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IMPACT OF ESG PERFORMANCE ON REIT MARKET VALUATION
EVIDENCE FROM EUROPEAN CAPITAL MARKETS

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Abstract

This thesis examines the relationship between ESG performance and market value (MV) in European Real Estate Investment Trusts (REITs) from 2015 to 2024 using panel regression models. The analysis finds no significant positive link between ESG performance and MV, with environmental disclosures negatively impacting MV. ESG performance also correlates negatively with Return on Equity (ROE), indicating that compliance costs may outweigh financial benefits. These findings highlight the complexities of ESG integration in real estate and the need for sector-specific, long-term financial analysis.

Keywords: ESG performance, REITs, market value, sustainability integration

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1 Introduction

The integration of ESG considerations into corporate strategies has become a central topic in both academic and professional discourse, reflecting the growing urgency of addressing sustainability challenges (Searcy and Elkhawas, 2012; United Nations, 1987). Investors, regulators, and other stakeholders are increasingly advocating for ESG-aligned business practices, highlighting their potential to drive long-term value creation and risk mitigation (Brounen, Marcato, and Op't Veld, 2021). Within this context, the real estate sector, particularly through Real Estate Investment Trusts (REITs), plays a pivotal role, given its substantial environmental footprint and societal impact (Op't Veld, 2023).

Empirical evidence on the relationship between ESG performance and financial performance has been mixed. A substantial body of literature supports a positive link, suggesting that ESG adherence can enhance financial outcomes through improved reputation, operational efficiency, and access to capital (Abate, Basile, and Ferrari, 2021; Chen, Song, and Gao, 2023; Zhou, Liu, and Luo, 2022). This narrative extends to REITs, where studies have demonstrated benefits such as higher market valuations and improved returns for ESG-compliant entities (Brounen, Marcato, and Op't Veld, 2021; Ooi and Dung, 2019). However, contrary findings have also emerged, indicating that ESG initiatives may impose significant costs or lead to inefficiencies, ultimately diminishing financial performance (Coën, Lecomte, and Abdelmoula, 2018; Mariani et al., 2017). These conflicting results underscore the complexity of the ESG-financial performance nexus and point to the need for more nuanced investigations.

Despite the increasing prominence of ESG considerations, much of the existing research has been concentrated on U.S. markets, leaving European markets, particularly in the context of REITs, underexplored (Mariani et al., 2017). This is surprising given the unique regulatory and market dynamics in Europe, which have driven a significant shift toward sustainable investment

practices. Thus, the European REIT market provides a fertile ground for examining the financial implications of ESG integration (Op't Veld, 2023).

The present thesis addresses this gap by examining the relationship between ESG performance and financial performance in a sample of European REITs. Drawing on the methodological framework of Zhou, Liu, and Luo (2022), this study evaluates the direct impact of ESG performance on market valuation while also assessing the mediating role of financial performance, specifically Return on Equity (ROE). By employing panel regression models, the analysis aims to provide robust empirical insights into the dynamics of ESG integration within the European REIT context.

The remainder of this thesis is organized as follows. Section 2 reviews the theoretical and empirical literature on ESG and financial performance, focusing on general corporate settings and REIT-specific studies. Based on this review, the hypotheses are developed and presented. Section 3 outlines the research design, including data collection, variable definitions, and the analytical framework. Section 4 presents the empirical results, discusses their implications, and reflects on the study's limitations. Finally, Section 5 concludes with a summary of findings and recommendations for future research.

2 Literature Review

The literature review begins by introducing the concept of sustainability and providing an overview of ESG criteria. Building on this theoretical foundation, it explores insights from academic literature concerning the financial implications of sustainable business practices, first from a broad perspective and then with a specific focus on REITs. Finally, the review culminates in the development of a theoretical framework informed by the empirical findings discussed in this section.

2.1 Sustainability and ESG Criteria

Sustainability is a multidimensional framework that provides essential guidance for policy-makers, corporations, and society. Its foundation lies in the landmark Brundtland Commission report, which introduced the concept of sustainable development as the ability to meet the needs of the present generation without compromising the capacity of future generations to meet their own needs ([Searcy and Elkhawas, 2012](#); [United Nations, 1987](#)).

Historical discussions of sustainability predate the Brundtland Report, as exemplified by Malthus's work on resource management and population growth ([Hansen and Prescott, 2002](#)). Sustainability gained further prominence through the Club of Rome's advocacy in the 1970s, which emphasized resource limits and societal adaptation ([Kuhlman and Farrington, 2010](#)). More recently, global initiatives such as the COP21 Paris Agreement have established concrete political frameworks for emission reduction and climate resilience. The operationalization of sustainability is frequently assessed through ESG criteria. These dimensions serve as key metrics to evaluate firms' alignment with sustainable and ethical practices ([Brounen, Marcato, and Op't Veld, 2020](#)). ESG criteria provide a structured lens for assessing corporate behavior, and their relevance extends across multiple sectors, including finance and real estate ([Abate, Basile, and Ferrari, 2021](#)). The three dimensions of ESG are outlined in the following.

The environmental (E) dimension evaluates corporate strategies aimed at reducing environmental harm while integrating sustainable business practices. Metrics include efforts to reduce waste, minimize carbon emissions, and optimize resource utilization. Companies excelling in environmental performance are often characterized by significant investments in renewable energy solutions and robust compliance with environmental standards.

Closely linked to the principles of Corporate Social Responsibility (CSR), the social dimension (S) emphasizes the integration of societal considerations into business operations. Effective

social practices often enhance stakeholder trust and brand equity. Examples include initiatives to support community welfare, equitable labor policies, and diversity programs. Moreover, corporations with credible social commitments are increasingly preferred by employees, consumers, and investors, creating a competitive advantage.

