

ESG performance variability: profitability and market implications for real estate entities in a worldwide context

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Abstract

Purpose – The central aim of this study is to examine the relationship between ESG metrics and financial outcomes in the real estate industry, honing in on particular sectors and geographical areas. Utilizing ESG ratings and pillar scores as indicators of sustainability performance, this research endeavors to discern their effects on measures of profitability and market performance.

Design/methodology/approach – Drawing on a dataset encompassing more than 200 publicly listed companies in the real estate sector, this research utilizes a fixed effects regression model and instrumental variables to scrutinize the data. This approach enables a thorough evaluation of how governance, environmental and social dimensions influence the financial and market outcomes of these entities.

Findings – The research reveals a complex relationship between ESG factors and financial performance, defying any simplistic, universal application. The connection is marked by diversity, deeply influenced by the unique aspects of each real estate industry segment and the particularities of regional markets. Specifically, the environmental aspect often corresponds with an increase in ROA, yet this pattern is not consistent throughout all cases. On the other hand, the social aspect is frequently associated with diminished performance indicators, while the influence of governance factors varies, affecting financial outcomes less predictably.

Originality/value – With its pioneering methodology, the research delves into the granular impacts of ESG factors within individual real estate sectors and specific countries. Insights into the Real Estate Rental, Development and Operations sector as well as firms operating in Oceania, extend the conversation in an area of ESG literature that has been relatively uncharted. Moreover, the study's illumination of how environmental, social and governance elements distinctly influence financial results injects fresh viewpoints into the ongoing dialogue on sustainable business practices.

Keywords ESG, Real estate, CSR, Financial performance, Sustainability

Paper type Research paper

1. Introduction

In the rapidly evolving landscape of global business, the real estate sector stands as a prominent pillar of economic growth and social development. However, this industry faces increasing scrutiny regarding its environmental, social, and governance (ESG) practices, as stakeholders demand more than just financial returns. This paper explores the nuanced relationship between ESG performance and financial performance within this vital sector, aiming to unravel the complex dynamics that underpinning this association.



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Historically, the real estate industry has significantly contributed to environmental concerns, given its role in land development, resource utilization, and energy consumption. At the same time, it is uniquely positioned to influence social welfare through its impact on community development and its governance structures that steer investment patterns. Thus, the integration of ESG criteria into the evaluation of real estate firms has become increasingly pertinent (Almeyda and Darmansyah, 2019). Not only does this integration reflect an ethical shift towards sustainability, but it also aligns with a growing body of literature that suggests ESG performance may correlate with improved financial outcomes (Almeyda and Darmansyah, 2019).

Despite the sector's size and importance, there remains a relative scarcity of focused academic inquiry into the ESG financial performance nexus specific to real estate (Kempeneer *et al.*, 2021; Morri *et al.*, 2024). Previous literature has often generalized findings across sectors or provided insufficient differentiation within the multifaceted real estate industry (Kempeneer *et al.*, 2021). To address this gap, our study delves into various categories of real estate companies, examining how each ESG dimension – environmental, social, and governance – affects corporate performance. This approach is informed by a recognition of the sector's diversity and the need for a granular analysis that acknowledges the distinct characteristics and influences at play within different market segments and geographical regions (Whelan *et al.*, 2021). Specifically, we draw upon data from over two hundred publicly traded companies within the real estate domain to assess how ESG factors influence key performance indicators related to profitability and market valuation, with a specific focus on determined sectors and geographic locations.

The contributions of this paper are multifaceted and significant. Past studies have primarily delved into specific subsets of real estate firms, focusing on particular regions and limited aspects of sustainability, notably environmental and governance concerns, often centered around US REITs. In light of this research gap, our paper seeks to broaden the investigation scope by undertaking a comprehensive examination of the interplay of ESG factors within the real estate sector. Taking a global perspective, our study encompasses a diverse array of real estate companies from various regions worldwide. Additionally, acknowledging the inherent diversity within the real estate sector, we adopt a nuanced approach by segmenting it into distinct subgroups, each characterized by its unique attributes and market dynamics. In this sense, the results unravel a landscape in which the interplay between ESG factors and financial performance does not conform to a one-size-fits-all pattern. Instead, it is characterized by variability that is contingent upon the specificities of industry type and regional context. We observed that the environmental dimension typically correlates with an uptick in ROA, although this trend does not hold uniformly across the board. Conversely, the social dimension often correlates with a downturn in performance metrics, and the governance dimension presents a more convoluted picture with its influence oscillating.

The structure of the research is divided into five sections. The literature review is reported in the next section and includes various aspects concerning the world of real estate and ESG along with the results of previous studies. Subsequently, the third section reports the research methodology, including the explanation of the research hypotheses and the description of the steps necessary for the construction of the models. To conclude, the last two sections report the discussion of the various models and are accompanied by considerations and comments on the research findings and observations regarding the limitations found, providing insights for future research.

2. Literature review and hypothesis development

For half a century, research has sought to quantify the link between ESG performance and corporate financial success (Whelan *et al.*, 2021). However, given the diverse methodologies

and timeframes, the findings have varied widely (Whelan *et al.*, 2021). In recent years, the intertwining of ESG considerations with investment decisions has garnered increasing attention (Morri *et al.*, 2024).

In the realm of corporate finance, a multitude of studies have delved into the potential value addition stemming from the integration of ESG considerations into financial decision-making processes (Barko *et al.*, 2018). Within this context, several researchers have endeavored to uncover the operational benefits associated with robust ESG performance metrics. In this sense, Barko *et al.* (2018) undertook a comprehensive examination of the influence of ESG factors on firm performance, particularly emphasizing the role of investor activism in compelling companies to enhance their ESG standings. Their findings underscored a positive correlation between proactive ESG engagement and improved operational efficiency. However, the literature regarding the relationship between ESG scores and stock returns presents a more nuanced picture (Whelan *et al.*, 2021). Moreover, the integration of ESG considerations introduces additional information and screening costs into the investment selection process, which may impact short-term profitability (Torre *et al.*, 2020). Consequently, while the short-term financial impact may be discernible, the full spectrum of benefits, including enhanced operational resilience and stakeholder trust, may only manifest in the longer term.

Regarding stock prices, contrary to initial hypotheses, findings suggest that the influence of ESG investments on stock prices may not be immediately evident in the short term but rather manifests over a longer time horizon. Rebonato (2023) indicates that ESG investments could potentially serve as an alternative for risk hedging purposes, offering global investors a mean to mitigate financial uncertainties. Studies by Rubbaniy *et al.* (2021) and Taylor and Neff (2022) further support this notion, emphasizing the role of ESG factors in impacting the risk premium of companies and contributing to broader risk management strategies. Recognizing the multifaceted nature of ESG considerations, it becomes imperative to view ESG as more than just a standalone driver of investment strategies. Instead, ESG emerges as a critical risk management tool for corporations, enabling them to navigate complex market dynamics effectively. By integrating sustainability and social impact criteria into investment decision-making processes, as advocated by Bradley (2021), firms can proactively address future financial challenges while simultaneously fostering positive social and environmental outcomes.

