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Environmental, Social and Governance (ESG) and Performance of Real-estate Firms in Vietnam: The Moderating Roles of Size, Leverage, and Fixed Assets

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Abstract
This study investigates the impact of environmental, social, and governance (ESG) practices on real estate firms' financial performance in Vietnam from 2014 to 2023, focusing on how firm size, leverage, and fixed assets moderate this relationship. Using a panel dataset of listed real estate companies and applying Feasible Generalized Least Squares (FGLS) estimation, we find that ESG engagement exhibits a negative association with return on equity (ROE) overall. However, the results also reveal that firm-specific characteristics moderate this relationship significantly. Specifically, larger firms and those with lower leverage levels experience a less negative or even neutral effect of ESG on performance, while firms with higher fixed asset intensity tend to suffer greater performance decline. These findings underscore the importance of firm structure in ESG implementation. This study contributes to the growing body of literature on ESG in emerging markets and offers practical insights for managers, investors, and policymakers seeking to align sustainability with financial performance in the real estate sector.

Keywords: ESG, performance, real estate, size, leverage, fixed assets, Vietnam.

1. Introduction

In recent years, environmental, social, and governance (ESG) factors have emerged as vital considerations for firms seeking long-term sustainability and competitive advantages. For real estate firms, the relevance of ESG is particularly pronounced because of its significant environmental footprint, community impact, and governance complexity. The sector plays a central role in urban development, land use, and energy consumption, making ESG integration a strategic imperative rather than just a reputational concern (Global Real Estate Sustainability Benchmark [GRESB] 2022).

Theoretically, ESG can affect a firm's performance through multiple mechanisms. Environmentally responsible practices can enhance operational efficiency and reduce regulatory risks, while social initiatives may foster community trust and customer satisfaction. Strong

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governance, in turn, ensures better decision-making, transparency, and investor confidence (Eccles, Ioannou, & Serafeim, 2014; Khan, Serafeim, & Yoon, 2016). In the real estate context, ESG may improve long-term asset valuations and attract ESG-sensitive investors. However, these practices also come with costs, especially for capital-intensive firms, raising the question of whether ESG enhances or hinders financial performance in this sector.

Existing literature offers mixed results. Some studies highlight a positive ESG–performance link, especially when firms integrate material ESG issues aligned with their strategic goals (Friede, Busch, & Bassen, 2015; Khan, Serafeim, & Yoon, 2016). However, others suggest neutral or even negative effects, particularly in firms that face high implementation costs or operate in ESG-immature markets (Krüger, 2015; Servaes & Tamayo, 2013). Additionally, there is growing evidence that the ESG–performance relationship is context-dependent and influenced by firm-specific characteristics such as size, capital structure, and asset profile (Fatemi, Glaum, & Kaiser, 2018).

Despite the increasing interest in ESG research, few studies have focused on the real estate sector in emerging economies. In Vietnam, a fast-growing market with expanding urbanization, real estate firms are under increasing pressure to disclose sustainability practices and align themselves with international ESG standards. However, Vietnam's institutional environment remains underdeveloped in terms of ESG regulation, creating uncertainties about how ESG affects firm value (Tran & Tran, 2022).

This study aims to fill this gap by exploring the impact of ESG on the financial performance of listed real estate firms in Vietnam while analyzing the moderating roles of firm size, leverage, and fixed assets. We employed panel data from 2014 to 2023 and applied the Feasible Generalized Least Squares (FGLS) approach to address potential heteroscedasticity and autocorrelation in the dataset.

Our results show that, while ESG is negatively associated with ROE overall, this effect varies significantly across firms. Larger firms appear better positioned to absorb ESG costs, while high-leverage and asset-heavy firms may experience sharp performance declines. These findings have practical relevance, suggesting that ESG adoption should be aligned with firm capacity and financial structures.