Governance (G) pertains to corporate policies and structures that promote equitable treatment of stakeholders and mitigate legal, regulatory, and reputational risks. Robust governance frameworks are associated with higher corporate accountability, transparency, and long-term shareholder value creation (Ishaq and Di Maria, 2020). This dimension also serves as a critical safeguard against unethical practices and adverse corporate events.

Despite its growing prominence, ESG integration presents complex challenges. From a financial perspective, ESG-aligned behavior often entails substantial costs, particularly in the short term, due to compliance requirements and resource allocation. However, proponents argue that the long-term benefits, including enhanced reputation, operational efficiency, and risk mitigation, outweigh these costs (Abate, Basile, and Ferrari, 2021; Brounen, Marcato, and Op't Veld, 2021). While some studies highlight its positive impact on firm value and market performance, others caution that ESG initiatives may erode profitability through increased expenditure. This duality makes it imperative to explore the net economic effects of ESG integration, particularly through the lens of specific industries and regions.

This section sets the stage for a comprehensive evaluation of ESG's financial impact by examining its relationship with financial performance metrics in subsequent sections. The next subsection 2.2 evaluates the broader relationship between ESG performance and financial outcomes, while subsection 2.3 focuses specifically on the real estate sector, particularly REITs.

2.2 Relationship of ESG Performance and Financial Performance

The empirical investigation of the relationship between ESG performance and financial returns has, until recently, been limited, with relatively few studies addressing this critical intersection. This scarcity is particularly striking given the increasing emphasis placed on ESG criteria by investors as pivotal in shaping investment decisions (Brounen, Marcato, and Op't Veld, 2021). Moreover, much of the existing research is predominantly concentrated on the U.S. market, which highlights a significant gap in the understanding of ESG-financial performance dynamics across other geographies, particularly in the European context (Mariani et al., 2017). This imbalance underscores the need for region-specific studies to broaden the scope of empirical evidence and provide richer insights into the global relevance of ESG practices.

Recent years, however, have witnessed substantial progress in this domain, with an emerging body of literature elucidating the nuanced relationship between ESG performance and financial outcomes. Empirical findings frequently highlight a positive relationship, though the results are often contingent upon the methodological frameworks and metrics employed in the analysis.

For instance, Chen, Song, and Gao (2023) offer robust evidence of a strong association between ESG performance and corporate financial performance, drawing on a large-scale dataset comprising 24,076 observations. Their findings underscore the transformative potential of ESG integration in driving financial outcomes. Similarly, Abate, Basile, and Ferrari (2021) report superior efficiency for mutual funds investing in securities with high ESG ratings. Their analysis, based on 634 European mutual funds, substantiates the economic rationale for ESG-focused investment strategies, particularly in contexts emphasizing fund efficiency.

Beyond these general findings, research has delved into the mechanisms through which ESG impacts financial metrics. Zhou, Liu, and Luo (2022), for instance, reveal that ESG performance positively influences market value (MV), with financial performance acting as a medi-

ating variable. Their results suggest that ESG performance bolsters financial outcomes, which, in turn, enhance market valuation. Notably, this mediation effect appears more pronounced for non-state-controlled firms, reflecting the unique dynamics in governance and accountability structures.

Despite the growing consensus around the positive impact of ESG performance, dissenting evidence challenges the universality of these findings. For example, [Gil \(2021\)](#) examine ESG risk categories in the context of NASDAQ100 stocks, demonstrating that social and environmental risks negatively impact excess stock returns. Interestingly, governance risks were found to exert no significant influence. This suggests that the nuances of ESG impact may vary across different dimensions, necessitating a more granular approach to ESG evaluation.

Region-specific studies further illustrate the complexity of this relationship. For example, [Velte \(2017\)](#) focus on German-listed companies, finding that ESG performance positively contributes to Return on Assets (ROA) but does not affect Tobin's Q. This finding aligns with broader evidence of ESG performance benefiting operational efficiency metrics while exhibiting less influence on market-based valuation measures. Moreover, their analysis identifies governance performance as the most influential ESG dimension, offering a striking contrast to the findings of [Gil \(2021\)](#), who report negligible governance effects.

Sector-specific research also highlights the heterogeneous nature of ESG impacts. [Naem, Cankaya, and Bildik \(2022\)](#) analyze environmentally sensitive industries and establish a positive link between ESG performance and both ROE and Tobin's Q. Their findings emphasize the importance of contextualizing ESG effects within the unique dynamics of specific industries, given their varying exposure to environmental and social considerations.

In summary, a substantial body of evidence underscores the positive relationship between ESG performance and financial outcomes, encompassing metrics such as MV and return met-

rics. However, this relationship is neither uniform across ESG dimensions nor consistent across studies. As [Gil \(2021\)](#) illustrate, the governance component may have a muted influence compared to its social and environmental counterparts. Furthermore, variations in study design, data sources, and metrics employed often yield divergent findings, emphasizing the importance of methodological rigor in unpacking the ESG-financial performance nexus.

