

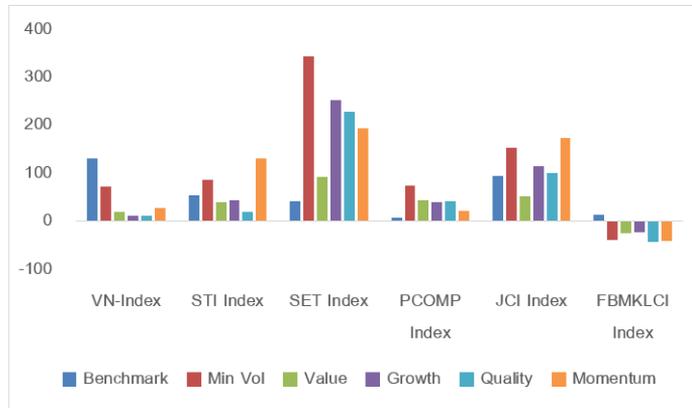
The analysis in Table 4 of the Sharpe ratios post-ESG rebalancing across ASEAN markets highlights the efficacy of integrating ESG factors into investment strategies. ESG integration has shown to enhance the risk-adjusted returns across multiple factors and countries. Notably, Vietnam, Thailand, and Malaysia exhibit significant improvements in Governance and Momentum factors when ESG criteria are considered, suggesting the potential of these factors to uncover superior risk-adjusted opportunities within these markets. Although the overall Sharpe ratios remain modest in some countries like Singapore and the Philippines, the integration of ESG still results in relative improvements. These findings underscore the strategic advantage of ESG incorporation, particularly in Governance and Momentum strategies, aligning with the growing emphasis on sustainable investing. The results thereby reinforce the potential of ESG integration not only as a conduit for achieving greater social and environmental impacts but also for enhancing financial performance across diverse ASEAN markets.

**Table 4. Sharpe ratio after ESG rebalancing – ASEAN markets**

Country	ESG	LVOL ESG	VAL ESG	G ESG	QY ESG	MOM ESG
<b>Vietnam</b>	0.34	0.37	0.15	0.10	0.10	0.18
<b>Singapore</b>	0.31	0.45	0.24	0.26	0.13	0.58
<b>Thailand</b>	0.63	0.92	0.45	0.81	0.79	0.64
<b>Philippines</b>	0.19	0.37	0.26	0.24	0.26	0.16
<b>Indonesia</b>	0.55	0.61	0.29	0.46	0.45	0.59
<b>Malaysia</b>	-0.14	-0.39	-0.22	-0.25	-0.42	-0.32

Note: Minimum Volatility (LVOL); Value (VAL); Growth (G); Quality (QY); and Momentum (MOM)

From Figure 2, it is apparent that all smart-beta strategies exceeded benchmark returns in Thailand and the Philippines. In Indonesia, four out of five strategies outperformed the benchmark, while in Singapore, only two strategies managed to do so. Surprisingly, in Vietnam and Malaysia, none of the strategies were able to outperform the benchmark returns. This demonstrates that the majority of ESG rebalancing strategies are effective in surpassing benchmark returns across several ASEAN countries under the ex-ante ESG rebalancing approach. However, when comparing these results to standalone ESG strategies without rebalancing, the majority of portfolios showed a decline in performance, suggesting that while ESG rebalancing can enhance returns, it may not always be consistent across all markets or strategies.

**Figure 2. Ex-ante ESG rebalancing approach compared with benchmark returns**

Note: VN-index (Ho Chi Minh Stock Index) – Vietnam; STI (Straits Times Index) - Singapore; SET (Stock Exchange of Thailand Index) - Thailand; PCOMP (Philippines Stock Exchange PSEi Index) - Philippines; JCI (Jakarta Stock Exchange Composite Index) - Indonesia; and FBMKLCI Index (FTSE Bursa Malaysia KLCI Index – Kuala Lumpur Composite Index) – Malaysia

The analysis of Sharpe ratios from Table 5 reveals insightful variations in the performance of smart beta strategies enhanced with ESG factors across ASEAN markets. Notably, Thailand and Indonesia emerge as leaders in maximizing risk-adjusted returns, with consistently high Sharpe ratios across multiple factors, affirming the robust integration of ESG principles. Singapore shows moderate success, particularly with the Low Volatility strategy, suggesting a partial but effective adaptation to ESG principles. Conversely, the Philippines demonstrates mixed outcomes, indicating a need for more fine-tuned strategies to fully harness the benefits of ESG integration. The underperformance observed in Vietnam and Malaysia, where Sharpe ratios are notably low or negative across all factors, calls for a critical reassessment of ESG strategy implementations in these markets. Overall, the findings suggest that while ESG integration can potentially enhance the performance of smart beta strategies, its success is highly contingent on local market characteristics and the specific execution of ESG criteria within the investment process.

**Table 5. Sharpe ratio after smart beta rebalancing – ASEAN markets**

Country	ESG	LVOL ESG	VAL ESG	G ESG	QY ESG	MOM ESG
<b>Vietnam</b>	0.34	0.37	0.15	0.10	0.10	0.18
<b>Singapore</b>	0.31	0.45	0.24	0.26	0.13	0.58
<b>Thailand</b>	0.63	0.92	0.45	0.81	0.79	0.64
<b>Philippines</b>	0.19	0.37	0.26	0.24	0.26	0.16
<b>Indonesia</b>	0.55	0.61	0.29	0.46	0.45	0.59
<b>Malaysia</b>	-0.14	-0.39	-0.22	-0.25	-0.42	-0.32

Note: Minimum Volatility (LVOL); Value (VAL); Growth (G); Quality (QY); and Momentum (MOM)

## 5. Conclusion

This research has systematically explored the performance of ESG-integrated smart beta strategies in ASEAN stock markets from 2015 to 2023, offering a detailed comparative analysis against traditional market capitalization-weighted indices. The findings reveal that ESG-integrated strategies not only enhance the risk-adjusted returns but also mitigate risks across diverse ASEAN markets, albeit with significant variability across different countries and factors. Specifically, markets like Thailand and Indonesia showed notable improvements in Sharpe ratios, suggesting a robust integration of ESG principles that align with superior risk-adjusted returns. Conversely, the underperformance in markets such as Vietnam and Malaysia underscore the complex interplay of local economic, cultural, and regulatory factors that can influence the efficacy of these strategies.

The implications of this study are twofold. Firstly, it substantiates the potential of ESG integration to enhance the financial performance and sustainability of investment portfolios in emerging markets, aligning investor values with financial goals. Secondly, it emphasizes the need for investors to consider local market dynamics when applying ESG-integrated smart beta strategies, suggesting that a one-size-fits-all approach may not be effective across different regions.

Future research should focus on longitudinal studies to track the evolution of these trends and extend the analysis to other emerging markets to validate these findings further. Further, employing data from a single provider, Bloomberg, introduces potential methodological bias. ESG scores can vary widely between providers like Bloomberg, MSCI, and Sustainalytics due to differences in their scope, measurement, and weighting methodologies. To address this,

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future research could construct a composite ESG score by integrating data from multiple sources.

Researchers should perform a sensitivity analysis using different providers' scores to test the robustness of their findings and present a more comprehensive view of the results. Additionally, exploring the impact of specific ESG factors such as environmental, sustainability, or governance models could offer deeper insights into which aspects of ESG most significantly drive performance in smart beta portfolios. By advancing our understanding of ESG integration in diverse market conditions, stakeholders can better navigate the complexities of sustainable investing in emerging markets.

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