The contributions of this study are threefold. First, it extends the ESG literature to the underexplored real estate sector in emerging markets. Second, it empirically identifies key firm-level moderators' size, leverage, and fixed assets that shape the ESG–performance relationship. Third, it provides actionable insights for corporate leaders and policymakers who aim to implement ESG strategies in capital-intensive industries.

The remainder of this paper is organized as follows. Section 2 reviews the relevant literature. Section 3 presents the research methodology and data. Section 4 presents the empirical results. Section 5 concludes the study with policy implications and suggestions for future research.

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2. Literature review

The relationship between ESG practices and firm performance can be interpreted using several well-established theories. Stakeholder theory (Freeman, 1984) posits that firms addressing the needs of various stakeholders, including employees, customers, communities, and regulators, are more likely to achieve long-term success. By enhancing transparency, reducing social and environmental risks, and promoting good governance, ESG initiatives can foster stronger stakeholder relationships and trust, thereby improving financial performance (Eccles, Ioannou, & Serafeim, 2014).

Additionally, the resource-based view (Barney, 1991) suggests that ESG capabilities can serve as a source of sustained competitive advantage, especially when they are rare, inimitable, and embedded within the firm's strategic processes. This is particularly relevant for real estate firms, where environmentally sustainable designs or community-based urban development can differentiate between firms in highly competitive markets (Tran & Tran, 2022).

Firm characteristics such as firm size, leverage, and fixed assets play an important role in moderating this ESG–performance nexus. Larger firms tend to have more resources to invest in ESG practices, and may benefit more from economies of scale in sustainability disclosures (Fatemi et al., 2018). By contrast, high leverage can act as a constraint, as firms under financial stress may prioritize short-term liquidity over long-term ESG investments (Zhao, Liu, & Deng, 2018). Fixed assets, especially in capital-intensive sectors, such as real estate, may interact with ESG performance in complex ways. On one hand, asset-heavy firms may benefit from energy-efficient improvements; on the other hand, these firms may face higher transition costs in alignment with ESG standards (Lins Servaes, & Tamayo, 2017).

Numerous studies have found a positive association between ESG performance and firm financial outcomes. For example, Khan et al. (2016) provided empirical evidence that firms with strong ESG performance on material issues outperform peers in terms of stock returns and accounting performance. In the real estate sector, Eichholtz, Kok and Quigley (2010) demonstrated that green-certified buildings had higher rent and occupancy rates, which translated into better firm-level performance. Similarly, Chegut, Eichholtz, and Kok (2014) reported that sustainability certifications add value to commercial real-estate portfolios.

Other studies argue that ESG practices can impose additional costs, particularly in emerging markets, where regulatory frameworks are less developed. For instance, Krüger (2015) found that firms engaging in ESG activities experienced negative market reactions when such actions were perceived as insincere or costly. Fatemi et al. (2018) observed that, while ESG transparency increased firm value, ESG performance itself could hurt value in highly leveraged firms, suggesting a trade-off between sustainability investment and financial constraints.

A third strand of research found no clear relationship between ESG and financial performance, indicating that context matters. For instance, Servaes and Tamayo (2013) argued that ESG contributes to value creation only when consumer awareness is high. In low-transparency

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markets, ESG disclosures may have little effect if stakeholders do not use or trust the information (Ioannou & Serafeim, 2015). In the Vietnamese context, Tran and Tran (2022) found inconsistent results across firms, further suggesting that firm-specific factors, including capital structure and industry characteristics, significantly mediate ESG outcomes.

3. Method

3.1. Data

This study uses panel data covering all listed real estate firms in Vietnam from 2014 to 2023. The dataset was compiled from multiple credible sources, including the Vietstock database for ESG disclosures, financial statements, ownership data, and the Widata and General Statistics Office for macroeconomic indicators such as GDP growth. Firms with missing or inconsistent data during the observation window are excluded to ensure data integrity and estimation robustness. The final sample comprises 70 real estate firms and approximately 681 firm-year observations, providing a comprehensive view of the Vietnamese real estate sector over a critical period of ESG adoption and financial transformation.