2.3 REITs and ESG Performance

The extensive evidence suggesting a positive relationship between ESG performance and financial performance has spurred interest in exploring this dynamic in the context of REITs. REITs represent a unique category of publicly listed real estate companies that provide distinct advantages, particularly in terms of tax efficiency compared to conventional firms. These tax benefits, however, are contingent upon compliance with stringent regulatory provisions governing ownership structures, investment types, and profit distribution ([Brauer, 2019](#)). Such characteristics establish REITs as a compelling subject for evaluating the financial implications of ESG integration. Initially introduced in the U.S., the REIT structure has since gained traction in Europe, reflecting its transformative impact on global real estate markets. The increasing relevance of ESG criteria for REITs is underscored by the critical role of the real estate sector in advancing sustainability and decarbonizing the economy ([Op't Veld, 2023](#)). The significance of ESG compliance extends beyond environmental concerns, resonating strongly with institutional investors, such as pension funds, which increasingly prioritize socially responsible investment strategies. The mounting interest in ESG compliance from investors and the public alike exerts significant pressure on REITs to adopt and adhere to ESG standards. This pressure is amplified by regulatory developments, including the Corporate Sustainable Reporting Directive (EU 2022/2464) and the European Sustainable Finance Taxonomy, which mandate specific sustain-

ability disclosures and practices.

Given this confluence of investor expectations and regulatory mandates, it becomes imperative to examine the interplay between ESG performance and financial outcomes in the REIT sector. Similar to the findings discussed in subsection 2.2, existing research provides compelling evidence for a positive relationship between ESG performance and financial performance in REITs, albeit with some contrasting findings that warrant further investigation.

Empirical studies provide robust support for the financial benefits of ESG integration within the REIT sector. For example, [Brounen, Marcato, and Op't Veld \(2021\)](#) demonstrate that greater ESG transparency and compliance are associated with enhanced financial returns for listed European real estate firms. Their findings suggest that investors are willing to pay a premium for companies that demonstrate stronger ESG performance, with larger companies typically exhibiting superior ESG transparency. This indicates the necessity of including firm size as a critical control variable in ESG-performance analyses. In the context of Singaporean REITs, [Ooi and Dung \(2019\)](#) reveal that portfolios with a higher proportion of green assets achieve better operational outcomes, including improved ROA and operating margins. However, their study does not identify a corresponding positive impact on abnormal returns, indicating that operational benefits may not necessarily translate into market-based advantages. Further evidence is provided by [Sah, Miller, and Ghosh \(2013\)](#), who find that green REITs positively influence firm value, as measured by Tobin's Q. Additionally, these REITs outperform their less green counterparts in terms of ROA and stock market performance, as indicated by Jensen's alpha. This underscores the potential of green investments to enhance both operational efficiency and investor confidence. Examining the role of green buildings, [Hin Ho, Rengarajan, and Han Lum \(2013\)](#) identify a positive correlation between environmentally sustainable practices and financial performance within REITs. However, they also highlight the methodological challenges

associated with standardizing measures of "greenness", which can yield varying results depending on the metrics employed. Similarly, [Eichholtz, Kok, and Quigley \(2010\)](#) show that certified green buildings command higher rental incomes and selling prices, with premiums systematically linked to energy-saving characteristics. Such findings reinforce the economic rationale for ESG integration, particularly through environmentally focused initiatives.

While much of the literature supports a positive ESG-financial performance relationship, dissenting studies highlight potential trade-offs and challenges. For instance, [Coën, Lecomte, and Abdelmoula \(2018\)](#) report a negative relationship between sustainability investments and financial performance among U.S. REITs. Their analysis attributes this adverse effect to the significant costs associated with ESG-related adjustments, which may outweigh the potential financial benefits. Similarly, [Mariani et al. \(2017\)](#) evaluate the impact of green certifications, such as BREEAM and LEED, on European REITs. Their findings indicate that such certifications negatively affect return metrics like ROA and ROE, as well as the stocks' alpha, despite improving beta. These results suggest that the costs of achieving green certifications – such as refurbishments and compliance measures – can impose a substantial financial burden, potentially eroding shareholder value in the short term.

2.4 Theoretical Framework and Hypothesis

Building on the existing empirical literature, the relationship between ESG performance and financial outcomes has been consistently demonstrated in various sectors, suggesting a generally positive association. However, the evidence within the context of REITs remains inconclusive, with notable inconsistencies in findings. While some studies underscore the financial advantages of ESG compliance – highlighting enhanced market valuation, operational efficiencies, and long-term sustainability – other research emphasizes potential drawbacks, including

significant implementation costs and reduced short-term profitability. These mixed outcomes underline the critical need for further investigation, particularly in the underexplored European REIT sector, which occupies a unique position at the intersection of sustainability and real estate investment.

This study aims to address this research gap by providing empirical evidence on the relationship between ESG performance and MV within the European REIT market. Drawing inspiration from the analytical framework proposed by [Zhou, Liu, and Luo \(2022\)](#), this research adapts their approach, originally applied in a non-real estate context, to the specific dynamics of the REIT sector. The inclusion of sector-specific nuances and a focus on the European market represents a novel contribution to the broader discourse on ESG and financial performance.

Central to the study is the hypothesis that ESG performance is positively related to the MV of REITs. Recognizing the multifaceted nature of ESG, the analysis is further disaggregated into the three core dimensions to explore the distinct and combined impacts of these components on market valuation. This disaggregation allows for a more nuanced understanding of the mechanisms through which ESG performance influences financial outcomes. Accordingly, the following hypotheses are proposed:

H1: ESG performance is positively related to the market value of REITs.

H1a: Ecological ESG performance is positively related to the market value of REITs.

H1b: Social ESG performance is positively related to the market value of REITs.

H1c: Governance ESG performance is positively related to the market value of REITs.

Beyond the direct effects of ESG performance, this study also examines the mediating role

of profitability, operationalized as ROE, in the ESG-performance relationship. This mediation hypothesis builds on the premise that ESG initiatives may enhance financial performance through improved operational efficiency, risk mitigation, and enhanced stakeholder trust, which in turn positively affects market valuation. To this end, the following hypotheses are posited:

H2: ESG performance is positively related to the profitability of REITs.

