



# UNIVERSITY OF GOTHENBURG

## SCHOOL OF BUSINESS, ECONOMICS AND LAW

Master Degree Project in Accounting and Financial Management  
Spring 2021

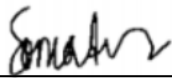
### **Is Investing in Sustainability Financially Rewarding?**

*A Quantitative Study of Public Real Estate Firms in the EU*

<b>Master Thesis</b>	Accounting and Financial Management
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## **Acknowledgements**

We would like to voice our gratefulness to all who have been involved in the process of conducting this paper. Firstly, we would like to express our gratitude and thank our supervisor Mari Paananen, Professor of Accounting at the School of Business, Economics, and Law, University of Gothenburg, for her valuable guidance and support in writing this thesis. Furthermore, we thank all the participants in our seminar group for the helpful comments and discussions which have helped us improve the quality of our work.



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## **Master Thesis in Accounting and Financial Management**

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**Date:** 2021-05-27

**Key words:** Real Estate, Sustainability, Financial rewards, benefits, costs, ROA, ROE, ESG

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### **Abstract**

**Background:** Since 2015, when the United Nations agreed on the 2030 Agenda for Sustainability Development, actions and requirements have been obligated for industries and companies all around the world. The sector with the largest carbon footprint is the building sector which accounts for 30 % of greenhouse gas emissions globally and it consumes 40 % of the world's energy. Therefore, it is pivotal that real estate firms contribute towards the Paris Agreement and develop sustainable climate strategies. Real estate firms investing in greener buildings have given rise to a new research field in recent years. Despite the many obvious benefits of green buildings for occupants and the wider society, some researchers suggest that there is a lack of evidence in terms of the financial benefits for real estate firms and that the additional costs of creating greener buildings often act as an obstacle for investors. Although, other researchers have found clear financial gain in terms of increased income, higher property prices and less operating costs.

**Purpose:** Our purpose is to investigate whether real estate firms in the EU that invest actively in sustainability are financially rewarded.

**Method:** We utilize a similar approach as studies by Eichholtz, Kok and Yonder (2012), Fuerst (2015) and Morri, Anconetani and Benfari (2020) where profitability will be measured through ROA and ROE as dependent variables. Our study spans from 2016 to 2019. Financial data and ESG Reuters Scores were collected from Thomson Reuters datastream. ESG GRI and ESG GRESB information were collected from each website. Interest rates were collected from ECB. We use a random effect regression model and control for country and cluster on companies.

**Conclusion:** This study has raised the importance of contributing to a more sustainable world and more specifically, the actions of the real estate sector. Previous studies find that the initial cost of entering into a more sustainable business strategy acts as an obstacle for firms to take that first step (Mariani et. al., 2018). However, the majority of previous studies do highlight the benefits that sustainable investments have on firm performance (Leskinen, Vimpari and Junnila, 2020). Therefore, we found our results surprising as our study only finds negative significant results for two of our chosen sustainability proxies, suggesting that the firms in our sample actively engaging in sustainability are not financially rewarded. Nonetheless, we conclude that investing in sustainability entail large initial costs, at least in the short-term. Although, as prior research has proven, it can bring long-term benefits in the form of higher rental income, selling prices, and not to mention contributing to the preservation on earth.

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## **1. Introduction**

*This section intends to bring light to the background of this thesis and provide a comprehensive insight to the reader of the concerned subject. Moreover, derived from the background, gaps from previous studies are highlighted in order to clearly illustrate our contribution and purpose of this study.*

### **1.1 Background**

Global warming is an alarming problem that poses a threat to life on earth as we know it. Higher temperatures have resulted in melting glaciers which have caused rising sea levels that have the potential to make some of the Earth's land inhabitable. Furthermore, this can also result in shifting weather patterns that threaten the planet's food production capabilities (Nunez, 2019). In September 2015, all member states of the United Nations agreed on the "2030 Agenda for Sustainable Development" which set out 17 Sustainable Development Goals and 169 targets aiming to end global poverty, combat inequalities and create a sustainable planet. The 13th goal concerns climate change and calls for urgent action to prevent global warming and its impact on the planet. To halt this development, the member states adopted the Paris Agreement and with a promise to limit global warming to well below 2°C (United Nations, 2015). Therefore, countries worldwide are now under pressure to find ways to minimize pollution. The sector with the largest carbon footprint is the building sector which accounts for 30% of greenhouse gas emissions globally. Moreover, this sector also consumes 40% of the world's energy (United Nations, 2016). Thus, it is pivotal that real estate firms contribute towards the Paris Agreement and develop sustainable climate strategies.

Green buildings are constructions that have little or no negative impact on the environment, preserve the earth's natural resources and have a positive impact on the quality of life. There are numerous ways that buildings can become considered green by the wider society, for example, through efficient use of energy and water. Other features that make buildings greener include providing healthy indoor air quality, reducing waste, considering the environment and quality of life in the design, construction and operation of the buildings as well as using materials that are ethical, sustainable and non-toxic (World Green Building Council, 2021). Despite the many obvious benefits of green buildings for its occupants and wider society, some researchers suggest that there is a lack of evidence in terms of the financial benefits for real

estate firms and that the additional costs of investing in greener buildings often act as an obstacle for investors (Falkenbach, Lindholm and Schleich, 2010; Mariani, Amoruso, Caragnano and Zito, 2018). Other researchers such as Ries, Bilec, Gokhan and Needy (2006) find that investing in green buildings results in several economic savings generated from smaller operating costs, savings in energy and maintenance costs as well as improvements in employee productivity and health resulting in lower costs in the long run for real estate firms. Furthermore, Reichardt, Fuerst, Rottke and Zietz (2012) and Fuerst and McAllister (2011) find that green certified buildings generate higher rental incomes and higher sell prices than buildings that are non-certified.

## **1.2 Purpose and Contribution**

Several studies find that buildings that are certified as green generate a higher return to their investors (Leskinen, Vimpari & Junnila, 2020). However, few studies have focused on whether real estate firms that invest in portfolios of sustainable buildings are more rewarded than real estate firms that do not. Furthermore, the studies that have been conducted on this topic have mostly centered around real estate firms in individual countries, using small samples, or looked at real estate investment trusts (REIT). Although both REIT's and real estate firms are both forms of investments in properties, investors of REIT's possess shares in a trust which owns a portfolio of various real estate properties while investors in real estate firms hold shares of ownership in the firm (REIT Institute, 2021). However, no study has, to our knowledge, looked at whether real estate firms based in countries that are members of the European Union (EU) and invest actively in sustainable property portfolios are more profitable in terms of its operational performance than firms that do not. This could be seen as surprising considering that the EU has set ambitious targets to fight climate change. In addition, the union also agreed on the European Green Deal in 2019 which is a set of policies aiming to create the world's first climate-neutral union by 2050. Moreover, an issue that European Green Deal specifically addresses is the need for renovation of energy inefficient properties and the need for future buildings to be constructed in ways that support a sustainable future (European Commission, 2019). Thus, the purpose of this study is to fill this research gap and investigate whether real estate firms in the EU that invest actively in sustainability are financially rewarded.