Vietnam presents a compelling context for studying the ESG–performance nexus in real estate for several reasons. As an emerging economy undergoing rapid urbanization and capital market liberalization, Vietnam has witnessed significant changes in environmental regulations, corporate governance, and stakeholder awareness. These developments are particularly pronounced in the real estate sector, which is both a major contributor to economic growth and a significant driver of land use, energy consumption, and infrastructure development.

The choice of the 2014–2023 period is deliberate. This timeframe captures a transformative phase in Vietnam's corporate landscape, including the gradual implementation of ESG disclosure standards, increasing foreign investor participation, and regulatory milestones such as the 2020 revised Law on Enterprises and Circular 96/2020/TT-BTC requiring improved financial transparency. It also encompasses pre- and post-pandemic dynamics, which allows for an examination of ESG's role in firm resilience across economic cycles.

By focusing on listed real estate firms, this study targets a sector where ESG issues such as energy-efficient construction, land use, and social impact are material and financially consequential. Moreover, real estate firms tend to be capital-intensive, making them particularly sensitive to leverage, asset composition, and firm size. Thus, the Vietnamese real estate context offers fertile grounds for exploring how ESG interacts with firm-specific characteristics to shape financial performance.

3.2. The model

Following the approach of Fatemi et al. (2018), Khan et al. (2016), and Lins et al. (2017), we propose the following model to estimate the impact of ESG on real estate firms' performance:

$$ROA_{it} = \beta_0 + \beta_1 \times ESG_{it} + \beta_2 \times SIZE_{it} + \beta_3 \times Leverage_{it} + \beta_4 \times FIXED_{it} + \beta_5 \times CASH_{it} + \beta_6 \times BIG4_{it} + \beta_7 \times INFL_{it} + \beta_8 \times GDP_{it} + \varepsilon_{it} \quad (1)$$

$$ROE_{it} = \beta_0 + \beta_1 \times ESG_{it} + \beta_2 \times SIZE_{it} + \beta_3 \times Leverage_{it} + \beta_4 \times FIXED_{it} + \beta_5 \times CASH_{it} + \beta_6 \times BIG4_{it} + \beta_7 \times INFL_{it} + \beta_8 \times GDP_{it} + \varepsilon_{it} \quad (2)$$

Where firm performance is measured by *ROA* and *ROE*. *ESG* is ESG scores of real estate firms. Equation (1) also includes control variables representing company characteristics and macro-business environment. Details of all variables are summarized in Table 1.

Table 1. Variable description

Variables	Definitions	Calculation methods
ROA	Firm performance	Profit after tax/Equity
ROE		Profit after tax/Total assets
ESG	ESG activities	Dummy, takes the value of 1 if firms have ESG reports, 0 otherwise
SIZE	Size	Natural logarithm of firm total asset
LEV	Leverage ratios	Total liabilities/total assets
FIXED	Fixed assets	Total fixed assets/total assets
CASH	Cashflow	Operating cash flow/total assets
BIG4	Big4 auditors	Dummy, takes the value of 1 if a firm is audited by a BIG4 auditor, 0 otherwise
INFL	Inflation	Annual inflation rate
GDP	GDP growth	Annual GDP growth rate

4. Results and discussion

4.1. Descriptive statistics

Table 2 describes all variables used in our model. Real-estate firms in the sample show variation in performance, ESG practices, and other firm-specfic characteristics. On average, the ROA and ROE ratios are 2.7% and 5.2% respectively. For ESG reporting activities, only 22.3% of real estate firms in Vietnam have ESG reports.