Despite extensive research efforts, consensus remains elusive regarding the precise relationship between ESG activities and Corporate Financial Performance (CFP) over subsequent years. Martielli *et al.* (2022) highlight the lack of unanimity in the literature, underscoring the need for continued investigation into this complex relationship. Friede *et al.* (2015) provide valuable insights into this debate, revealing that a majority of studies—approximately 90%—demonstrate a non-negative relationship between ESG activities and financial performance. Moreover, over half of these studies indicate a positive association between sustainability initiatives and positive financial outcomes.

In the ongoing discourse on the nexus between ESG factors and CFP, specificity to industry sectors has emerged as a critical factor (Autio *et al.*, 2023). Research encompassing multiple sectors may lead to conclusions that do not account for the unique ways in which different sectors engage with ESG issues. Scholars such as Waddock and Graves (1997), Chand (2006), and Porter and Kramer (2006) have emphasized the importance of a nuanced, sector-specific approach to analysis. The real estate sector, in particular, has garnered attention in this context due to its significant societal footprint and the literature's comparatively scant exploration of sustainability's financial implications within this field. Although literature in this field is still limited (Kempeneer *et al.*, 2021), pioneering studies by Cajias *et al.* (2014) have started to bridge this gap, but the conversation around the ESG-CFP relationship within real estate remains unresolved with studies indicating varying

outcomes (Morri *et al.*, 2021). Cajias *et al.* (2011) suggest a negative association between the corporate social responsibility (“CSR”) performance and the returns of US real estate companies, indicating that higher CSR efforts may not correlate with higher financial gains. Cajias *et al.* (2014) echo the sentiment that a higher ESG rating does not necessarily translate into better financial returns for real estate firms, a finding that resonates with the broader performance trends of socially responsible investment funds. On the contrary, studies like those by Bauer *et al.* (2010) and Almeyda and Darmansyah (2019) provide a different perspective. Bauer *et al.* (2010) found no significant link between governance strength and financial metrics in US REITs, perhaps attributable to regulatory earnings distribution requirements that inherently minimize agency costs. Similarly, Brounen *et al.* (2021) and Coen *et al.* (2018) uncovered compelling evidence of a sustainability premium, indicating investors’ willingness to pay a premium for access to companies with superior sustainable ratings. On the contrary, Almeyda and Darmansyah (2019) observed that governance had a favorable impact on Return on Assets in G7 countries, while environmental and social factors did not show the same effect. Also, Fan *et al.* (2022) revealed that environmental ratings, a material ESG component in REITs, negatively forecast expected returns, while social and governance ratings, considered immaterial ESG components, exhibit a positive association with future returns. However, research has indicated a favorable correlation between energy efficiency certifications, such as LEED and Energy Star, and both operational or market performance. Conversely, Erol *et al.* (2023) proposed that investors distinguish between individual ESG metrics, highlighting the substantial influence of environmental and social investing practices on the financial performance of REITs. Similarly, Fuerst (2015) illustrated that a holistic approach to sustainability, gauged by GRESB ratings, pays dividends for REITs by bolstering operational efficiency and mitigating risk exposure and volatility. As evidenced by studies conducted by An and Pivo (2017) and Fuerst and McAllister (2011). However, Brounen and Marcato (2018) reported mixed findings, indicating that while social and governance aspects contribute positively to returns, in line with Chong *et al.* (2017), environmental initiatives may detract from them, possibly due to their higher implementation costs. On the contrary, within the realm of US Real Estate Investment Trusts, investigations into the impact of governance ratings and agency costs on financial performance have yielded mixed results (Erol *et al.*, 2023; Aroul *et al.*, 2022), underscoring the complexity of these relationships. In a similar vein, Morri *et al.* (2024) unearthed a connection between sustainability initiatives, particularly environmental considerations, and financial performance. Nevertheless, their investigation also unveiled a contradictory finding: governance elements are linked to unfavorable financial results.

Therefore, the uncertainty surrounding the impact of ESG variables persists, not only concerning their overall influence but also with regard to their individual effects within each of the three pillars, as noted by Morri *et al.* (2024).

Prior research has tended to narrow its focus on specific segments within the industry or particular aspects of sustainability, leading to a deficiency in a comprehensive and universally applicable approach. In this sense, the divergence in findings across previous studies can be attributed to several factors, including variations in sample selection, the breadth of financial and sustainability variables examined, the statistical methodologies employed, and the time periods analyzed.

Researchers have adopted diverse approaches concerning sample composition, often focusing on specific continents or countries. For instance, studies such as Brounen and Marcato (2018), Coen *et al.* (2018), and Fan *et al.* (2022) have centered their analyses on the United States, while others like Morri *et al.* (2024) have concentrated on Europe. This regional focus can introduce unique market dynamics and regulatory environments that influence research outcomes.

Moreover, the temporal scope of studies plays a crucial role in shaping results. Some investigations have centered on periods preceding significant shifts in ESG disclosure practices, such as before 2018, as observed in studies by [Fuerst \(2015\)](#) and [Coen et al. \(2018\)](#). This temporal limitation may not fully capture the evolving landscape of ESG integration and disclosure practices, which have experienced substantial growth and development in recent years, as indicated by reports such as [KPMG \(2023\)](#). This indicates not only the complexity of the relationship between ESG and CFP but also the considerable variation in how ESG factors are prioritized and reported across the real estate sector globally ([Whelan et al., 2021](#); [Cajias et al., 2012](#)).

Therefore, there is a noticeable gap in comprehensive analysis within the realm of environmental, social, and governance factors' influence on corporate financial performance, as highlighted by [Morri et al. \(2024\)](#). Previous research has predominantly focused on specific subsets of real estate companies, particular geographic regions, and select dimensions of sustainability, with an emphasis on American REITs and a concentration on environmental and governance issues. In response to this research gap, our paper aims to broaden the scope of inquiry by conducting a more expansive examination of the relationship between ESG factors and CFP. Specifically, we seek to investigate this relationship across diverse regions and industries within the real estate sector. By doing so, we aim to provide fresh insights into a field that is ripe for further academic exploration. Our study adopts a global perspective, drawing on a comprehensive sample of real estate companies from various regions around the world. Furthermore, we prioritize recent data to ensure the relevance and timeliness of our findings. Additionally, we recognize the inherent diversity within the real estate sector and its various subsegments. As such, we undertake a nuanced approach by dividing the real estate sector into distinct subsamples, each characterized by its unique attributes and market dynamics.