## **2. Prior Research and Hypothesis Development**

*This section presents previous literature concerning the real estate sector. First, a comprehensive review of the characteristics as well as commonly used determinants when evaluating the real estate market is presented. Secondly, different sustainability proxies used throughout previous studies in relation to financial performance are reviewed along with the hypothesis development.*

### **2.1 Characteristics of the Real Estate Market**

In contrast to many other markets, the real estate market is characterized by heterogeneity, high transaction costs, high carrying costs, illiquidity and limited efficiency (Timmermann and Elliott, 2013). Therefore, a debated topic among researchers has been which characteristics and starting points to consider when evaluating the market. Depending on factors such as longevity, geographical areas, type of investments, type of company, laws and regulations, different determinants will be more or less suitable (Morawski, Rehkugler and Füss, 2008). Researchers within this area have addressed the issue of examining the real estate market to find similar patterns and explanatory factors across geographical regions (DiPasquale & Wheaton, 1996). However, depending on the study orientation as well as country-specific concerns, different outcomes have been found.

When examining price developments for real estate properties, several authors show that interest rates, financial wealth and disposable income are the most significant determinants of prices, at least in Sweden and Norway (Claussen, 2013; Frisell and Yazdi, 2010; Jacobsen and Naug, 2015). In contrast, Algieri (2013) finds that changing preferences, structural changes in markets, the stock market and inflation are best explaining changes in real estate prices in Europe. Authors such as Ganoulis and Giuliadori (2011) also find that determinants for prices might change over time where income and mortgage debt best explained prices historically and interest rates and housing prices have grown to be more accurate.

As for authors who examine different forms of returns in the real estate market, outcomes have been surprisingly similar in some contexts, while varied in others. Researchers that examine returns of real estate offices continuously find that unemployment, gross domestic product (GDP) and total investments are most significant in explaining the variations in those returns.



The same results have been found both in Europe, Asia, Iran and the UK (De Wit and Van Dijk, 2003; Fereidouni and Bazrafshan, 2012; Kohlert, 2010). However, authors investigating real estate stock returns are highly affected by the location when examining determinants. For example, Pagliari, Webb & Canter (1997) show that Australian real estate stock returns are negatively affected by exchange rates while British firms are positively affected. Moreover, continental factors positively affect North American real estate stock returns while the opposite is shown for the Asia-Pacific region (Eichholtz, Huisman, Koedijk and Schuin, 1998).

Regarding real estate key financial performance determinants, authors across Asia, Europe and North America consistently find growth, profitability, leverage, age and size as important determinants (Liow, 2010; Doan, 2020; Morri and Cristanziani, 2009). However, in contrast, Deitiana and Habibuw (2015) show that liquidity, size, and ownership have no impact on financial performance, although they do agree upon that leverage and firm age are significant variables. Reasons for these disparities are explained by differences in tenure structures, markets, regulations and rental contracts (Meen, 2002; Eichholtz and Hartzell, 1996). Therefore, country-specific factors could be explained as the most dominant determinant (Hamelink and Hoesli, 2004).

As demonstrated by previous studies, different variables are used depending on the aims and conditions of the study. Thus, when evaluating the real estate market in a quantitative setting, the choice of variables is highly individual, and researchers must construct the model out of the intended purpose of the study. Our study will use control variables that similar studies with a performance orientation have found significant and combine those with studies evaluating this in regard to sustainability.

## **2.2 Sustainability and Financial Valuation in the Real Estate Sector**

Throughout history, many firms have been accused of environmental scandals which have given rise to companies being subject to discussions regarding their ecological footprint. As a result, incorporating sustainability aspects into corporations has become increasingly popular among firms (Lozano, Nummert & Ceulemans, 2016). International initiatives and directives have come to growth such as the UN Sustainable Development Goals (UN 2030 Agenda), the OECD Guidelines and the EU NFR Directive, also referred to as the Directive 2014/95/EU, where all aim to promote corporate social responsibility (CSR) (European Parliament, 2020).

In 2019, the European Commission incorporated the European Green Deal with the aim of making EU climate neutral by 2050. The initiative includes strategies and required actions by several sectors. Among these, the real estate sector, due to its large carbon footprint, is essentially affected (ibid). Even though affected before, the European Green Deal brings the climate concerns and highlights actions one step further and Responsible Property Investments (RPI) is therefore of most interest.

The real estate sector, in terms of energy use, carbon emissions and the standard of living requires improvement and increased efficiency (European Commission, 2019). Researchers have conducted studies on the potential association between being actively engaged in sustainability and financial rewards and the outcomes have been varied. Investing in green buildings and restructuring a business is often associated with large costs and a time-consuming process and several studies have found similar results. For example, Mariani, Amoruso, Caragnano and Zito (2018) find that certain certifications of green buildings have a negative impact on the return on equity (ROE), return on assets (ROA) as well as the alphas (excess returns) of firms, which can be explained by the costs of incurring the certifications. Similarly, Chang, Nelson and Witte (2012) find that green mutual funds often underperform and generate lower returns than non-green mutual funds and Coën, Lecomte and Abdelmoula (2020) find that non-green REITS in the US perform better than green REITs. In contrast, prior literature has also found evidence that the financial benefits can exceed the costs in the long run. Several researchers find that green buildings in comparison to non-green buildings generate higher property prices as well as higher rental income (Mangialardo et al., 2018; Grafström and Käck, 2020; Vimpari and Junnila, 2013). Grafström and Käck (2020) find that certified buildings are generally sold at 14-26% higher prices than non-certified buildings and Vimpari and Junnila (2013) show that certified buildings are at average valued 9% higher than non-certified properties. Consistently, authors find that green buildings could generate higher yields, higher income, less vacancy levels and lower operating costs (Reichardt, Fuerst, Rottke and Zietz, 2012; Leskinen, Vimpari and Junnila, 2020), affecting operating performance positively, although it can be costly in the short run.