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Table 2. Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	700	0.027	0.064	-0.1	0.184
ROE	700	0.052	0.093	-0.121	0.239
ESG	700	0.223	0.416	0	1
SIZE	700	27.962	1.997	23.987	32.911
LEV	700	0.665	0.237	0.011	1
FIXED	700	0.748	0.953	0	3.352
CASH	681	0.14	0.276	-0.087	0.984
BIG4	700	0.247	0.432	0	1
INFL	700	2.961	1.014	0.631	4.16
GDP	700	6.046	1.834	2.55	8.12

Table 3 reports the pairwise correlations of the variables used in Equation (1). The statistics in Table 3 show that the probability of our model suffering from multicolinearity is low.

Table 3. Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) ROA	1.000									
(2) ROE	0.846	1.000								
(3) ESG	0.155	0.231	1.000							
(4) SIZE	-0.009	0.120	0.353	1.000						
(5) LEV	-0.203	-0.206	-0.217	-0.386	1.000					
(6) FIXED	0.003	-0.194	-0.298	-0.696	0.444	1.000				
(7) CASH	-0.042	-0.068	0.141	0.369	-0.250	-0.210	1.000			
(8) BIG4	0.006	0.014	0.250	0.505	-0.200	-0.328	0.392	1.000		
(9) INFL	-0.005	-0.035	0.027	0.022	0.015	0.003	-0.021	0.008	1.000	
(10) GDP	0.018	-0.024	-0.066	-0.048	0.004	0.000	-0.009	0.000	0.079	1.000

4.2 Baseline results

Table 4 presents the estimation results of the baseline model obtained using the FGLS method. Our results show the significant impacts of ESG and other control variables on the financial results of real estate firms in Vietnam.

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Regarding our main independent variable, ESG shows a strong positive impact on ROA and ROE, implying that real estate companies with ESG reports have higher profitability levels. Our results are consistent with those of Aziz et al. (2023) and De Lucia, Pazienza, and Bartlett (2020). Our results can be explained by various theories. First, as the real estate sector is characterized by long-term investments, along with the long-term focus on ESG goals, investors in this sector are likely to value the risk reduction effects of ESG. Hence, companies with strong ESG practices may experience higher performance results as their properties and portfolios achieve sustainable future growth (Almeyda & Darmansya, 2019). Second, the real estate sector currently faces a growing demand for sustainable properties from both buyers and tenants as a result of increasing awareness of climate change and a preference for healthier living conditions. Thus, real estate companies that integrate ESG practices into their projects can attract premium prices or rental rates for their properties, thus enhancing financial performance (Morri, Yang, and Colantoni, 2024).

Regarding control variables, we found significant positive impacts of size and fixed assets on firm performance but negative impacts on leverage, cash flow, and inflation. First, larger companies with bigger size demonstrate higher levels of financial performance, consistent with the findings of Xu, Wang, Shan, and Mciver (2016) for Chinese real estate firms and Migliaccio and Palma (2023) for Italian firms. Sanga, Seik, Situmorang, Bangngu, and Taus (2025) argue that as real estate sector has long business cycles and substantial capital investments, larger firms can better manage their business, operate across various regions to diversify their business, and have more resources to invest in technology and innovative practices, which eventually lead to higher financial results.

Similarly, firms with higher fixed asset ratios exhibit higher levels of financial performance, supporting the conclusions of Xu et al. (2016) and Biasin et al. (2024). Firms with higher fixed asset ratios may achieve better financial performance because of the operational leverage of these tangible assets. Fixed assets in the real estate sector often appreciate over time, providing both capital gains and enhancing borrowing capacities for firms (Chen & Lee, 2020). Fixed assets of ten provide stable long-term income streams, as properties can be developed for rental income or sold at profit (Chua, 1999).