2.1 Research hypothesis

This study aims to empirically investigate the relationship between ESG initiatives and CFP within the real estate sector. It seeks to assess how ESG considerations influence key profitability and market performance metrics.

Based on these considerations, we built the following hypotheses:

- H1. ESG pillar scores impact on the return on average total assets of public real estate companies
- H2. ESG pillar scores impact on the total return of public real estate companies

The overarching sub-hypotheses of this study are tailored to discern the nuances within the public real estate sector, taking into account both the industry segment and the geographical location of the companies involved. To achieve granular specificity, each broad sub-hypothesis is further delineated in order to study the impact of ESG scores for a particular subset of emblematic industries (Real Estate Rental, Development and Operations, Commercial REITs and Specialized REITs) and geographical regions (Americas, Asia, Oceania and Europe) within the initial sample.

3. Materials and methods

3.1 Data

This research utilizes data from the Refinitiv Datastream database. The selection process for the cross-sectional data involved filtering the universe of public companies by the Thomson Reuters Business Classification (TRBC) for real estate sectors. Only companies assigned ESG pillar scores were retained. Further segmentation by industry and

geographical location was implemented for a detailed analysis. The seven-year period, from 2015 to 2021, was chosen based on data availability and to include the most extensive set of consecutive yearly observations. The chosen timeframe was tailored to maximize the incorporation of companies with accessible data. Over the past two years, there has been a notable uptick in the establishment of sustainability committees among numerous companies, contrasting with the minimal reports of such committees prior to 2015 (Ferri *et al.*, 2023). This duration also helps to moderate any distortive effects of the COVID-19 pandemic on the data.

To assess the impact of ESG pillar scores on corporate performance, which is measured in two different metrics, two primary samples were established. The first sample, assessing the Return on Average Total Assets, comprises 1,687 observations (spanning 241 companies over seven years), and the second, evaluating Total Return, encompasses 1,407 observations (201 companies over the same period). Each primary sample is further subdivided into six industry and geographical area-specific subsamples, resulting in a total of 14 models being scrutinized in this study.

3.2 Variable description

The focus of this study is on evaluating corporate performance through two dependent variables: Return on Average Total Assets (ROA) and Total Return (TR). ROA serves as an indicator of a company's profitability, reflecting the efficiency with which a firm utilizes its assets to produce earnings. It is calculated by dividing recurring earnings by the average total assets of the company within a year (Tron and Colantoni, 2021). This metric refines the traditional Return on Assets by accounting for potential fluctuations in asset value over the year, thus offering a more nuanced view of asset utilization.

On the other hand, TR captures the company's stock price performance, inclusive of any dividends issued. This metric reflects the market's response to company developments and investor sentiment, making it a valuable measure of market-based corporate performance. In understanding the impact of ESG initiatives on corporate outcomes, TR provides a lens through which to gauge market reactions and the perceived value of sustainable practices within the corporate framework.

The central theme of this analysis is the integration of sustainability considerations into corporate evaluation, encapsulated by the composite ESG Score. ESG variables are assessed using Refinitiv ESG scores sourced from the Refinitiv database, a widely recognized tool in academic research (Morri *et al.*, 2024). These scores, known for their reduced susceptibility to selection bias, provide more informative results compared to similar ESG ratings. Refinitiv meticulously evaluates and assigns scores to companies based on over 630 ESG metrics, organized into three pillars: environmental, social, and governance. The final scores reflect the overall performance of the company on ESG, normalized on a scale from 0 to 100, where 0 signifies the lowest possible performance and 100 denotes the highest possible performance. These scores are preferred in academic literature due to their reliability, relevance, and ability to demonstrate more variability and distribution compared to comparable ESG ratings. Refinitiv categorizes a company as an ESG compliant asset when it incorporates environmental, social, and governance factors into the investment decision-making process, positioning it in the first quartile of ESG scores.

To mitigate confounding effects on financial outcomes not examined in this study and to fortify the integrity of our model, we've included an array of accounting and market control indicators. These controls are drawn from both contemporary and established research (Almeyda and Darmansyah, 2019; Cannas, 2022; Morri *et al.*, 2024.), ensuring that our approach aligns with scholarly standards. The specific control variables selected for inclusion are detailed in the following Table 1.

Indicator	Description
EBITDA margin	it represents the ratio of earnings before interests, taxes, depreciation and amortization divided by the value of revenue from business activities. It belongs to the category of profitability indexes. By controlling for variations in profitability, we can better isolate the effects of other independent variables on financial outcomes
Total assets	it represents the total assets reported by a company and provides indications about the size of the companies analyzed. By controlling for differences in company size, we can account for the potential influence of scale on financial performance
Market capitalization	it is the total market value of all relevant share types and refers to its value as of December 31 of each year analyzed. It provides indications about the size of the companies analyzed. Controlling for market capitalization helps to account for variations in company size and market influence
Debt on assets	it represents the ratio of total liabilities and total assets as of December 31 and is a measure of company's financial leverage and level of indebtedness. By including it as a control variable, we can account for the potential impact of varying levels of debt on financial outcomes
Beta	Indicator of risk as the covariance between stock's price and market's price. Controlling for beta allows us to account for differences in risk exposure across companies, which may influence financial performance
Floating shares	it represents the total amount of share capital freely available to ordinary investors and is expressed as a percentage of total number of shares. It represents an indicator of stock liquidity. By including floating shares as a control variable, we can assess the potential impact of liquidity on financial outcomes and ensure that our analysis accounts for differences in market activity

Source(s): Authors' own work

Table 1.
Control variables

3.3 Research design

This study's empirical strategy aligns with established methodologies, utilizing a panel data framework to maintain coherence with existing literature and to leverage the strengths of this approach for our data set. Panel data models adeptly merge time series with cross-sectional data, enhancing the reliability of the results under the right conditions and model specifications. Within the spectrum of common estimation techniques for such models, the decision between the "fixed effects" (FE) and "random effects" (RE) models is typically informed by the data's intrinsic properties (Brooks, 2008). The Hausman test, a standard procedure to discern the more suitable model for the data at hand, has indicated the fixed effects model as the preferred specification for our analyses. Adopting the FE model allows for a rigorous examination of the research hypotheses previously delineated. This entails employing various configurations of the FE model, tailored with different variable combinations, control measures, and refinements to directly address the nuances of the research questions:

- (1) **Main Hypotheses 1** (Model 1 – ROA) and 2 (Model 2 – Total Return):

$$Y_{i,t} = \beta_{E,S,G}x_{it} + \beta_{CV}z_{it} + \alpha_i + \delta_t + \varepsilon_{it}$$

where:

- (1) i refers to the company
- (2) t refers to the time period
- (3) $Y_{i,t}$ represents either Return on Average Total Assets or Total Return (dependent variable)

- (4) $\beta_{E,S,G}$ represents the coefficients of E, S and G pillar scores (independent variables)
- (5) x_{it} represents the E, S and G pillar scores
- (6) β_{CV} represents the coefficients of control variables
- (7) z_{it} represents control variables
- (8) α_i is the individual specific effect, which represents part of the unobserved heterogeneity across companies
- (9) δ_t are the dummies representing time fixed effects
- (10) ε_{it} is the error term

The fixed effects were applied based on time and company as the nature of the analysis using clustered standard errors.

