THE IMPACT OF ESG FACTORS ON SECURITIES RISK: EVIDENCE FROM THE THSI IN THAILAND USING THE GARCH MODEL

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Abstract - This study evaluates the risk profiles of Thai securities in the Thailand Sustainability Investment (THSI) index versus non-THSI securities using the GARCH(1,1) model. Results indicate that THSI securities generally exhibit lower volatility, with the Transportation industry showing the least risk (1.60%). However, the Financials and Real Estate sectors present exceptions with minimal or reversed differences. These findings highlight the potential of ESG-focused investments to enhance portfolio stability while emphasizing the need for industry-specific risk assessments.

I. INTRODUCTION

Sustainable investing, guided by Environmental, Social, and Governance (ESG) principles, has witnessed a remarkable rise in popularity among investors globally. This trend is underscored by a 34% growth in assets under management (AUM) dedicated to ESG-focused investments between 2016 and 2018 (Alliance, 2018). The increasing focus on non-financial factors stems from their profound potential to influence a company's long-term performance. For example, neglecting environmental concerns can adversely impact employee health, resulting in illnesses that diminish workplace productivity (Sassen, Hinze, &Hardeck, 2016). Similarly, inadequate control of carbon emissions exacerbates climate change, leading to natural disasters that disrupt global economic stability (Ziegler, Morelli, &Fawibe, 2017).

Recognizing the importance of sustainability, the global investment community has embraced ESG principles as essential components of responsible business practices. In 2005, the United Nations introduced the Principles for Responsible Investment (PRI), setting a global benchmark for sustainable investing. Earlier, in 1999, the Dow Jones Sustainability Index (DJSI) was established to evaluate and rank securities based on sustainability criteria. These milestones underscore a growing commitment to integrating non-financial considerations—particularly sustainability—into investment decision-making processes.

In line with this global movement, the Stock Exchange of Thailand (SET) has actively promoted sustainable investing. In 2018, the SET launched the Thailand Sustainability Investment (THSI) index, providing a benchmark for investors seeking opportunities in companies committed to sustainability. This initiative has driven Thai fund managers to increase their exposure to stocks listed in the THSI, signaling the rising prominence of ESG investing in Thailand (Makarabhiromya, 2022).

Despite the growing enthusiasm for ESG investing, the academic literature offers mixed findings regarding its financial benefits. While some studies suggest that ESG stocks may deliver superior returns (Jacobsen, Lee, & Ma, 2019; Sudha, 2015; Ur Rehman, Zhang, Uppal, Cullinan, & Akram Naseem, 2016), others highlight their role in risk mitigation rather than return enhancement. For instance, ESG stocks are often perceived as safer investments, particularly during periods of market volatility (Burchi, Włodarczyk, Szturo, &Martelli, 2021). This suggests that ESG stocks may function as effective safe-haven assets within diversified portfolios.

In Thailand, while sustainable investing through indices such as the THSI has gained traction, limited research exists on the risk-return characteristics of ESG stocks in this specific market. Although previous studies suggest that ESG stocks may exhibit lower risk profiles, their ability to generate superior returns or serve as robust risk management tools in the Thai context remains inconclusive.

This study addresses this gap by analyzing and comparing the risk-return profiles of ESG and non-ESG stocks within the Thai investment landscape. The findings will offer valuable insights into the distinct characteristics of ESG investments, contributing to a deeper understanding of how these assets align with both financial performance objectives and sustainability goals.

II. LITERATURE REVIEW

Effective risk management is critical in investment decision-making, as investors seek to maximize risk-adjusted returns through informed asset selection. The introduction of the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) model by Engle (1982) enhanced the ability to measure time-varying risks in financial assets, offering more accurate assessments than traditional methods (So & Yu, 2006). GARCH models also support portfolio optimization by improving expected returns while reducing volatility (Abdul Aziz, Vrontos, & M. Hasim, 2019).