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Table 4. ESG and performance of real estate firms in Vietnam

Variables	Dependent variables	
	ROA	ROE
ESG	0.017***	0.084***
	(6.77)	(16.86)
SIZE	-0.001	-0.002
	(-1.30)	(-1.36)
LEV	-0.052***	-0.039***
	(-9.42)	(-3.41)
FIXED	0.005**	-0.022***
	(2.20)	(-5.57)
CASH	-0.021***	-0.046***
	(-4.24)	(-4.30)
BIG4	-0.002	-0.019***
	(-0.93)	(-3.61)
Inflation	-0.001**	-0.004***
	(-2.11)	(-2.65)
GDP	0.00006	0.001
	(0.18)	(1.47)
Observation	681	681

*Notes: ***, **, * denote statistical significance at 1%, 5%, and 10% levels, respectively. t-statistics are in parentheses*

Next, firms with higher leverage ratios exhibit lower profitability levels, consistent with Innocent et al. (2014) and Arhinful and Radmehr (2023). In the real estate sector, firms often have high leverage levels because of the capital-intensive nature of property investments. Real estate firms typically rely on a significant amount of debt financing to acquire and develop property, which might burden them with high interest obligations, particularly in the context of economic downturns, eventually leading to lower financial performance (Innocent et al. 2014).

Furthermore, firms with higher cash flow ratios show lower financial performance, which is in line with the findings of Sanga et al. (2025). Sanga et al. (2025) state that higher cash flow ratios indicating higher level of liquidity for real estate firms. However, excess liquidity can signal inefficiency, as sustainable liquidity without effective allocation could refer to lost opportunities for productive investments, leading to lower financial returns.

Finally, inflation negatively affects the performance of real estate firms in Vietnam, supporting the findings of Yin et al. (2015) and Hogan et al. (2008). Inflation normally leads to a higher cost of borrowing for firms, as central banks may raise interest rates to curb inflationary pressures. Real estate firms with a high level of debt financing may face an increased cost of capital, which can significantly impact their profitability. Furthermore, inflation can also lead to increased expenses for materials and labor, which further reduces firm profit margins (Kinyua & Kamau, 2025).

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4.3 Moderating impact of firm size, leverage, and fixed assets

Report any other analyses performed, including subgroup analyses and adjusted analyses, indicating those that were pre-specified and those that were exploratory (though not necessarily in the level of detail of primary analyses). Consider putting the detailed results of these analyses on the supplemental online archive. Discuss the implications, if any, of the ancillary analyses for statistical error rates. We perform further analysis by adding moderating variables: *ESG x size_d*, *ESG x lev_d*, and *ESG x fixed_d* to the original equation. *size_d* is a dummy variable, taking the value of 1 for firm bigger than the average size in the sample, 0 otherwise. *lev_d* is a dummy, equals 1 for firm that have higher leverage ratios than the average value in the sample. Similarly, *fixed_d* is a dummy, equals 1 for firms that have higher fixed asset ratios than the average firms in our sample. The results are reported in Table 5. The results in Table 5 show that firm size and leverage reduce the positive impact of ESG on the performance of real estate firms in Vietnam, while firm fixed assets help enhance their positive impacts.

In terms of size, Morri et al. (2024) state that larger firms typically possess complex organizational structures and higher levels of bureaucracy, which might reduce the effectiveness of ESG practices. As firms expand, implementing stringent ESG activities can be more challenging owing to increased scale and administrative challenges. Our results align with those of Dkhili (2023), which indicate that larger firms have less sensitivity to ESG improvements than smaller firms in European countries.

Regarding leverage, Tawfiq, Tawaha, Almasria and Tahtamouni (2024) imply that companies with a high leverage ratio have limited flexibility in resource allocation. In other words, firms with significant debt obligations might prioritize financial stability over sustainable practices, which affects the impact of ESG on firm performance.

Regarding the enhancing effect of firm fixed assets on the relationship between ESG and performance, Biasin et al. (2024) indicate that the fixed assets of real estate firms offer a medium through which ESG improvements can be tangibly reflected, such as through sustainable construction practices, energy efficiency for buildings, or enhanced governance practices. Furthermore, higher ESG practices in the real estate sector also signal stakeholders the alignment of their fixed assets with sustainable objectives, leading to better financial results.