H3: Profitability contributes to ESG performance, which, in turn, enhances the market value of REITs.

The theoretical framework proposed in this study not only aims to elucidate the direct and mediated pathways through which ESG performance affects financial outcomes but also seeks to contribute to the broader academic debate on the interplay between sustainability and profitability. The findings are expected to advance the discourse on ESG integration by offering sector-specific, empirically robust evidence that bridges existing gaps in the literature.

3 Methodology and Data

This section outlines the methodological framework employed in this study. It begins by detailing the study design and data collection process, followed by a comprehensive description of the variables and concludes with the analytical approach undertaken to test the hypotheses.

3.1 Study Design and Data Collection Process

This study adopts a longitudinal research design, building on the methodological framework of [Zhou, Liu, and Luo \(2022\)](#) and adapting it to the real estate sector.

Data for this study were sourced from Bloomberg (BBG), a widely recognized financial database, ensuring the robustness and reliability of the dataset. The sample comprises publicly listed European REITs, with observations spanning a ten-year period from 2015 to 2024. This timeframe is chosen to capture long-term dynamics in the relationships, accounting for both market trends and regulatory developments. The data collection process prioritized variables relevant to financial, ESG, and control factors. ESG performance metrics were obtained through BBG's ESG disclosure scores, which are widely used in academic research as a proxy for sustainability performance. Financial performance indicators, including MV, ROE, and other relevant metrics, were also retrieved. Additionally, control variables such as firm size (log-transformed total assets) and leverage (debt-to-assets ratio) were included to isolate the effects of ESG performance.

Data preprocessing was a critical step to ensure analytical reliability. As the initial dataset was provided in a wide format, it was reshaped into a long format to facilitate the application of statistical techniques. This transformation, along with subsequent analyses, was conducted using R. To maintain data integrity, multiple cleaning steps were undertaken. First, the dataset was examined for outliers and extreme values that could skew the results. Values identified as implausible through visual inspection and statistical thresholds were either corrected or excluded. Second, missing data were systematically assessed. A significant prevalence of missing values was observed in ESG-related variables, consistent with challenges noted in prior research on sustainability metrics in emerging domains. To address this issue, the sample was refined to include only complete observations, ensuring compatibility with the panel regression models employed. While this step reduced the sample size, it enhanced the robustness of the statistical analyses by minimizing biases associated with incomplete data.

Descriptive statistics were calculated to provide an initial understanding of the data distri-

bution and key characteristics. Following this, correlation analyses were conducted to examine the linear relationships among variables and to identify potential multicollinearity issues, particularly among predictor variables.

To empirically test the hypotheses, panel regression models were employed, incorporating both fixed effects (FE) and random effects (RE) specifications. These models are particularly suited to longitudinal datasets as they account for unobserved heterogeneity across entities. The Hausman test was used to determine the appropriateness of the FE versus RE model for each specification. FE models were employed when entity-specific effects were found to correlate with explanatory variables, while RE models were used when such correlations were absent.

The regression models were structured to test the primary hypothesis regarding the impact of ESG performance on MV, as well as the mediating role of profitability (ROE). ESG performance was operationalized using both the aggregate ESG disclosure score and its sub-components to provide granular insights. Further details of the regression models and results are provided in section 4, where the empirical findings are discussed in depth.

3.2 Overview of Variables

The selection and operationalization of the variables in this study is informed by the work of [Zhou, Liu, and Luo \(2022\)](#), with adjustments tailored to the specific context of REITs. For the purposes of this research, a refined subset of variables is selected to ensure alignment with the research objectives and the characteristics of the obtained dataset.

The primary explained variable in this analysis is MV, chosen to maintain methodological consistency with [Zhou, Liu, and Luo \(2022\)](#) and to contribute to the academic discourse by applying an established approach in a novel context. MV is considered an appropriate metric for assessing the economic impact of ESG performance due to its ability to reflect firm valuation

over time. While other financial indicators, such as stock returns, could have been used, these metrics often capture short-term market sentiment and volatility. MV, calculated on an annual basis, provides a more stable and comprehensive measure of financial performance, mitigating the influence of transient fluctuations in investor sentiment or market dynamics.

The primary explanatory variable is the Total ESG Disclosure Score (ESG_Score), which represents the aggregate of disclosures across the environmental, social, and governance dimensions. This score serves as a proxy for ESG performance, capturing the extent of transparency and adherence to sustainability principles by firms. While the score provides valuable insights into ESG practices, it is important to note that it reflects disclosure levels rather than actual performance outcomes.

In addition to the ESG_Score, sub-scores for the three dimensions are analyzed, enabling a more granular exploration of how specific aspects of ESG performance influence financial outcomes. Some variables were derived from the raw data obtained from BBG to align with the analytical framework. For instance, the size variable, representing firm size, was log-transformed to address skewness and stabilize variance, thereby enhancing its suitability for regression analysis. However, a similar transformation was not applied to MV, as it is defined as a ratio (market capitalization divided by total assets) and does not exhibit the same level of skewness typically observed in absolute-value metrics.

The inclusion of control variables is critical to isolating the impact of ESG performance on MV. This study incorporates firm size and leverage, consistent with the approach of [Zhou, Liu, and Luo \(2022\)](#). These variables are well-established in financial literature as determinants of firm performance and are included to account for variations that could confound the relationship between ESG performance and financial outcomes. Additional control variables employed by [Zhou, Liu, and Luo \(2022\)](#), such as ownership concentration and cash-to-total-assets ratio,

were not included in this analysis. These variables were considered less relevant in the context of REITs, where ownership structures and cash flow characteristics often differ significantly from non-real estate firms. Moreover, their exclusion is unlikely to substantially alter the findings, as the key determinants of financial performance for REITs are captured by the selected control variables. An overview of the variables used in this study, along with their definitions, is presented in Table 1.