Building on the initial analysis, Models 1 and 2 have been recalibrated to examine the influence of ESG scores within specific segments of the industry and across distinct geographic regions. This segmentation has yielded additional models: for industry-focused subsets, we have Commercial REITs (Models 1A and 2A), Real Estate Rental, Development, and Operations, companies that either focus primarily on owning, managing, and leasing properties or engage in broader and more diversified real estate activities, such as property development, management, and other operational roles, (Models 1B and 2B), and Specialized REITs (Models 1C and 2C); for geographical analysis, the models cover the Americas (Models 1D and 2D), Asia (Models 1E and 2E), Oceania (Models 1F and 2F), and Europe (Models 1G and 2G). These refined models aim to shed light on how ESG scores impact corporate performance within these particular sectors and locales.

In this study, a series of diagnostic tests were conducted to ensure the robustness of the empirical model: a Normality test to verify the distribution of the residuals, a Multicollinearity test to check for dependency between independent variables, and a Heteroskedasticity test to assess the consistency of variance across the dataset. The outcomes of these tests did not reveal any significant concerns that would undermine the validity of the model.

The descriptive statistics of the variables used is presented in the next [Table 2](#) and [Figure 1](#).

4. Results

The regression outcomes detailed in the following [Table 3](#) draw from Model 1, which evaluates the entire population of real estate companies. The results indicate that the variables representing the Environmental, Social, and Governance Pillar Scores are statistically significant, with the Environmental and Governance scores positively influencing Return on Assets (ROA), and the social score having a negative effect. Specifically, a one-unit increase in either the Environmental or Governance score is associated with a 0.018% increase in ROA, while a one-unit increase in the Social score results in a 0.019% decrease in ROA.

Delving into industry-specific analyses with Models 1A, 1B, and 1C, it's noteworthy that ESG variables hold significance only within the Real Estate Rental, Development and Operations sector (Model 1B) where a one-unit increase in the Social score results in a 0.059% decrease in ROA, while a one-unit increase in the Governance score results in a 0.024% increase in ROA. Here, the Social and Governance scores are significant, echoing the general model's findings with similar directional impacts on ROA.

Summary of model 1 variables					
Model 1					
Variable	Observations	Mean	Std dev	Min	Max
ROA (%)	1,687	3.839	4.498	-26.271	32.302
Env score	1,687	41.992	30.923	0	98.280
Soc score	1,687	51.723	20.979	1.598	96.960
Gov score	1,687	53.737	21.714	0.580	97.460
EBITDA margin (%)	1,687	41.336	43.156	-87.966	94.753
Total assets (\$ m)	1,687	13,700	25,700	94	308,936
Debt on assets (%)	1,687	51.669	17.993	5.937	157.208
Beta levered	1,687	0.924	0.537	-0.447	3.380

Summary of model 2 variables					
Model 2					
Variable	Observations	Mean	Std dev	Min	Max
Total return (%)	1,407	9.505	28.607	-79.207	252.831
Env score	1,407	42.493	30.831	0	98.280
Soc score	1,407	53.338	19.531	2.060	96.960
Gov score	1,407	56.290	20.878	2.03	97.460
EBITDA margin (%)	1,407	43.565	29.815	-57.613	94.753
Market cap (\$ m)	1,407	7,770	11,900	79.537	133,313
Beta levered	1,407	0.937	0.558	-0.447	3.380
Floating shares (%)	1,407	75.476	20.525	3	100

Source(s): Authors' own work

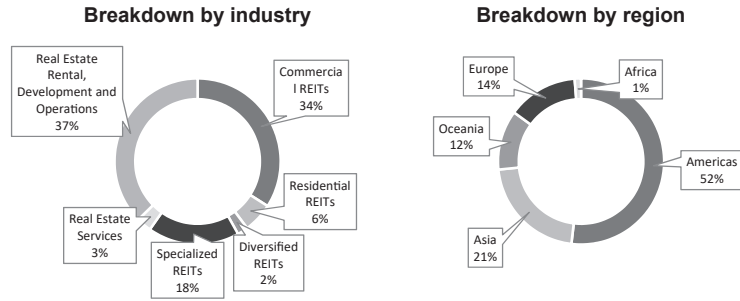
Table 2.
Descriptive statistics

The examination of regional subsamples, through Models 1D, 1E, 1F and 1G reveals distinct patterns. For Asian, Oceanic and European real estate companies, the Social score adversely affects ROA, with the Governance score exerting a positive influence for Oceanic firms. Specifically, a one-unit increase in the Social score is associated with a 0.028% decrease in ROA for Asia, a 0.129% decrease for Oceania, and a 0.065% decrease for Europe. In contrast, a one-unit increase in the Governance score leads to a 0.085% increase in ROA for Oceania real estate companies.

Therefore, the examination of ESG pillar scores' impact on the accounting performance (ROA) of real estate firms yielded mixed outcomes. The general model (Model 1) confirmed the significance of all ESG variables, with environmental and governance investments enhancing profitability and social investments reducing it. This pattern aligns with findings by [Friede et al. \(2015\)](#) and [Whelan et al. \(2021\)](#) but diverges from studies by [Almeyda and Darmansyah \(2019\)](#), which had differing views on the governance scores' effects on ROA.

Our findings partially align with those of [Morri et al. \(2024\)](#), confirming the positive impact of environmental performance while revealing a different impact of governance scores. This discrepancy could be attributed to the broader sample used in our study, encompassing global data rather than focusing solely on Europe, as well as the inclusion of various types of real estate companies. One noteworthy discovery from our research is the favorable influence of environmental performance on the Return on Asset in the real estate sector. This contrasts with the findings of [Brounen and Marcato \(2018\)](#), who indicated a negative relationship between environmental scores and total returns. However, it's important to note that their study examined a different set of companies (the entire real estate industry versus investment trusts only) and utilized different frameworks and variables (performance versus portfolio factors). Our evidence suggests that companies may face not substantial costs initially to enhance their environmental friendliness, and the positive effects on profitability become apparent in subsequent years.