Despite these outcomes, difficulties and limitations have risen due to the lack of a unified definition of sustainability. Authors have used various proxies of sustainability when performing their studies. Since different measures have been used, outcomes have varied and

possibly resulted in skewed and dispersed results. Authors have measured sustainability by analyzing CSR reports, using certifications, using Environmental, Social, and Governance (ESG) scores as well as using organizational memberships among others.

Using CSR reports as a proxy for sustainability engagement has resulted in conflicting outcomes. A widely debated topic has been whether CSR reports show a fair picture of a company's real activities for contributing to a more sustainable world. Authors find that there is a large risk of the occurrence of greenwashing in CSR reports creating unreliable results (Ionascu, Mironiuc, Anghel and Huian, 2020; Rashidfarokhi, Toivonen and Kauko, 2018; Stibbe and Voigtländer, 2014). Moreover, studies have consistently shown that sustainability reporting in the real estate industry lags behind and does not have a consistent approach resulting in difficulties in finding effects of producing such reports (Glass, 2012; Zahid, Ghazali and Rahman, 2016; Myers, 2005). Other authors argue that even though CSR reports might be subject to greenwashing, results show financial benefits to companies producing them and researchers have found positive relationship between implementation of CSR reporting and its financial performance (Kerscher and Schäfer, 2015; Ansari, Cajias and Bienert, 2015; Cajias and Beinert, 2011) with conditions of clear, transparent and relevant information (Ansari, Cajias and Bienert, 2015; Cajias and Bienert, 2011). However, this relationship is diluted for firms that over-report (Kerscher and Schäfer, 2015). Companies that follow the guidelines by the Global Reporting Initiative (GRI) standards often present more credible, consistent and transparent reports. Thus, following GRI standards has become associated with receiving a quality stamp (GRI, 2021). By adhering to green agendas driven by GRI standards, operational performance in terms of increased revenue have been proven (Cajias, Geiger and Bienert, 2012). Due to the inconclusive outcomes of previous studies, we suggest that companies that perform CSR reports with adherence to GRI standards can find reflections in its operational performance reflected in ROA and ROE in both directions. Thus, our first hypothesis is:

**H1:** *There is an association between real estate firms that produce CSR reports under GRI standards and profitability.*

Leadership in Energy and Environmental Design (LEED) and Building Research Establishment Environmental Assessment Method (BREEAM) are the most commonly used certifications to award green buildings (Danivska, Heywood, Christersson, Zhang & Nenonen, 2019). Certified buildings come with large costs. However, market incentives for developers to invest in greener buildings are rent premiums and price premiums, although the financial gain have appeared to depend on the used certification proxy. For example, Grafstöm and Käck (2020) find that LEED and BREEAM certificates appear to generate a higher price premium than the GreenBuilding certificate. Reichardt, Fuerst, Rottke and Zietz (2012) find that only LEED and Energy Star certifications generate higher rental income. The effect certifications generate also depends on market segments and time horizons (Eichholtz, Kok, Quigley, 2010; Robinson and McAllister, 2015). Some studies show no association between certified buildings and financial benefits indicating that people are not willing to pay a premium for green buildings (Dixon, Bright, Mallaburn, Gabe and Rehm, 2014). Moreover, Eichholtz, Kok and Yonder (2012) investigate US REIT portfolios and its portion of LEED and Energy Star certifications. They use ROA, ROE and a ratio between funds from operations (FFO) over total revenue to measure operational performance and find that REITs with certifications perform better than those without. They also find that the impact green portfolios have on abnormal stock returns is non-existent, proposing that the benefits from green funds are already reflected in the stock prices.

Certifications only indicate whether certain buildings that a firm owns are considered to be green, but they do not always provide a full view of how actively whole real estate firms are working with sustainability. Thus, several actors such as Bloomberg, Thomson Reuters, European Public Real Estate Association (EPRA), Global Real Estate Sustainability Benchmark (GRESB) and Morgan Stanley, have created their own scorecards to assess the sustainability of different companies. As a result, depending on which ESG score provider one is using, different outcomes will occur. Brounen and Marcato (2018) find that higher GRESB scores are associated with lower REIT returns, while the scores by Thomson Reuters and Morgan Stanley generate a REIT return premium. Furthermore, Cajias, Fuerst, McAllister and Nanda (2014) find that negative Morgan Stanley scores appear to generate higher total returns in the short run. In contrast to the GRESB result by Brounen and Marcato (2018), the study by Caijas et al., (2014) shows no financial impact on positive Morgan Stanley scores. Another

study by Morri, Anconetani and Benfari (2020) investigates the ROA and ROE in relation to three different GRESB metrics (the overall GRESB score, management & policy and implementation & measurement components and lastly the seven aspect scores) of 50 European REITs and finds different impacts depending on the GRESB variable. Alareeni and Hamdan (2020) also investigates ROA and ROE but collects ESG scores from Bloomberg. The overall ESG score affects operating performance positively. However, if dividing the score into its subcategories; environmental, social and governance, different results were found for the ROA and ROE measures. That is, the outcomes from prior research impact firm performance in both directions. It is important to realize when conducting a study using ESG scores that all scores are weighted differently and generate different outcomes. While GRESB scores focus more on the environmental aspect, Morgan Stanley puts more focus on governance. Thomson Reuters scores appear to have equally weighted importance among the three pillars (Bruonen, Marcato and Op't Veld 2021). As prior research has utilized all different scores, no score appears to be superior. Seeing that the Thomson Reuters score is based on equally weighted importance for the three pillars (Bruonen, Marcato and Op't Veld 2021), this study will use the Thomson Reuter score and our second hypothesis is:

**H2:** *There is an association between real estate firms ESG scores and profitability.*

*Global Real Estate Sustainability Benchmark (GRESB)* membership as a proxy for measuring sustainability in prior literature is limited and therefore difficult to find. GRESB memberships have been more popular in recent years and companies that members the organization considers it to be a proof of quality and legitimacy. Therefore, it is of interest to implement the proxy in this study along with the other proxies to investigate its potential operational financial impact. One article that has used membership as a proxy is a study by Sah, Miller and Ghosh (2013). They investigate whether REITS that consider themselves as green funds in the sense of being members of the Energy Star program are given financial benefits. The study finds that by being actively engaged in sustainability reflected in Energy Star would positively affect firm value, ROA and stock performance. However, since evidence shows that green agendas often incur high costs and the GRESB organization charges high membership fees (GRESB, 2021b), the association to a firm's profitability might go in either direction. Hence, our third hypothesis is:

**H3:** *There is an association between real estate firms that are members of GRESB and profitability.*

We also include a hypothesis that reflect firms that are actively engaged in any of the discussed ESG measures. Thus, our fourth hypothesis is:

**H4:** *There is an association between real estate firms that are active within any of the ESG measures and profitability.*

### **3. Method**

*This section presents the method and process of conducting this study. First, a thorough review of our sample selection and data collection is introduced. Second, we explain and present our chosen regression model and the associated variables with definitions. This section will also briefly explain our outcome from the Hausman test. Lastly an enlightenment is given regarding our limitations of this study.*

#### **3.1 Sample Selection and Data Collection**

Our study spans from 2016, i.e., when the Paris Agreement was signed, to 2019 and the data was collected on a yearly basis as ESG data is reported yearly. Initially, we included 2020 as our end year but removed it as it appeared to affect the results due to the Covid-19 pandemic. The year of 2020 affected many businesses financially including the real estate sector. Tenants might have experienced difficulties of paying rents, constructions might have been paused and increased costs with decreased revenues might have appeared. Although the real estate sector has received some help to uphold the industry by government guarantees (Boverket.se, 2021; GOV.UK, 2021), many companies around Europe have potentially seen some consequences on their financials. Hence, even though the effect of removing the year from the sample only showed marginal impact we chose to exclude it to be certain that no Covid-19 effect would impact our outcome of this study.

The real estate firms were identified using Thomson Reuters Datastream, where a sample of 301 publicly traded firms with 1505 observations, that are domiciled within the EU were retrieved. After manually screening for misclassified companies and firms with inadequate information we yielded 255 companies with 1275 observations. We also removed observations with no adequate data for ROA, ROE and control variables which resulted in 240 firms with 1049 observations. Lastly, after removal of the year of 2020 we ended up with our final sample of 240 companies and 929 observations. A sample breakdown is provided in Panel A and B of Table 1.

Our final sample consists of countries that are members of the EU as they are subject to the same goals and regulations (see table 1 panel B). The reason why only firms within the EU are used in this study is due to the goal set by the European Commission to be the world's first

climate-neutral union by 2050. Although countries outside the EU have committed to the Paris Agreement and thus need to work towards the collective promise to limit global warming to well below 2°C, they are not subject to the same requirements of renovating energy inefficient properties and planning for future buildings to be constructed in ways that support a sustainable future to the same extent as countries in the EU. We chose to include the United Kingdom in our sample despite the fact that the nation left the EU 31<sup>st</sup> of January 2020. Although, since we excluded the year of 2020 in our sample, the United Kingdom belonged to the EU throughout our sample period. As illustrated in table 1 panel B, the majority of the companies have headquarters in Germany, Poland, Sweden and the United Kingdom. The reason for this is that these countries have a larger proportion of publicly listed real estate firms. Financial data were collected from Thomson Reuters. GRI reporting data and GRESB data were collected from each website manually. Furthermore, interest rates data for each country was collected from the European Central Bank’s Statistical Data Warehouse (ECB). We use the harmonized long-term interest rates set for convergence assessment purposes by the ECB as these capture the differences that still exist among the EU countries today and are thus likely to be closer to the rates at which the real estate firms in each respective country can borrow funds from their local banks.

*Table 1: Sample Selection and Breakdowns*

<b>PANEL A: Sample Selection</b>		
	<b>Firm-Year Observatio</b>	<b>Unique Firms</b>
Sample frame: Publicly listed real estate firms that are headquartered in the EU between 2016 and 2020	1505	301
After removal of misclassified firms and firms with no data available at Thomson Reuters Datastream	1275	255
After removal of observations that are missing ROE and ROA data	1123	254
After removal of observations that are missing control variables data	1049	240
After removal of 2020 data	<b>929</b>	<b>240</b>



**PANEL B: Sample Breakdown**

<b>Country</b>	<b>Obs</b>	<b>%</b>	<b>Year</b>	<b>Obs</b>	<b>%</b>
Austria	24	2.6	2016	226	24.3
Belgium	44	4.7	2017	228	24.5
Bulgaria	11	1.2	2018	239	25.7
Cyprus	18	1.9	2019	236	25.4
Denmark	37	4.0	<i>Total</i>	<i>929</i>	<i>100</i>
Estonia	8	0.9			
Finland	12	1.3			
France	68	7.3			
Germany	129	13.9			
Greece	20	2.2			
Hungary	16	1.7			
Italy	31	3.3			
Latvia	8	0.9			
Lithuania	8	0.9			
Luxembourg	53	5.7			
Malta	16	1.7			
Netherlands	4	0.4			
Poland	103	11.1			
Romania	16	1.7			
Spain	30	3.2			
Sweden	163	17.5			
United Kingdom	110	11.8			
<i>Total</i>	<i>929</i>	<i>100</i>			

### 3.2 Regression Models

We utilize a similar approach as studies by Eichholtz, Kok and Yonder (2012), Fuerst (2015) and Morri, Anconetani and Benfari (2020) where profitability will be measured through ROA and ROE as dependent variables. In contrast to some earlier studies, we do not look at stock price performance as we argue that the market performance of any firm is strongly tied to its operational performance. Like Eichholtz et al., (2012), we argue that benefits from sustainability activities are already reflected in stock prices. In the models we control for country and cluster on companies<sup>1</sup>. We also use four different proxies to measure active work with sustainability: GRI reporting, Thomson Reuters ESG score, GRESB membership and any of the mentioned ESG proxies. All of which are binary dummy variables that take the value of 1 if the company is actively engaging in sustainability and 0 if not. The aim is to investigate whether our chosen ESG proxies affect the profitability for our firm sample estimated by certain control variables. Hence, our equation composes:

$$\begin{aligned} \textit{Profitability}_{it} &= \alpha + \beta_1 \textit{ESGProxies}_{it} + \beta_2 \textit{PB}_{it} + \beta_3 \textit{DC}_{it} + \beta_4 \textit{lnTA}_{it} + \beta_5 \textit{OpInc/TR}_{it} \\ &+ \beta_6 \textit{InterestRate}_{it} + \varepsilon_{it} \end{aligned} \tag{1}$$

where  $i$  represent the individual real estate firms,  $t$  represent year and  $\varepsilon$  is the error term.

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<sup>1</sup> Our original dataset showed some extreme outliers and to reduce the impact that these could have on the statistical data, we used winsorization which modifies the tails of the data by replacing the outlier values with better fitted values. The variables are winsorized at the 99th and the 1st percentiles.