[Insert Table 1 about here]

This table provides clarity on the operationalization of each variable and serves as a reference for interpreting the empirical results.

4 Results and Discussion

This section presents the results of the empirical analysis and provides a discussion of the findings. The presentation begins with descriptive statistics, followed by correlation analysis, and then the results of the regression models. A detailed discussion of these results in relation to the stated hypotheses is included. Finally, the limitations of the analysis are outlined.

4.1 Descriptive Statistics

To provide an overview of the sample, a descriptive analysis of countries was conducted, as shown below in Table 2. The sample consists of European REITs from various countries, with the majority originating from Spain, Great Britain, and Bulgaria.

[Insert Table 2 about here]

Furthermore, descriptive statistics for the variables were calculated, which are depicted below in Table 3. Given the total number of REITs included in the sample ($n = 240$) and the

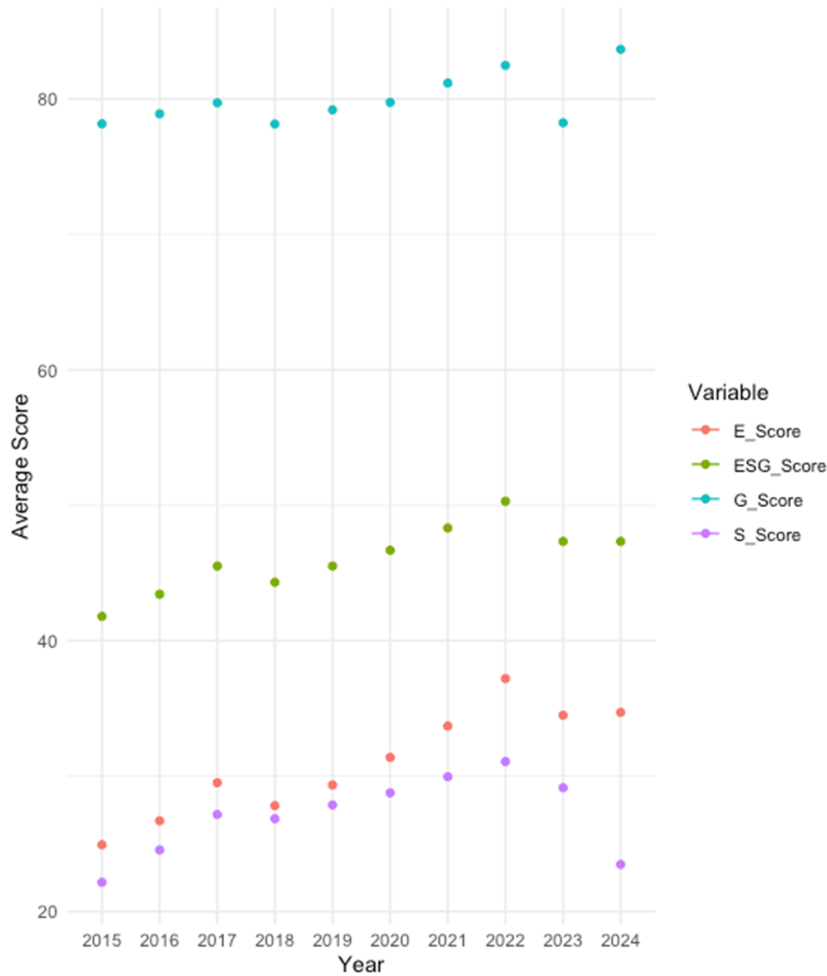
observation period of ten years (2015 to 2024), a total of 2,400 company-year observations have been gathered.

[Insert Table 3 about here]

The mean ESG score of 46.19 represents an average level of ESG disclosure for the sample, but the scores for the three sub-dimensions reveal notable differences. The governance score (G_Score) is substantially higher than the environmental (E_Score) and social (S_Score) scores, suggesting that REITs place greater emphasis on governance-related disclosures. This disparity highlights the uneven quality of ESG disclosures across dimensions, which could have implications for financial performance relationships. To explore these dynamics further, the temporal evolution of ESG scores is depicted in Figure 1. This visualization captures trends in the aggregate ESG score and its sub-components. The figure illustrates an upward trend in ESG disclosure scores from 2015 to 2022, followed by a slight decline in 2023. Notably, the governance dimension exhibits a strong resurgence in 2024, contrasting with the stagnation of the environmental and social dimensions. This divergence underscores potential variations in how firms prioritize different aspects of ESG, possibly driven by regulatory changes or investor focus.

The variability in ESG scores and their sub-components underscores the need for nuanced analyses that consider each dimension individually rather than relying solely on aggregated scores. For example, the relatively high governance scores could reflect stricter regulatory requirements or established best practices in corporate governance within the real estate sector. Conversely, the lower environmental and social scores suggest areas where firms face challenges in achieving robust disclosure standards. This observation motivates the inclusion of individual ESG dimensions as explanatory variables in the subsequent regression analyses, enabling a more granular investigation into their respective financial impacts.

Figure 1: Development of ESG Scores Over Time (Including Sub-Scores)



The descriptive statistics and temporal trends provide a foundation for understanding the relationships explored in this study. They reveal heterogeneity in ESG performance across dimensions and over time, highlighting the complex interplay of disclosure practices and market dynamics. These observations inform the analytical strategy employed in subsequent sections, particularly the decision to assess both aggregate and dimension-specific ESG impacts on financial performance.