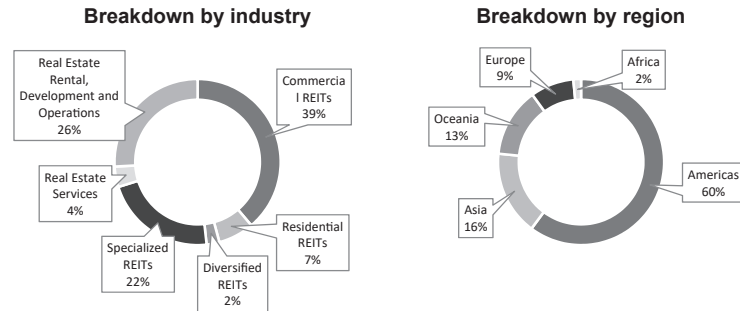
Model 1



breakdown by industry of model 1.

breakdown by region of model 1.

Model 2



breakdown by industry of model 2.

breakdown by region of model 2.

Source(s): Authors' own work

Figure 1.
Breakdown of the sample

Therefore, our results suggest that environmental and governance initiatives might be seen as investments that can lead to direct financial benefits. For instance, energy-efficient buildings might reduce operating costs, and strong governance could mitigate risks and attract more investors. Social initiatives, however, while beneficial in the long run, may involve upfront costs without immediate financial returns, thus potentially lowering ROA in the short term. Similarly, investors might value environmental and governance actions more highly, perceiving them as contributors to long-term value creation. In contrast, social initiatives might not be directly linked to financial performance in investors' views, leading to less favorable immediate financial assessments.

In alignment with the methodology detailed previously, the subsequent [Table 4](#) encapsulates the regression results derived from Model 2 across various panels.

When analyzing the aggregate real estate sector (Model 2), the Social and Governance Pillar Scores emerge as statistically significant, both exhibiting a negative correlation with the Total Return of the companies studied. The Environmental Pillar Score, however, does not demonstrate a significant effect on Total Return.

Within the Commercial REITs subsector (Model 2A), the Governance Pillar Score is the only ESG factor showing statistical significance, adversely affecting Total Return, mirroring

Models	1	1A	ROA	1B	1C
<i>Dependent variable</i>					
Property sector	All real estate companies	Commercial REITs		Real estate rental, development and operations	Specialized REITs
Geographic region	World	World		World	World
<i>Independent variables</i>					
Environmental score	0.018** (0.007)	0.019 (0.012)		0.029 (0.020)	0.021 (0.017)
Social score	-0.019* (0.011)	-0.002 (0.019)		-0.059** (0.025)	0.012 (0.026)
Governance score	0.018** (0.008)	0.009 (0.014)		0.024* (0.014)	0.026 (0.018)
Ebitda margin	0.013*** (0.003)	0.033** (0.016)		0.017*** (0.003)	0.012*** (0.005)
Log total assets	0.471 (0.392)	1.419* (0.747)		-1.208 (0.812)	1.283 (0.917)
Debt on assets	-0.092*** (0.015)	-0.260*** (0.040)		0.012 (0.027)	-0.103*** (0.029)
Beta levered	-1.527*** (0.269)	-1.812*** (0.507)		-1.066 (0.963)	-1.134* (0.639)
Constant	-0.949 (8.737)	-15.952 (17.024)		32.803* (17.691)	20.028 (20.812)
R-squared	18.24%	28.98%		15.89%	29.60%
Observations	1,687	574		630	301
Models	1D	1E	ROA	1F	1G
<i>Dependent variable</i>					
Property sector	All real estate companies	All real estate companies		All real estate companies	All real estate companies
Geographic region	America	Asia		Oceania	Europe
<i>Independent variables</i>					
Environmental score	-0.005 (0.007)	0.009 (0.011)		0.025 (0.033)	0.012 (0.028)
Social score	0.018 (0.012)	-0.028** (0.012)		-0.129*** (0.043)	-0.065* (0.037)
Governance score	-0.005 (0.009)	0.013 (0.013)		0.085*** (0.031)	-0.010 (0.028)
Ebitda margin	0.015*** (0.004)	0.018** (0.008)		0.100** (0.039)	0.102*** (0.031)
Log total assets	-0.143 (0.249)	1.823*** (0.563)		5.174*** (1.630)	-2.251 (5.651)
Debt on assets	-0.042*** (0.013)	-0.083*** (0.029)		-0.134*** (0.047)	-0.378*** (0.091)
Beta levered	1.799*** (0.544)	-1.625*** (0.565)		-2.955** (1.169)	-2.512** (1.045)
Constant	8.537 (5.609)	-31.868** (12.758)		-97.796*** (33.988)	22.953*** (4.607)
R-squared	21.63%	39.40%		46.57%	23.40%
Observations	875	364		196	231

Note(s): ***, **, and * indicates statistically significant levels of 1%, 5% and 10%, respectively

Source(s): Authors' own work

Table 3.
Model ROA

Models	2	2A	Total return		2B	2C
<i>Dependent variable</i>						
Property sector	All real estate companies	Commercial REITs	Real estate rental, development, and operations		Specialized REITs	
Geographic region	World	World	World		World	
<i>Independent variables</i>						
Environmental score	0.089 (0.059)	-0.084 (0.056)	0.174 (0.179)		0.124 (0.093)	
Social score	-0.211** (0.089)	0.073 (0.095)	-0.580* (0.317)		-0.133 (0.136)	
Governance score	-0.119* (0.064)	-0.195*** (0.068)	0.017 (0.143)		0.054 (0.096)	
Ebitda margin	0.035 (0.031)	0.019 (0.089)	0.311 (0.209)		0.019 (0.025)	
Log market cap	27.12*** (2.077)	14.87*** (2.340)	42.76*** (6.484)		28.87*** (4.241)	
Beta levered	6.233*** (1.929)	4.018 (3.608)	6.718 (6.450)		-1.139 (3.930)	
Floating shares	-0.177* (0.106)	-0.026 (0.137)	-0.229 (0.188)		-0.149 (0.202)	
Constant	-570.4*** (44.50)	-314.3*** (51.21)	-914.3*** (135.09)		-619.1*** (93.47)	
Observations	1,407	546	364		308	
R-squared	35.21%	57.81%	37.77%		51.55%	
Models	2D	2E	Total return		2F	2G
<i>Dependent variable</i>						
Property sector	All real estate companies	All real estate companies	All real estate companies		All real estate companies	
Geographic region	America	Asia	Oceania		Europe	
<i>Independent variables</i>						
Environmental score	-0.101 (0.066)	0.232 (0.185)	0.086 (0.144)		0.366 (0.230)	
Social score	0.012 (0.099)	-0.425 (0.349)	-0.106 (0.163)		-0.210 (0.343)	
Governance score	-0.192*** (0.071)	-0.257 (0.249)	0.260** (0.099)		-0.039 (0.219)	
Ebitda margin	0.014 (0.028)	0.170 (0.235)	0.221 (0.246)		0.092 (0.278)	
Log market cap	22.10*** (2.272)	35.34*** (8.357)	13.80*** (3.996)		31.47*** (8.473)	
Beta levered	2.298 (2.002)	18.378 (13.921)	1.960 (3.985)		-3.938 (7.506)	
Floating shares	-0.316** (0.125)	0.040 (0.213)	-0.016 (0.196)		-0.139 (0.307)	
Constant	-451.1*** (48.94)	-796.3*** (183.27)	-297.7*** (93.38)		-681.9*** (184.35)	
Observations	847	231	189		119	
R-squared	48.86%	44.03%	33.96%		18.04%	