### 3.3 Variables

*Table 2: Definitions of Variables*

Variable	Definition
Return on Assets (ROA)	ROA is defined as Net income divided by total assets for each firm $i$ in year $t$ , representing firm profitability. All numbers are retrieved from the year-end financial statements.
Return on Equity (ROE)	ROE is defined as Net income divided by total shareholder's equity for each firm $i$ in year $t$ , representing firm profitability. All numbers are retrieved from the year-end financial statements.
ESG Proxies	<ol style="list-style-type: none"> <li>1. <u>GRI Reporting Standards</u>: A dummy variable that symbolizes "1" if firms <math>i</math> perform sustainability report under GRI standards in year <math>t</math>. Otherwise, given a "0".</li> <li>2. <u>Thomson Reuters ESG Score</u>: A dummy variable that symbolizes "1" if firm <math>i</math> in year <math>t</math> have an ESG score <math>&gt; 50</math>, otherwise given a "0".</li> <li>3. <u>GRESB membership</u>: A dummy variable that symbolizes "1" if firm <math>i</math> is a member of GRESB at year <math>t</math>, otherwise given a "0".</li> <li>4. <u>ESG Any</u>: A dummy variable that symbolizes "1" if firm <math>i</math> have a "1" of any of the mentioned proxies: GRI reporting standards, Thomson Reuters ESG score, or GRESB membership. Otherwise given a "0".</li> </ol> <p>Note: All ESG proxies above are proxies for firm's engagement in sustainability.</p>
Price-to-Book (PB)	PB is defined as stock price per share divided by book value per share.
Debt-to-Capital (DC)	DC is defined as total debt divided by total capital.
Natural logarithm of total assets (LnTA)	LnTA is natural logarithm of total assets
Operating Income/ Total Revenue (OpInc/TR)	OpInc/TR is defined as operating expenses divided by total revenue
Interest Rate	Interest rate represents each country's 10y government bond rate. We use the harmonized long-term interest rates set for convergence assessment purposes by the ECB.

Note: If not stated otherwise, ESG proxies are collected on the website for each measure; GRI, Thomson Reuter and GRESB. Interest rates are collected from the European Central Bank (ECB), and the remainder are collected from Thomson Reuters database.

*Return on assets (ROA) and Return on Equity (ROE)* are our dependent variables and symbolizes a company's profitability in terms of its operational performance. Since both key figures measure how well and efficiently a company utilizes its assets and equity to generate earnings, we suggest it to be suitable measures to use in this study. Previous research has found both individual green buildings and firms having greener portfolios, to affect *ROA* and *ROE* both positively and negatively (Eichholtz, Kok and Yonder, 2012; Morri, Anconetani and Benfari, 2020; Alareeni and Hamdan, 2020; Mariani, Amoruso, Caragnano and Zito, 2018). Hence, these figures are utilized to investigate how and whether green real estate investments are operationally rewarded.

Our test variables consist of three ESG proxies; GRI standards, Thomson Reuters score and GRESB membership. The *Global Reporting Initiative (GRI)* is an organization that helps and promotes guidelines for companies to actively engage in corporate social responsibility reporting. GRI performs standards of sustainability reporting with the aim of receiving accountable, credible, transparent and consistent reports. Thus, companies that perform CSR reports often follow these standards to give quality to their reports. Data concerning GRI reporting standards are collected from GRI's database. *Thomson Reuters* is a database providing financial and non-financial information from companies all around the world. In contrast to other ESG scores, *Thomson Reuters* puts equal importance on the three pillars; environmental, social, and governance (Brounen, Marcato and Op't Veld, 2021) and therefore these scores are chosen in this study. ESG scores for each firm are downloaded from *Thomson Reuters* and the scores are reported yearly and range between 0 and 100. *Global Real Estate Sustainability Benchmark (GRESB)* is a benchmarking tool for sustainability work within the real estate industry. By making investors and people within the industry aware of the challenges and how those challenges can be met, it could contribute to a more sustainable future (GRESB, 2020). Thus, by providing ESG performance to the capital markets, companies hopefully will be more attentive to actively work with these challenges. Data concerning membership in *GRESB* are collected from *GRESB*'s database. We create an additional ESG variable that we call *ESG Any*. By creating this variable, we hope to capture a comprehensive picture of whether active sustainability investments by real estate firms are associated with profitability.

Firms with better cash flow and more growth tend to have excess cash to spend and add on greener investments. Notwithstanding, previous studies have found growth and investments to be significant determinants in explaining financial rewards of green real estate investments (Eichholtz, Kok and Yonder, 2012; Mariani et. al., 2018). Hence, *Price-to-book ratio (PB)* have been included as a control variable. The *debt-to-capital (DC) ratio* measures how leveraged a company is and Morri, Anconetani and Benfari (2020) found a significant association between debt to capital and GRESB. As the capital structure of real estate firms has been successfully identified as a significant variable in earlier studies, it seems appropriate to include it in this study as a control variable.

Researchers such as Morri et al. (2020) that have conducted studies on REITs find *total assets* to be a significant control variable as it captures the size differences of the individual firms. As our sample includes firms of various sizes, we transform *total assets into natural logarithms* to obtain a more normalized dataset as a control variable. Moreover, previous studies find that investing in sustainability can be beneficial for European REITs in terms of decreased operating expenses (Morri et al., 2020), as well as increased revenue (Mangialardo et al., 2018; Grafström and Käck, 2020; Vimpari and Junnila, 2013; Reichardt, Fuerst, Rottke and Zietz, 2012). In order to avoid multicollinearity issues by including both operating expenses and operating revenue, we scale *total operating income to operating revenue* in order to control for the effect green investments have on operating performance. Furthermore, since prior research indicates that *interest rates* have an effect on multiple aspects of the real estate sector (Claussen, 2013; Frisell and Yazdi, 2010; Jacobsen and Naug, 2015), we have chosen to include it as a control variable.

### **3.4 Fixed Effect and Random Effect Models**

As we have a panel data set, we will conduct the regressions likewise. Panel data methods are a mixture of time series and cross-sectional data. In regard to this paper, we will analyze observations from several different real estate companies over a set period of time. Panel data deals with individual effects and heterogeneity. These effects can either be in the form of fixed effect or random effect. If no effects can be traced, a pooled OLS regression should be used (Baltagi, 2008).