4.2 Correlation Analysis

The correlation analysis provides an initial examination of the linear relationships between the variables used in the regression models. This step is critical for identifying potential issues

of multicollinearity, which could distort regression estimates. Multicollinearity becomes problematic when the correlation coefficient between two predictor variables exceeds the threshold of 0.8, as highlighted by [Zhou, Liu, and Luo \(2022\)](#). The results of the correlation analysis are summarized in Table 4.

[Insert Table 4 about here]

The correlation matrix reveals no instances where the correlation coefficients exceed the critical value of 0.8, indicating that multicollinearity is not a significant concern for most of the variables included in this study. This result supports the robustness of the planned regression models. However, one notable exception is the strong correlation observed between ROE and ROA. This finding aligns with theoretical expectations, as both metrics are closely related measures of profitability, albeit with distinct denominators.

Given the strong linear relationship between ROE and ROA, retaining both variables in the regression models would introduce redundancy without offering additional explanatory power. Therefore, it was decided to include only ROE in the subsequent analyses. This decision ensures that the regression models remain parsimonious and avoids potential overfitting caused by multicollinear predictors.

The results of the correlation analysis inform key decisions regarding variable inclusion in the regression models. By eliminating ROA, the analysis focuses on the unique contributions of ROE as a measure of profitability. This approach not only enhances the interpretability of the models but also ensures that the assumptions underpinning linear regression are upheld. Overall, the correlation analysis serves as a foundational step in constructing robust empirical models that accurately capture the relationships under investigation.

4.3 Regression Analysis

To assess the proposed hypotheses (H1, H2, and H3), panel regression models were employed, adhering to the methodological approach of [Zhou, Liu, and Luo \(2022\)](#). The regression analysis utilized both FE and RE models, with the choice between these determined through the Hausman test. A significance threshold of 5% was applied to the Hausman test results: RE models were selected when the test statistic exceeded this threshold, while FE models were used otherwise. The primary regression results are summarized in [Table 5](#).

[Insert [Table 5](#) about here]

The regression analysis yields several notable insights. First, in Model 1, no statistically significant relationship is identified between the total ESG score and MV, indicating that ESG performance does not exert a direct influence on market valuation within this dataset. In contrast, Model 2 reveals a statistically significant negative relationship between the total ESG score and ROE. This suggests that higher ESG compliance or performance may impose costs that detract from profitability, a finding consistent with some prior literature emphasizing the financial burdens of sustainability-related initiatives.

Model 3 explores the mediating effect of ROE in the relationship between ESG performance and MV, as proposed in hypothesis H3. However, the results do not support a significant mediating relationship. Furthermore, Model 3's negative adjusted R^2 value highlights potential issues such as model misspecification or multicollinearity, emphasizing the need for cautious interpretation of the findings within the context of this analysis.

Given the inconclusive results of Model 1 with the aggregate ESG score, the analysis was extended to include the three ESG sub-dimensions – environmental (E_Score), social (S_Score), and governance (G_Score) – as independent variables predicting MV. The corresponding results are presented in [Table 6](#).

[Insert Table 6 about here]

The disaggregated analysis provides more nuanced insights. A significant negative relationship is identified between E_Score and MV, suggesting that increased environmental disclosures may reduce MV. A potential explanation is the perception among investors that environmental initiatives entail high costs or long payback periods, thus adversely impacting short-term profitability. The coefficient for S_Score is positive but not statistically significant. This implies that while social initiatives may have a positive perception among stakeholders, their impact on market valuation is not robustly evident in the dataset. Similar to S_Score, the G_Score coefficient is positive but lacks statistical significance, indicating that governance-related disclosures do not exert a discernible effect on MV within this analysis.

The disaggregated analysis highlights that the environmental dimension of ESG disclosure exerts the most pronounced (and negative) influence on MV. In contrast, the social and governance dimensions, while exhibiting positive coefficients, do not yield statistically significant relationships. These findings suggest a differential impact of ESG dimensions, emphasizing the need for firms to strategically balance environmental initiatives with financial objectives. Moreover, the absence of significant results in Models 1 and 3 regarding aggregate ESG performance underscores the complexity of the ESG-financial performance nexus and the importance of considering sector-specific dynamics, particularly in the real estate domain. Future research could benefit from further refinement of the model specifications and the inclusion of additional control variables to account for sector-specific heterogeneity.

4.4 Discussion of Results

The findings of this study reveal a lack of significant evidence supporting a positive relationship between ESG performance and the MV of REITs. Consequently, the overarching hypoth-

esis (H1) and its sub-hypotheses (H1a, H1b, and H1c), which propose positive relationships between the ecological (E_Score), social (S_Score), and governance (G_Score) dimensions of ESG performance and MV, are not supported by the empirical results. Instead, the analysis uncovers a statistically significant negative relationship between the E_Score and MV, suggesting that environmental initiatives, when measured through disclosure scores, may detract from market valuation. This aligns with prior studies, such as [Coën, Lecomte, and Abdelmoula \(2018\)](#) and [Mariani et al. \(2017\)](#), which also identify adverse financial impacts linked to sustainability-related activities.

The negative impact of ESG performance extends to profitability, as indicated by the regression analysis with ROE as the dependent variable. The results show a statistically significant negative relationship between the ESG score and ROE, leading to the rejection of H2, which hypothesized a positive association. These findings reinforce the notion that ESG-related activities, particularly in the ecological domain, may impose costs that overshadow potential financial benefits in the short term. This is consistent with literature emphasizing the resource-intensive nature of environmental initiatives, which can lead to reduced profitability metrics.