ESG investing similarly requires robust risk analysis. Studies across global (Dunn, Fitzgibbons,

&Pomorski, 2017), Asian (Ur Rehman et al., 2016), and Indian markets (Sudha, 2015) indicate that ESG securities often exhibit lower risk. The GARCH model has proven effective for comparing ESG and conventional assets, confirming its value in ESG risk assessments (Badea et al., 2020; Jain, Sharma, & Srivastava, 2019).

However, ESG performance varies by industry. Research shows that ESG initiatives can have a limited impact in sectors like banking, where investors may not assign additional value to sustainability practices (Tasnia, Syed JaafarAlHabshi, & Rosman, 2020). These findings highlight the need for industry-specific ESG assessments rather than a generalized approach.

III. RESEARCH METHODOLOGY

This research aims to compare the risk profiles of THSI and non-THSI securities using the GARCH model. The analysis focuses on securities listed in the THSI index from 2016 to 2021, examining pairs of securities within the same industry and with comparable market capitalization and total assets. By controlling for industry, size, and other factors, the study seeks to isolate the effect of ESG factors on risk. The GARCH model is employed to estimate volatility and assess risk differentials.The GARCH equation is presented below as Equation (1).

$$\sigma_t^2 = \omega + \sum_{i=1}^{q} \alpha_i \varepsilon_{t-i}^2 + \sum_{j=1}^{p} \beta_i \sigma_{t-i}^2 \quad (1)$$

Where σ_t^2 is the variance of the error term at time t, ω is a constant term, $\sum_{i=1}^{q} \alpha_i \varepsilon_{t-i}^2$ represents the contribution of past error terms to the current variance, and $\sum_{j=1}^{p} \beta_i \sigma_{t-i}^2$ represents the contribution of past variances to the current variance.

IV. RESULT

The study utilizes a sample of Thai securities drawn from various industries between July 1, 2016, and June 30, 2021, aligning with the timeline of the sustainable investment list. Securities are matched based on industry and market capitalization to ensure a robust comparison. The number of securities obtained through this method is presented in Table 1.

Industry Group	Agriculture &Food Industry	Financials	Industrials	Real Estate &Construction	Transportation	Communication	Total
THSI	1	3	2	3	1	2	12
non-THSI	1	1	1	1	1	1	8

Table 1: Number of Matched Securities by Industry

From the 12 securities within the THSI group and 8 securities outside the group (non-THSI), a sufficient number of comparable securities were identified to facilitate a risk comparison using the GARCH (1,1) model. The results are shown in Table 2.

Industry Group	Agriculture & Food Industry	Financials	Industrials	Real Estate &Construction	Transportation	Communication
THSI	2.12%	1.94%	1.89%	1.74%	1.60%	1.80%
non-THSI	2.68%	1.90%	2.83%	1.51%	1.77%	2.08%
P-value	<0.001**	0.423	<0.001**	<0.001**	<0.001**	<0.001**

**Statistically significant at the 0.01 level

Table 2. A comparison of average volatility, estimated using the GARCH(1,1)

Table 2 demonstrates that most industries within the THSI group exhibit lower volatility, as measured by the GARCH(1,1) model, compared to their non-THSI counterparts. The Transportation industry shows the lowest volatility at 1.60%, while the Agriculture and Food Industry records the highest at 2.12%. Notably, the majority of THSI industries have significantly lower volatility than those outside the THSI group. However, exceptions are observed in the Financials and Real Estate& Construction industries, where THSI securities exhibit higher volatility. Specifically, the Financials industry shows no statistically significant difference in volatility between THSI and non-THSI securities, indicating minimal distinction in risk profiles for this sector.

V. CONCLUSION

This study reveals that Thai securities within the THSI index generally exhibit lower volatility than their non-THSI counterparts, suggesting a risk-reducing effect of sustainable investment practices. The Transportation industry demonstrates the lowest volatility, while the Financials and Real Estate sectors

present exceptions, showing no significant difference or slightly higher volatility, respectively. This aligns with previous research indicating that the impact of ESG factors varies across industries (Tasnia et al., 2020). These findings highlight the potential of ESG criteria to enhance portfolio stability while also underscoring the need for further investigation into industry-specific effects.

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