Table 4.
Model total return

Note(s): ***, **, and * indicates statistically significant levels of 1%, 5% and 10%, respectively
Source(s): Authors' own work

the overall model's trend. Conversely, for companies in Real Estate Rental, Development, and Operations (Model 2B), it is the Social Pillar Score that is significant, also negatively influencing Total Return. The Specialized REITs segment (Model 2C) shows no significant ESG influences. Regarding the significant coefficient results suggest that a one-unit increase in the Social score results in a 0.211% decrease in ROA for all real estate companies globally, with an even greater impact of 0.580% for Real Estate Rental, Development, and Operations companies. Similarly, a one-unit increase in the Governance score leads to a 0.119% decrease in ROA for all real estate companies worldwide, with a more pronounced effect of 0.195% for Commercial REITs.

The regional breakdown presents varied findings. In the Americas (Model 2D) and Oceania (Model 2F), the Governance Pillar Score is significantly linked to Total Return, but the direction of the impact diverges; it is detrimental in the Americas (-0.192%), whereas it is beneficial in Oceania (0.260%). This suggests regional variations in how governance improvements are valued by the market. For Asian and European firms (Model 2E and 2G), none of the ESG scores are significant.

Analyzing the impact of ESG scores on stock performance (Total Return), the general model (Model 2) identified significant social and governance effects, with both reducing returns, while environmental factors were non-significant. These outcomes contradict studies that found generally positive ESG impacts on performance (Friede *et al.*, 2015; Whelan *et al.*, 2021). The significant negative impact of social and governance scores on Total Return, contrasted with the positive or mixed effects found in other studies, might be explained by the fact that the market's reaction to ESG scores can be influenced by current investor sentiment, which can fluctuate based on broader economic conditions or sector-specific trends. For example, governance issues may be more scrutinized during times of financial uncertainty, leading to a negative impact on Total Return. Moreover, Total Return reflects immediate market perceptions, which may not always align with the long-term benefits of ESG investments. The market may penalize the short-term costs or perceived risks associated with implementing governance changes or social programs, even though they might contribute to long-term sustainability and profitability in line with Fan *et al.* (2022).

Regarding industry analysis, Commercial and Specialized REITs did not exhibit any significant ESG impacts on ROA, echoing Bauer *et al.* (2010) but conflicting with Eichholtz *et al.* (2012).

Only the Real Estate Rental, Development, and Operations sectors displayed significant ESG effects, suggesting that governance efforts boost profitability while social initiatives may reduce it. The Real Estate Rental, Development, and Operations sectors might be experiencing significant ESG effects because these companies often have direct interactions with consumers and communities. Social initiatives could directly affect brand perception and tenant satisfaction, leading to decreased profitability. On the contrary, Commercial and Specialized REITs typically manage portfolios of income-generating properties, where the asset intensity and capital structure may make it harder to realize immediate gains from ESG initiatives.

Regionally, the ESG variables had no marked impact on ROA in American firms, while Oceanian companies' ROA was adversely affected by social initiatives but gained from governance investments. Regarding Total Return, governance scores significantly affected Total Return, negatively in American companies and positively in Oceanian firms, mirroring Cajias *et al.*'s (2011, 2014) results. Asian and European companies showed no significant ESG impact, in contrast to Chong *et al.* (2017) and Brounen *et al.* (2021). The lack of significant ESG impact on American firms' ROA may indicate that in well-established and regulated markets like the United States, ESG practices could already be priced in or expected as a standard, thereby not providing a distinctive advantage, especially linked to governance factors as shown by Total Return results. On the other hand, in Oceania, where there might be a

different regulatory environment or investor and consumer sentiment, governance initiatives could be more valued and hence positively influence ROA and Total Return. The negative impact of social initiatives on ROA in Asian and European firms could suggest that in these regions, the market may not yet fully recognize or reward social sustainability efforts, or these efforts may not directly translate into increased asset profitability. This finding resonates with the conclusions drawn by [Morri et al. \(2024\)](#), suggesting that companies stand to benefit from prioritizing improvements in their environmental performance to enhance profitability. However, when it comes to enhancing governance and social structures, it becomes crucial for companies to weigh the associated costs and benefits carefully, differently from the US ([Fan et al., 2022](#)).

Our findings for Europe diverge from those of [Brounen et al. \(2021\)](#) regarding the influence of social and governance scores. However, their study was constrained by a small sample size (64 observations) and a single-year focus (2018), whereas our analysis offers broader applicability and enhances the generalizability of the data.

A comprehensive table summarizing all the significant results is provided in the [Appendix](#).

4.1 Robustness checks

We recognize the potential for our results to be influenced by spurious correlations with other unobservable factors. To address this concern, we employ two-stage least squares estimations with instrumental variables (IV-2SLS) to mitigate endogeneity issues following the methodology of [Fan et al. \(2022\)](#). Therefore, in the instrumental variable approach, the first-stage regression is estimated using the following equation:

$$E_{it} / S_{it} / G_{it} = \beta_{E,S,G}x_{it} + \beta_{CV}z_{it} + \alpha_i + \delta_t + \varepsilon_{it}$$

where:

- (1) i refers to the company
- (2) t refers to the time period
- (3) $E_{it} / S_{it} / G_{it}$ represents the coefficients of E, S and G pillar scores (dependent variable)
- (4) $\beta_{E,S,G}$ represents the coefficients of E, S and G pillar scores (independent variables)
- (5) x_{it} represents the average E, S and G pillar scores of other real estate companies operating in the same regions and industries
- (6) β_{CV} represents the coefficients of control variables
- (7) z_{it} represents control variables
- (8) α_i is the individual specific effect, which represents part of the unobserved heterogeneity across companies
- (9) δ_t are the dummies representing time fixed effects
- (10) ε_{it} is the error term

[Table 5](#) shows the first-stage results of the IV-2SLS confirming the significance of all instrument variables. Our instrumental variables are valid and pass the tests of under-identification and weak identification. Weak identification tests pass the Stock and Yogo's critical value of 16.38.

[Tables 6 and 7](#) demonstrate the second-stage results of the regression which are similar to the results obtained using fixed regression models.