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Table 5. ESG and real estate firm performance in Vietnam: the moderating impact of firm size and the COVID-19 pandemic

Variables	Dependent: ROA			Dependent: ROE		
	Firm size	Firm leverage	Fixed assets	Firm size	Firm leverage	Fixed assets
ESG	0.064***	0.048***	0.017***	0.103***	0.098***	0.068***
	(13.99)	(12.81)	(5.74)	(15.78)	(17.47)	(10.40)
ESG x size_d	-0.048***			-0.04***		
	(-9.65)			(-4.71)		
ESG x lev_d		-0.054***			-0.098***	
		(-12.37)			(-8.01)	
ESG x fixed_d			0.030***			0.051***
			(5.05)			(4.77)
SIZE	-0.001	-0.002	-0.0001	-0.004**	-0.001	-0.0001
	(-1.48)	(-0.29)	(-0.08)	(-2.22)	(-0.58)	(-0.06)
LEV	-0.052***	-0.055***	-0.052***	-0.025**	-0.046***	-0.013
	(-8.96)	(-6.40)	(-9.39)	(-2.07)	(-2.77)	(-1.13)
FIXED	0.003	0.005**	0.008	-0.017***	-0.026***	-0.007
	(1.59)	(2.22)	(2.59)	(-4.02)	(-6.82)	(-1.36)
CASH	-0.016***	-0.016***	-0.021***	-0.041***	-0.037***	-0.048***
	(-3.28)	(-3.25)	(-4.11)	(-3.98)	(-3.57)	(-4.32)
BIG4	-0.003	-0.001	-0.004	-0.020	-0.012**	-0.026***
	(-1.28)	(-0.23)	(-1.70)	(-3.74)	(-2.14)	(-4.63)
INFL	-0.001**	-0.001**	-0.001**	-0.005***	-0.003**	-0.003**
	(-2.22)	(-2.34)	(-2.31)	(-3.41)	(-2.53)	(-2.50)
GDP	0.0001	0.0002	0.0002	0.001*	0.001**	0.0008
	(0.45)	(0.73)	(0.80)	(1.83)	(2.00)	(0.98)
Observation	681	681	681	681	681	681

*Notes: ***, **, * denote statistical significance at 1%, 5%, and 10% levels, respectively. t-statistics are in parentheses*

5. Conclusion

This study examines the impact of ESG practices on the performance of real estate firms in Vietnam by considering the moderating impact of distinct real estate firm characteristics, including size, leverage, and fixed assets. Using a sample of 70 real estate companies in Vietnam from 2014-2023, and the FGLS estimation method, this study finds a strong positive relationship between ESG and firm performance. Furthermore, looking at the moderating role of firm characteristics on the relationship, this study reports that firm size and leverage reduce the positive influence of ESG on financial performance, while firm fixed assets help increase the impact.

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Based on these results, we suggest the following recommendations for real estate firms and regulators. First, real estate firms should prioritize the implementation of ESG practices to enhance their financial performance and long-term sustainability. By adopting ESG practices, real estate firms can improve their operational efficiency, reduce risk exposure, and increase their attractiveness to investors and other stakeholders. Second, regulators could consider developing incentives to encourage ESG adoption in the real estate sector, particularly for smaller and highly leveraged firms that may face challenges in implementation. This could include tax incentives for energy-efficient buildings or preferential treatment in permitting processes for projects that meet the specific ESG criteria. Regulators could establish clear reporting standards and guidelines to ensure transparency and comparibility in the ESG disclosures of firms in the sector. Third, firms with significant levels of fixed assets should leverage their resources to maximize the positive impact of ESG on their financial results. This could involve investing in smart building technologies, implementing green leasing practices, or proposing innovative ESG solutions.

Although our research makes significant theoretical and empirical contributions to the current literature, we are limited to our sample and data on other firm characteristics in the real estate sector. We suggest future research to expand to the real estate sectors in other countries and look at other influencing factors that can affect the relationship between ESG and performance, such as business models or governance.

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