Contradicting a body of literature that supports the positive financial implications of ESG performance ([Ooi and Dung, 2019](#); [Sah, Miller, and Ghosh, 2013](#)), the current study also finds no evidence of a mediating role of ROE in the ESG-MV relationship. This result necessitates the rejection of H3, which proposed that profitability acts as a conduit through which ESG performance influences MV. These findings diverge from the results of [Zhou, Liu, and Luo \(2022\)](#), who observed a significant mediating effect of financial performance in a general company sample. The absence of such an effect in the REIT sample underscores the sector-specific nature of the ESG-financial performance nexus.

The results suggest that investors should carefully evaluate the financial implications of ESG

activities, particularly those in the environmental domain. While environmental initiatives align with broader sustainability goals, their negative impact on market valuation and profitability raises critical questions about the trade-offs between achieving sustainability objectives and maintaining financial performance. This highlights the need for investors to adopt a balanced approach, weighing economic returns against ESG commitments.

The findings have significant regulatory implications, suggesting that mandatory ESG disclosure requirements, while promoting transparency, may inadvertently impose economic costs on REITs. Policymakers should consider these potential drawbacks when designing and implementing ESG-related mandates. Regulatory frameworks might benefit from greater flexibility, allowing firms to pursue sustainability initiatives without compromising financial objectives. Moreover, targeted incentives for environmental activities could help offset associated costs and encourage firms to engage in sustainable practices.

The study contributes to the ongoing academic debate by providing evidence that challenges the universally positive narrative surrounding ESG performance. The findings suggest that the relationship between ESG performance and financial metrics may vary significantly across sectors. In the case of REITs, the financial impact of environmental activities appears distinct from the results obtained for broader corporate samples. This divergence underscores the importance of sector-specific analyses and calls for further research into the unique dynamics of ESG performance in real estate. Additionally, the results point to the role of methodological differences in shaping empirical findings. Studies such as [Brounen, Marcato, and Op't Veld \(2021\)](#) and [Ooi and Dung \(2019\)](#), which report positive financial implications of ESG performance, may have adopted analytical specifications or variable definitions that differ from those used in the present study. Future research should aim to harmonize methodologies across studies or explore alternative modeling approaches to reconcile conflicting findings.

4.5 Limitations

This study is subject to certain limitations that warrant consideration. The dataset is limited in size and exhibits considerable missing data, particularly regarding ESG-related variables. These gaps could potentially bias the findings and reduce their robustness. While imputation techniques might mitigate these issues, such methods could introduce additional bias, especially given the relatively small and incomplete dataset for European REITs. The reliance on BBG data also restricted access to alternative datasets, further constraining the scope of the analysis.

The heterogeneity of the sample may also pose challenges. A more homogeneous sample, such as focusing on REITs from a single country or region, could enhance consistency and comparability across observations. Additionally, the number of variables and relationships analyzed was limited, which could restrict the study's ability to uncover nuanced dynamics between ESG performance and financial outcomes. Alternative model specifications and expanded datasets might yield different insights. Another limitation stems from the exclusive use of ESG disclosure scores, which capture only a portion of a firm's ESG performance. This narrow focus may reduce the generalizability of the findings and complicates comparisons with studies employing alternative or broader measures of ESG performance. The decision to build upon the methodological framework of [Zhou, Liu, and Luo \(2022\)](#) also limited the inclusion of additional mediator variables that could further enrich the analysis.

Future research could address these constraints by integrating alternative mediators, expanding variable definitions, and exploring diverse datasets. These steps would enhance the study's robustness and contribute to a more comprehensive understanding of ESG performance in the context of REITs.

5 Conclusion

Extensive prior research has highlighted the positive influence of ESG performance on the financial performance of companies and investment funds (Abate, Basile, and Ferrari, 2021; Chen, Song, and Gao, 2023; Zhou, Liu, and Luo, 2022). While similar relationships have been observed for REITs (Brounen, Marcato, and Op't Veld, 2021; Ooi and Dung, 2019), the evidence within the real estate sector remains more ambiguous. Several studies suggest that ESG performance can negatively affect financial outcomes, particularly due to the costs associated with ESG-related adjustments (Coën, Lecomte, and Abdelmoula, 2018; Mariani et al., 2017).

This thesis empirically examined the relationship between ESG performance, measured through ESG disclosure scores, and financial performance, represented by MV and ROE, for a sample of European REITs from 2015 to 2024. Employing panel regression models, the analysis found no evidence supporting a positive link between ESG performance and MV. Conversely, negative relationships were identified between ESG performance and ROE, as well as between environmental disclosure scores and MV. These findings indicate that, for this sample, ESG performance may reduce financial performance.

The study's primary contribution lies in extending the framework of Zhou, Liu, and Luo (2022) to a REIT-specific context. The findings also underscore the critical role of variable selection in shaping outcomes, contributing to ongoing academic discussions about ESG performance across different sectors. From a practical perspective, this study provides valuable implications for investors and regulators. It highlights the potential financial trade-offs associated with environmental initiatives, emphasizing the need for strategic alignment between sustainability goals and economic performance. Methodologically, the research underscores the critical importance of diverse approaches to unravel the complex interplay between ESG performance and financial outcomes, providing a foundation for future studies in this field.

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Appendix

Table 1: Overview and definition of variables

Variable type	Name	Code	Definition
Explained variable	Market Value	MV	Market Capitalization divided by Total Assets
Explanatory Variables	ESG Performance	ESG_Score	ESG Disclosure Score
	ESG Performance – environmental	S_Score	ESG Disclosure Score – environment
	ESG Performance – social	E_Score	ESG Disclosure Score – social
	ESG Performance – governance	G_Score	ESG Disclosure Score – governance
	Total Asset Turnover	TAT	Net Operating Income / Total Assets
	Revenue Growth	Rev	Growth of yearly revenues (YoY)
	Return on equity	ROE	Return on company's equity
	Return on assets	ROA	Return on company's assets
Control variables	Size	Size	Log of total assets
	Leverage	LEV	Debt / Total Assets

Source:

Own presentation.