Model 1			
Dependent variable			
Models	E	S	G
<i>Independent variables</i>			
Enviromental score	0.90531 ^{***} (0.053)		
Social score		1.038 ^{***} (0.079)	
Governance score			1.025166 ^{***} (0.057)
Control variables	YES	YES	YES
Year FE	YES	YES	YES
Company FE	YES	YES	YES
Underidentification test	26.954 ^{***}	19.487 ^{***}	19.804 ^{***}
Weak identification test	333.85	184.77	335.99
Observations	1,685	1,685	1,685
Model 2			
Dependent variable			
Models	E	S	G
<i>Independent variables</i>			
Enviromental score	0.599 ^{***} (0.108)		
Social score		0.897 ^{***} (0.0844)	
Governance score			0.911 ^{***} (0.0753)
Control variables	YES	YES	YES
Year FE	YES	YES	YES
Company FE	YES	YES	YES
Underidentification test	27.644 ^{***}	17.415 ^{***}	19.245 ^{***}
Weak identification test	158.58	169.07	222.88
Observations	1,407	1,407	1,407

Note(s): ^{***}, ^{**}, and ^{*} indicates statistically significant levels of 1%, 5% and 10%, respectively
Source(s): Authors' own work

Table 5.
2SLS: first-stage
regression

5. Conclusions

This research sought to analyze the intricate relationship between ESG performance and financial performance within the real estate sector. The motivation for this deep dive stemmed from the observed lacuna in previous studies concerning the real estate sector's engagement with ESG performance and the subsequent financial implications (Cannas, 2022). By focusing on the distinct characteristics of specific real estate segments, the study aimed to provide a nuanced understanding of how sustainability initiatives translate into financial metrics.

Our findings delineate a complex landscape where the ESG-financial performance link is not uniform across the sector but varies by industry and region. The environmental pillar seems to demonstrate the presence of a positive impact on ROA in general, but this effect was not universal across all models. The social pillar seems to have a negative impact, while the governance pillar exhibited mixed outcomes. These findings may suggest that the benefits of ESG initiatives, and the weight investors place on them, can significantly differ based on context in line with previous research (Brounen *et al.*, 2021).

Models	1D	1E	ROA	1F	1G
<i>Dependent variable</i>					
Property sector	All real estate companies	All real estate companies		All real estate companies	All real estate companies
Geographic region	America	Asia		Oceania	Europe
<i>Independent variables</i>					
Enviromental score	-0.005 (0.007)	0.009 (0.011)		0.025 (0.033)	0.012 (0.028)
Social score	0.018 (0.012)	-0.028** (0.012)		-0.129*** (0.043)	-0.065* (0.037)
Governance score	-0.005 (0.009)	0.013 (0.013)		0.085*** (0.031)	-0.010 (0.028)
Ebitda margin	0.015** (0.004)	0.018** (0.008)		0.100** (0.039)	0.102*** (0.031)
Log total assets	-0.143 (0.249)	1.823*** (0.563)		5.174*** (1.630)	-2.251 (5.651)
Debt on assets	-0.042*** (0.013)	-0.083*** (0.029)		-0.134*** (0.047)	-0.378*** (0.091)
Beta levered	1.799*** (0.544)	-1.625*** (0.565)		-2.955** (1.169)	-2.512** (1.045)
Constant	8.537 (5.609)	-31.868** (12.758)		-97.796*** (33.988)	22.953*** (4.607)
R-squared	21.63%	39.40%		46.57%	23.40%
Observations	875	364		196	231
<i>Dependent variable</i>					
Models		E	S		G
<i>Independent variables</i>					
Enviromental score		0.9053121*** (0.053)	1.038*** (0.079)		
Social score					
Governance score					1.025166*** (0.057)
Control variables		YES	YES		YES
Year FE		YES	YES		YES
Company FE		YES	YES		YES
Underidentification test		26.954***	19.487***		19.804***
Weak identification test		333.85	184.77		335.99
Observations		1,685	1,685		1,685
Models	1	1A	ROA	1B	1C
<i>Dependent variable</i>					
Property sector	All real estate companies	Commercial REITs		Real estate rental, development and operations	Specialized REITs
Geographic region	World	World		World	World
<i>Independent variables</i>					

Table 6.
2SLS: second-stage regression model 1

(continued)

Models	1	1A	ROA	1B	1C
Enviromental score	0.266 ^{***} (0.0522)	0.120 ^{***} (0.0222)		0.0743 ^{***} (0.0273)	0.264 ^{***} (0.0348)
Social score	-0.139 [*] (0.0778)	-0.438 ^{***} (0.0729)		-0.276 ^{***} (0.0719)	0.0114 (0.0734)
Governance score	0.109 (0.0765)	0.207 ^{***} (0.0350)		0.101 [*] (0.0536)	0.122 (0.0344)
Control variables	YES	YES		YES	YES
Year FE	YES	YES		YES	YES
Company FE	YES	YES		YES	YES
R-squared	22.7%	26.8%		29.6%	40.9%
Observations	1,687	574		630	301
Models	1D	1E	ROA	1F	1G
<i>Dependent variable</i>					
Property sector	All real estate companies	All real estate companies		All real estate companies	All real estate companies
Geographic region	America	Asia		Oceania	Europe
<i>Independent variables</i>					
Enviromental score	0.0247 (0.0495)	0.0740 (0.0907)		0.182 ^{**} (0.0872)	0.266 ^{***} (0.0522)
Social score	-0.171 ^{***} (0.0491)	0.0320 (0.195)		-0.505 ^{***} (0.204)	-0.139 [*] (0.0778)
Governance score	0.132 ^{***} (0.0510)	0.0183 (0.0897)		0.235 ^{***} (0.0801)	0.109 (0.0765)
Control variables	YES	YES		YES	YES
Year FE	YES	YES		YES	YES
Company FE	YES	YES		YES	YES
R-squared	21.9%	22.7%		20.1%	22.7%
Observations	875	364		196	231

Note(s): ^{***}, ^{**}, and ^{*} indicates statistically significant levels of 1%, 5% and 10%, respectively

Source(s): Authors' own work

Table 6.

Particularly, the nuanced insights on Real Estate Rental, Development and Operations companies, and firms in Oceania, contribute to a previously underexplored discourse in ESG literature. In this sense, investors should assess the strength of environmental practices within each sector to identify areas where such initiatives are likely to drive financial performance. Moreover, the social pillar's negative impact on financial performance suggests that not all social initiatives yield immediate financial benefits. Investors should carefully evaluate the potential trade-offs between social responsibility and financial returns, particularly in sectors where social factors may not align with performance goals. This evaluation will help in making more balanced investment decisions that consider both social impact and financial performance.

This study's theoretical contributions to ESG knowledge are multifaceted, offering a better understanding of how ESG investments correlate with firm performance across different areas of the real estate sector. It advances the scholarly conversation on market-based performance indicators, acknowledging the complexity of the sector and the diverse effects of CSR initiatives.