Fixed effects are suitable for analyzing variables over time and address the relationship of the dependent variable and the independent variables within an entity. Entities, i.e. the companies in our case, each have different individual characteristics meaning that these might impact and create bias of the variables. By using a fixed effect regression model, these effects of the time-invariant characteristics creating biases are removed and controlled for. In contrast to the fixed effect model, the variation between entities is assumed to be uncorrelated with the dependent and independent variables in the random effect model (Torres-Reyna, 2007). The Hausman test is a commonly used method for deciding which of the models that are more suitable to use. We conduct an Hausman test with the hypothesis that a correlation between the independent variables and the error terms does not exist. Hence, the null hypothesis states that there is no such correlation. We reject the null hypothesis if the p-value is less than 0.05. The results from the Hausman test shows that the random effect model is more preferable for our sample. Hence, a random effect model has been applied. We also control for country and cluster on company as it yielded a better fitted model.

### **3.5 Limitations**

All research contains limitations, and our paper is not an exception. One limitation of our study concerns the individual country differences that may exist in the sample. Although all countries of this research are members of the EU for the study period, we do acknowledge that there are differences in many economic rules at a country level which may impact companies' investment choices.

An additional constraint of the study concerns the time period of the study, we only look at four years of data and hence do not consider any longer-term financial effects of investing in sustainability. This is a limitation due to that the return on investment for real estate firms can be a long process. For example, when investing in renovating older buildings or building completely new properties, the returns in form of increased rental income or higher sales prices may come long after the investments while it is likely to be costly in the short-term.

Real estate firms could be of different types such as residential, industrial or commercial. Some studies choose to only examine one of the types due to the fact that they might have different structures and strategies. However, we have chosen to include all types of firms to grasp an overall picture of the whole real estate market. To be actively working with sustainability is

according to the Green Deal applicable for all real estate firms (European Commission, 2019). Nonetheless, it is possible that the association between profitability and ESG investing differs among different types of real estate firms. Despite this, we chose to include all firms that belong to the real estate sector and had complete financial information. This choice was based on the fact that many of the real estate firms have a mixture of residential, industrial and commercial properties and because our study does not aim to study the differences between the firm's property types, but rather to look at the effects of investing in ESG regardless of property portfolio structure.

Moreover, we have chosen to include three different proxies to measure active investing in sustainability: Thomson Reuters ESG score, GRESB membership and reporting in accordance with GRI standards. However, as discussed in our literature review, a unified definition of sustainability is still lacking creating many different proxies and ways to measure sustainability. Thus, companies can still actively work with sustainability without showing results for our chosen proxies. For example, some real estate may work actively with sustainability without being members of GRESB or produce comprehensive CSR reports without adhering to the GRI standards for sustainability reporting. Still, we believe that using a variety of sustainability proxies that are measured in different ways by three unconnected organizations will provide a broad overview of the sustainability work of most firms included in the sample. Lastly, an additional limitation is that there might be other control variables that drives the ROA and ROE that have not been included in other study.

## 4. Results and Analysis

*This section presents, explains and analyzes the findings of this study. It begins with describing the descriptive statistics of the sample. Second, the hypotheses are reviewed individually with associated analysis of the outcomes.*

### 4.1 Descriptive Statistics

Table 3 shows the descriptive statistics for all variables with 929 observations. When looking at the dependent variables, i.e., *ROE* and *ROA*, we observe quite high standard deviations of 19.452 and 7.074, respectively. This is largely due to the size differences between the firms in the sample.

The *P/B* variable varies from a minimum value of 0.080 to a maximum value of 10.770. However, the mean and median of the *P/B* are 1.436 and 1.020, respectively. This indicates that firms have a *P/B* ratio of around 1, with a few exceptions. This is further strengthened when looking at the standard deviation of 1.602 which indicates that the *P/B* values deviate little from the mean. The *D/C* ratio, which represents how leveraged the firms in the sample are relative to their total capital, has a mean and median of 51.221 and 54.432, respectively. This indicates that many firms in the sample finance their business with roughly half debt and half equity. However, the minimum value of *D/C* is 2.459 whereas the maximum value is 92.210, showing that there is a variety of financing structures among the firms. Furthermore, the high standard deviation of 19.910 indicates that the data is highly dispersed in relation to the mean. The natural logarithm of total assets has a minimum value of 7.900 and a maximum value of 16.636, showing the different sizes of firms included in the sample. These have an overall mean and median of around 12. However, the standard deviation is 1.968 which indicates that total assets are slightly dispersed in relation to the mean. The variable *Operating Income/ Total Revenue* is the variable that clearly stands out most in the sample with a minimum value of -1,767.081, a maximum value of 589.159, and a standard deviation of 263.634. This indicates that there is a large variety of values for this variable, which is likely due to the size differences among the firms as well as the firm's main orientation. The last control variable, interest rate, which is the harmonized long-term interest rates set for convergence assessment purposes by the ECB, shows a quite varied result with a minimum value of -0.253 and a maximum value of 8.360. The established countries in the EU have in



the last years had uncommonly low interest rates with some even crossing below zero. However, other more volatile EU countries such as Greece and Romania have had higher interest rates which is why the sample has high maximum value. The mean and median of the sample are quite low at 1.123 and 0.652, respectively, which means that the majority of the sample consists of countries with low interest rates. By interpreting the difference between the mean and the median we can also note a slightly skewed distribution. The standard deviation of 1.254 indicates a slight dispersion in relation to the mean. Moreover, when looking at the ESG proxies, we can observe that all variables have rather low means and as these are dummy variables that take either the value of 0 or 1, we can conclude that the vast majority of the firms in the sample do not actively invest in sustainability work. Furthermore, the lowest mean of the ESG proxies is the ESG GRESB variable at 0.026, indicating that few firms are members of the GRESB organization.

### Summary Statistics

**Table 3: Overall Descriptive Statistics**

<b>PANEL A: Descriptive Statistics</b>						
Variable	N	Mean	Median	Min	Max	Std. Dev.
ROE	929	7.182	8.815	-108.837	64.943	19.452
ROA	929	3.500	3.761	-29.255	22.669	7.074
ESG Reuters	929	0.071	0.000	0.000	1.000	0.257
ESG GRESB	929	0.026	0.000	0.000	1.000	0.159
ESG GRI	929	0.101	0.000	0.000	1.000	0.302
ESG Any	929	0.123	0.000	0.000	1.000	0.328
P/B	929	1.436	1.020	0.080	10.770	1.602
D/C	929	51.221	54.432	2.459	92.210	19.910
ln Total Assets	929	12.305	12.115	7.900	16.636	1.968
Op Inc/Tot Rev	929	28.322	44.843	-1767.081	589.159	263.634
Interest Rate	929	1.123	0.652	-0.253	8.360	1.254