Table 2: Country overview of REITs in the sample

Country	<i>n</i>	%
ES	48	20.0%
GB	40	16.7%
BG	39	16.3%
TR	31	12.9%
FR	24	10.0%
BE	17	7.1%
GR	7	2.9%
GG	6	2.5%
Other	28	11.7%
Total	240	100.0%

Source: Own presentation.

Table 3: Descriptive statistics of variables

Variable	<i>n</i>	Mean	SD	Min	Max	Median
ESG_Score	2,400	46.19	11.77	14.78	69.92	47.94
E_Score	2,400	30.86	16.63	0.00	75.51	32.89
S_Score	2,400	27.79	12.12	2.57	54.20	27.99
G_Score	2,400	79.79	13.31	17.13	100.00	81.79
MV	2,400	15.03	336.94	0.00	8,914.98	0.53
ROE	2,400	5.64	71.77	-2,576.94	263.24	6.33
ROA	2,400	-10.06	343.14	-11,624.82	246.54	3.34
TAT	2,400	0.04	0.02	-0.13	0.21	0.04
Rev	2,400	97.90	885.19	-99.38	25,933.33	7.40
Size	2,400	19.67	2.35	5.92	25.77	19.85
LEV	2,400	37.50	20.12	0.00	100.00	38.70

Source:

Own presentation.

Table 4: Correlation matrix of variables

	ESG_Score	E_Score	S_Score	G_Score	MV	ROE	ROA	TAT	Rev	Size	LEV
ESG_Score	1	0.87***	0.87***	0.77***	-0.06	-0.13**	-0.12**	-0.2***	-0.07	0.6***	-0.15**
E_Score	0.87***	1	0.68***	0.45***	-0.18***	-0.17***	-0.19***	-0.19***	-0.06	0.59***	-0.08
S_Score	0.87***	0.68***	1	0.53***	-0.02	-0.09*	-0.08	-0.16**	-0.08	0.54***	-0.18***
G_Score	0.77***	0.45***	0.53***	1	0.07	-0.04	-0.01	-0.15**	-0.04	0.36***	-0.11*
MV	-0.06	-0.18***	-0.02	0.07	1	-0.02	-0.35***	0	-0.01	-0.25***	-0.14***
ROE	-0.13**	-0.17***	-0.09*	-0.04	-0.02	1	0.98***	0.23***	-0.01	0.04	-0.03
ROA	-0.12**	-0.19***	-0.08	-0.01	-0.35***	0.98***	1	0.18***	0.06*	0.24***	-0.16***
TAT	-0.2***	-0.19***	-0.16**	-0.15**	0	0.23***	0.18***	1	-0.17***	0.19***	0.05
Rev	-0.07	-0.06	-0.08	-0.04	-0.01	-0.01	0.06*	-0.17***	1	-0.07**	0.08*
Size	0.6***	0.59***	0.54***	0.36***	-0.25***	0.04	0.24***	0.19***	-0.07**	1	0.2***
LEV	-0.15**	-0.08	-0.18***	-0.11*	-0.14***	-0.03	-0.16***	0.05	0.08*	0.2***	1

Note:

* p < 0.05, ** p < 0.01, *** p < 0.001

Source:

Own presentation.

Table 5: Regression results for ESG-Score

	<i>Dependent variable:</i>		
	MV (1) <i>Random effects</i>	ROE (2) <i>Fixed effects</i>	MV (3) <i>Fixed effects</i>
ESG_Score	-0.002 (0.003)	-0.543*** (0.117)	-0.006 (0.004)
ROE		0.004* (0.002)	
TAT	2.319 (1.817)	-61.084 (90.084)	-1.412 (3.048)
Rev	0.001 (0.001)	0.046** (0.019)	0.0003 (0.001)
Size	0.0005 (0.032)	6.000** (2.445)	0.066 (0.083)
LEV	-0.008*** (0.002)	-0.336*** (0.091)	-0.006* (0.003)
Constant	0.866 (0.677)		
Observations	369	369	369
R ²	0.064	0.184	0.060
Adjusted R ²	0.051	0.043	-0.105
F Statistic	23.192***	14.118*** (df = 5; 314)	3.339*** (df = 6; 313)

Note:

* p < 0.1; ** p < 0.05; *** p < 0.01

Source:

Own presentation.

Table 6: Regression results for ESG-Score

	<i>Dependent variable:</i>		
	(1) <i>Random effects</i>	MV (2) <i>Random effects</i>	(3) <i>Random effects</i>
E_Score	-0.004** (0.002)		
S_Score		0.0001 (0.002)	
G_Score			0.003 (0.002)
TAT	2.218 (1.819)	2.368 (1.819)	2.490 (1.786)
Rev	0.001 (0.001)	0.001 (0.001)	0.001* (0.001)
Size	0.023 (0.031)	-0.014 (0.031)	-0.026 (0.029)
LEV	-0.008*** (0.002)	-0.008*** (0.002)	-0.008*** (0.002)
Constant	0.406 (0.687)	1.076 (0.675)	1.102* (0.620)
Observations	369	369	369
R ²	0.077	0.062	0.067
Adjusted R ²	0.065	0.049	0.054
F Statistic	28.871***	22.478***	24.586***

Note:

* p < 0.1; ** p < 0.05; *** p < 0.01

Source:

Own presentation.