Models	2	2A	2B	2C
Total return				
<i>Dependent variable</i>				
Property sector	All real estate companies	Commercial REITs	Real estate rental, development and operations	Specialized REITs
Geographic region	World	World	World	World
<i>Independent variables</i>				
Environmental score	0.659** (0.325)	-0.304 (0.775)	0.306 -1,098	0.899* (0.533)
Social score	-0.296* (0.211)	-0.149 (0.543)	-0.713 -1,221	
Governance score	-0.135* (0.281)	-0.0219 (0.602)	-0.224 -1,218	0.231 (0.479)
Control variables	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Company FE	YES	YES	YES	YES
R-squared	36.5%	25.5%	14.4%	11.2%
Observations	1,407	546	364	308
Models	2D	2E	2F	2G
Total return				
<i>Dependent variable</i>				
Property sector	All real estate companies	All real estate companies	All real estate companies	All real estate companies
Geographic region	America	Asia	Oceania	Europe
<i>Independent variables</i>				
Environmental score	1.511*** (0.428)	1,033 -1,027	-0.682 (0.624)	-1,772 -1,260
Social score	1.680*** (0.517)	-0.297 (0.782)	-0.0971 (0.324)	-0.189 (0.675)
Governance score	-0.106* (0.469)		0.407 (0.491)	1,234 -1,295
Control variables	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Company FE	YES	YES	YES	YES
R-squared	24.7%	25.4%	37.1%	44.4%
Observations	847	231	189	119

Note(s): ***, **, and * indicates statistically significant levels of 1%, 5% and 10%, respectively
Source(s): Authors' own work

Table 7.
2SLS: second-stage regression model 2

In line with findings of earlier research, this study reinforces the notion that the impact of CSR on firm performance is far from uniform and is influenced by how stakeholders value CSR efforts and the specific regulatory environment (Buallay *et al.*, 2020; Whelan *et al.*, 2021). Therefore, real estate companies should engage with stakeholders within their specific sector to understand how CSR impacts are perceived and prioritize ESG efforts accordingly. Additionally, ESG initiatives should be adapted to regional contexts, taking into account local regulations, market conditions, and stakeholder expectations. Enhancing ESG reporting to clearly demonstrate how CSR initiatives affect performance in specific sectors and regions can improve transparency and build stakeholder trust. Effective communication

strategies that resonate with regional and sectoral concerns will further support stakeholder engagement and alignment.

Additionally, the analysis of the distinct ESG pillar scores reveals a more significant impact on accounting-based performance measures compared to market-based measures. This distinction echoes the findings of previous research (Morri *et al.*, 2024; Brounen *et al.*, 2021; Cajias *et al.*, 2011, 2014), yet it presents novel insights and analytical angles. The divergence in significance between accounting and market performance underscores the multifaceted influence of ESG practices, hinting at the complex interplay between CSR activities and the perceptual and financial metrics by which companies are evaluated. This seems to confirm that the divergence in findings across previous studies can be attributed to several factors, including variations in sample selection, the scope of financial and sustainability variables considered, the statistical methods used, and the time periods analyzed.

While the study advances our understanding, it also acknowledges limitations that pave the way for future research. Firstly, the absence of lagged variables, due to the need for additional yearly data, restricts the analysis to the immediate impact of ESG performance, potentially overlooking longer-term effects. Incorporating lagged variables could provide insights into the sustainability of financial outcomes over time, offering a more comprehensive understanding of the relationship between ESG metrics and financial performance in the real estate industry. Secondly, the reliance on a single source for ESG data presents another limitation. Standardized ESG measurement methodologies vary across different agencies, leading to inconsistencies in ratings and scores. Utilizing data from multiple sources or employing alternative measurement approaches could mitigate this limitation, enhancing the robustness and reliability of the findings. Furthermore, the fixed effects regression model, while commonly employed in studies of this nature, may have inherent assumptions and limitations that affect the interpretation of results like the fact that they assume that all unobserved characteristics that do not change over time (time-invariant) are accounted for within the model that could limit in some cases the generalizability of the results. Therefore, exploring different modeling techniques or incorporating qualitative analysis could offer a deeper understanding of the complex relationship between ESG factors and financial performance in the real estate industry.

To refine the understanding of the ESG-financial performance relationship, subsequent studies could benefit from incorporating a range of dependent variables and considering the adoption of ESG ratings from multiple agencies. This would allow for a more robust analysis and a better comparison of results, ensuring their reliability and relevance to the real estate sector's evolving landscape.

Thus, this paper not only contributes to academic discourse but also serves as a call to action for more comprehensive and longitudinal studies, encouraging a multifaceted approach to evaluating the true impact of ESG initiatives on financial performance within the real estate sector.

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Models CFP measure	1 ROA	1B ROA	1E ROA	1F ROA	1G ROA
Property sector	All Real Estate Companies	Real Estate Rental, Development and Operations sector	All Real Estate Companies	All Real Estate Companies	All Real Estate Companies
Environmental score	Positive Effect	–	–	–	–
Social score	Negative Effect	Negative Effect	Negative Effect	Negative Effect	Negative Effect
Governance score	Positive Effect	Positive Effect	–	Positive Effect	–
Control variables	Ebitda Margin, Log Total Assets, Debt on Assets, Beta Levered	Ebitda Margin, Log Total Assets, Debt on Assets, Beta Levered	Ebitda Margin, Log Total Assets, Debt on Assets, Beta Levered	Ebitda Margin, Log Total Assets, Debt on Assets, Beta Levered	Ebitda Margin, Log Total Assets, Debt on Assets, Beta Levered
Period	2015–2021	2015–2021	2015–2021	2015–2021	2015–2021
Geographic region	World	World	Asia	Oceania	Europe
Statistic model	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect
Observations	1,687	630	364	196	231
Models CFP measure	2 Total return	2A Total return	2B Total return	2D Total return	2F Total return
Property sector	All Real Estate Companies	Commercial REITs	Real Estate Rental, Development and Operations sector	All Real Estate Companies	All Real Estate Companies
Environmental score	–	–	–	–	–
Social score	Negative Effect	–	–	–	–
Governance score	Negative Effect	Negative Effect	Negative Effect	Negative Effect	Positive Effect
Control variables	Ebitda Margin, Log Market Cap, Beta Levered, Floating Shares	Ebitda Margin, Log Market Cap, Beta Levered, Floating Shares	Ebitda Margin, Log Market Cap, Beta Levered, Floating Shares	Ebitda Margin, Log Market Cap, Beta Levered, Floating Shares	Ebitda Margin, Log Total Assets, Debt on Assets, Beta Levered
Period	2015–2021	2015–2021	2015–2021	2015–2021	2015–2021
Geographic region	World	World	World	America	Oceania
Statistic model	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect
Observations	1,407	546	364	847	189

Table A1.
Synthesis of the significant results

Source(s): Authors' own work