Panel B of table 3 describes the correlation between the variables and most of the variables have significant correlation. Only P/B in relation to ROA, ROE, ESG Reuters and ESG any, as well as D/C in relation to ROE, Operating Income/Total Revenue, ESG Reuters and ESG GRESB do not show significant correlations. We found it surprising that P/B was not significant with ROA and ROE as it represents the growth which in turn should affect company resources. Moreover, ROE and ROA show a positive correlation of approximately 84% indicating a strong relationship. However, this is not surprising considering that both measures are built on the same source, i.e the net income of the individual firms in the sample. ROE and

ROA show similar values for most correlations. However, ROE shows a slightly stronger positive correlation with ESG GRI and ESG Any. This could possibly be due to the quality stamp adhering to the GRI standards yield and thus affecting the resourced equity more than it does to the actual asset. As with ROE, ROA also shows a negative correlation with interest rate. Interest rates show negative correlation with all variables with strong significance levels. This seems reasonable as the interest rate decreases, companies can take advantage of taking on more debts and/or investing in more assets affecting the financial figures.

Most variables show quite small correlations either positively or negatively. The strongest correlation among the variables is seen among the ESG proxies. However, this is not surprising since firms can actively work with sustainability in accordance with more than one of the proxies. Hence multicollinearity exists among the ESG variables. However, this is not a problem as we run the variables in separate regressions when we test for the hypothesis.

## Summary Statistics

**Table 4: Correlation Matrix****PANEL B: Pairwise Correlations**

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) ROE	1.000										
(2) ROA	0.843*** (0.000)	1.000									
(3) ESG Reuters	0.073** (0.027)	0.083** (0.011)	1.000								
(4) ESG GRESB	0.061* (0.065)	0.060* (0.066)	0.483*** (0.000)	1.000							
(5) ESG GRI	0.117*** (0.000)	0.102*** (0.002)	0.560*** (0.000)	0.373*** (0.000)	1.000						
(6) ESG Any	0.118*** (0.000)	0.107*** (0.001)	0.739*** (0.000)	0.435*** (0.000)	0.897*** (0.000)	1.000					
(7) P/B	0.009 (0.793)	-0.020 (0.545)	0.026 (0.430)	0.072** (0.027)	-0.057* (0.083)	-0.011 (0.745)	1.000				
(8) D/C	0.005 (0.873)	-0.114*** (0.000)	0.037 (0.254)	0.044 (0.185)	0.131*** (0.000)	0.123*** (0.000)	0.132*** (0.000)	1.000			
(9) ln Total Assets	0.259*** (0.000)	0.227*** (0.000)	0.432*** (0.000)	0.264*** (0.000)	0.476*** (0.000)	0.531*** (0.000)	-0.099*** (0.003)	0.311*** (0.000)	1.000		
(10) Op Inc / Tot Rev	0.486*** (0.000)	0.489*** (0.000)	0.103*** (0.002)	0.053* (0.108)	0.100*** (0.002)	0.115*** (0.000)	-0.104*** (0.001)	0.002 (0.954)	0.308*** (0.000)	1.000	
(11) Interest Rate	-0.158*** (0.000)	-0.147*** (0.000)	-0.136*** (0.000)	-0.083** (0.011)	-0.176*** (0.000)	-0.186*** (0.000)	-0.114*** (0.001)	-0.188*** (0.000)	-0.233*** (0.000)	-0.183*** (0.000)	1.000

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 4 illustrates the mean and medians of green versus non-green firms to allow for comparison between the firms. Noteworthy is that the difference between the mean ROA of non-green firms and green firms is statistically significant. This indicates that green firms perform better in terms of ROA than non-green firms. Another interesting finding is that the difference in both means and medians of the P/B variable of non-green firms and green firms is statistically significant. Furthermore, the difference in medians of D/C between non-green firms and green firms is also statistically significant. This indicates that P/B and D/C could be large drivers in our model.

Other interesting findings, although not statistically significant, is that the Operating Income / Total Revenue ratio is showing a large gap with a mean value of 17.026 for non-green firms and 109.073 for green firms. This the large difference in operating income/total revenue strengthens the results seen in earlier studies that show that green buildings generate higher income and less operating expenses than non-green buildings. Another noteworthy, but not statically significant, observation can be seen in the interest rates where green firms seem to have lower interest rates than non-green firms. The reason for this might be that firms investing in green buildings operate in established countries with a history of having lower interest rates and firms that do not invest in green agendas might operate in more riskier countries with higher interest rates.

*Table 5: Non-Green Firms vs. Green Firms*

Variable	Non-Green Mean	Green Mean	Difference Mean	Non-Green Median	Green Median	Difference Median
ROE	6.328	13.293	-6.965	8.021	13.789	-5.768
ROA	3.218	5.518	<b>-2.301</b>	3.429	5.652	-2.223
ESG Reuters	0.000	0.579	-0.579	0.000	1.000	-1.000
ESG GRESB	0.000	0.211	-0.211	0.000	0.000	0.000
ESG GRI	0.000	0.825	-0.825	0.000	1.000	-1.000
ESG Any	0.000	1.000	-1.000	0.000	1.000	-1.000
P/B	1.443	1.390	<b>0.053</b>	1.000	1.140	<b>-0.140</b>
D/C	50.302	57.789	-7.487	53.582	57.039	<b>-3.457</b>
ln Total Assets	11.914	15.098	-3.184	11.853	15.256	-3.403
OpInc/ TotRev	17.026	109.073	-92.047	39.471	70.484	-31.013
Interest Rate	1.211	0.498	0.713	0.663	0.540	0.123

## 4.2 Hypothesis Testing

### 4.2.1 GRI Sustainability Reporting Standards and Profitability

To test the first hypothesis, we regressed ROA and ROE on the ESG GRI variables and the control variables. The regression results are shown in models (1) and (5) of table 5. We find no significant association between adherence to GRI standards and our profitability measures ROE and ROA. Therefore, we reject our hypothesis that there is an association between the reporting in accordance with GRI standards and profitability.

One possible explanation for why no association between GRI standards and profitability were shown could be due to the normality in producing such reports. As previous studies suggest (Ionascu, Mironiuc, Anghel and Huian, 2020; Rashidfarokhi, Toivonen and Kauko, 2018; Stibbe and Voigtländer, 2014), companies often produce these reports for legitimacy reasons and the reports might be subject for greenwashing. Moreover, public companies are obligated to conduct sustainability reports. Hence, it is unconsciously expected by customers and investors that these types of companies have sustainability reports available and it is not considered differentiated or unique. As such, stated by previous research, it is difficult to evaluate whether the statements in these reports are legit and true and therefore might be the reason for why the profitability is not affected.

When looking at the control variables, we find no significant association between D/C and ROE. However, there is a negative and significant association between ROA and D/C at a 1% level. This indicates that capital structures with high debt levels have a negative effect on firm performance measured as ROA. This is not surprising considering that by taking on additional debt, firms also increase their assets and if the additional assets are not accompanied by an increase in the same amount of net income or more, it will result in a decrease in ROA. Similarly, an increase in debt in a firm's capital structure will result in a decrease in equity which in turn leads to an increase in the firm's ROE. This is most likely the reason why ROA has a strong association with D/C while ROE does not.

We find a significant positive association between the size of firms and ROE at a 5% level. Similarly, there is also a significant positive association between the size of firms and ROA at the 1% level. As we measure size by taking the natural logarithm of total assets it is not

surprising that the variable is strongly linked with ROA since the denominator of the ratio is total assets. Furthermore, as the total assets of any firm is financed by a combination of equity and/or debt, it was expected that ROE would be associated with size. We also find a strong positive association between the ratio of Operating Income / Total Revenue and both of the profitability measures at the 1% level. This is likely due to that net income, which is the numerator in both of the profitability ratios, is derived from the total revenue and subsequently the operating income on the income statement. To our surprise, the interest rates of the individual countries showed no significant association with the profitability measures. Noteworthy is that although the models showed some significant variables, the r-squared were only at 31.2% when using ROE as a dependent variable and at 33% when using ROA as a dependent variable. This means that a roughly 70% of the variance in the dependent variables can be explained by other variables outside the models.

#### **4.2.2 Thomson Reuters ESG Scores and Profitability**

To test our second hypothesis, we regressed the control variables and the ESG Reuters variable on the dependent variables ROE and ROA, separately. The results are shown in models (2) and (6) of table 5. The results show that there is a significant negative association between the profitability measures and the ESG Reuters variable. Specifically, the ESG Reuters variable is significant at a 5% level when tested with ROE while it is significant at a 10% level when tested with ROA. Hence, we do not reject our hypothesis that there is an association between the Thomson Reuters ESG score and profitability.

Our results contradict many previous studies that have found a positive association between ESG scores and profitability (Brounen and Marcato, 2018; Morri, Anconetani and Benfari, 2020; Alareeni and Hamdan, 2020). Presumably, the higher rental income, lower operating expenses and higher property prices that are linked with greener buildings (Mangialardo et al., 2018; Grafström and Käck, 2020; Vimpari and Junnila, 2013) are a long-term process and require a longer timeframe than what we have used in this study to see positive effects. Our outcome strengthened the result by Mariani et al., (2018) suggesting that green agendas are often associated with large initial costs affecting the profitability in terms of negative ROA and ROE. Interesting to observe in our findings, is that the coefficient for ROE is almost double than it is for ROA suggesting that as the ESG Reuters score increases the ROE decreases twice as much as the ROA. Moreover, by looking at these differences in negative coefficients and

assuming that the costs will eventually turn into financial benefits, the ROA might be positively affected earlier than ROE. An alternative approach to find positive effects could be to investigate stock returns to see potential positive short-term effects on firm performance in relation to sustainability or to use a longer time period to see if and when the costs turn into benefits in the long run.

When looking at the control variables, we see a similar trend as with hypothesis 1. There is no significant association between ROE and D/C while capital structure and ROA is negatively associated at a 1% level. Similarly, size is positively associated with both ROE and ROA, both at a 5% level. The ratio of Operating Income/Total Revenue has a strong positive association with ROE and ROA, respectively, both at a 1% level. However, no association is found between interest rates and the dependent variables.

#### **4.2.3 GRESB Membership and Profitability**

Our third hypothesis concerns whether there is a positive association between real estate firms that are members of GRESB and profitability. To test for this, we regressed the control variables and the ESG GRESB variable on the profitability variables ROE and ROA, respectively. The results, which are presented in models (3) and (7) of table 5 show that no significant association exists between being a member of GRESB and ROE. However, there is a significant negative association between the ESG GRESB variable and ROA at the 5% level. Hence, we both reject and do not reject our third hypothesis.

The results indicate that being a member of GRESB is costly for the owners of the firm, hence, affecting the ROA negatively. This outcome is the reverse to the study by Sah, Miller and Ghosh (2013) that found Morningstar membership to affect ROA positively. Potential explanations for this might be due to the different memberships or again, the time period. Moreover, there is an annual assessment participation fee of EUR 4,000 for GRESB members for every submission which covers support, informational guidelines, validation, benchmark reports and data and portfolio analysis tools (GRESB, 2021b). However, in addition to the upfront costs to be paid to GRESB, firms also need to allocate employees to collect the information required and produce the reports. In some cases, firms may not have the resources and expertise required in house, despite the supporting material from GRESB, and need to hire consultants to produce the reports. Hence, there is a cash outflow associated with being a



member of GRESB and it is therefore logical that our results show a negative association between the ESG GRESB variable and ROA. Furthermore, the coefficient is similar to the results seen with ESG Reuters, although it is slightly higher, suggesting that an increase in ESG GRESB affects ROA more negatively than ESG Reuters. The reason for this could potentially be that to actively choose to engage in a membership such as GRESB is more costly than an external valuation from a database such as Thomson Reuters.

Similarly, to the results obtained for control variables when testing for hypothesis 1 and 2, there is no significant association between ROE and D/C but capital structure and ROA have a significant negative association at the 1% level. Moreover, size has a positive association with ROE and ROA at levels of 10% and 5%, respectively. Like with the other models, there is a strong positive association between the ratio of Operating Income/Total Revenue and ROE and ROA, separately, at a 1% level. Still, no association is found between interest rates and the dependent variables.

#### **4.2.4 Any ESG Activity and Profitability**

Our fourth hypothesis concerns whether there is a positive association between firms that are actively engaged in any of the discussed ESG measures and profitability and the results are shown in models (4) and (8) of table 5. We find no significant association between firms that are engaged in any of the sustainability proxies and profitability. This is surprising considering that we created the ESG Any dummy variable based on the other ESG measures in this study. Thus, if a firm either conducts sustainability reports in accordance with GRI standards, has a Thomson Reuters ESG score above 50 or is a GRESB member they receive a 1 and otherwise a 0. This variable was created to capture a comprehensive picture of whether the real estate firms in the sample actively work with sustainability or not. As our study yielded significant results in both hypothesis 1 and partially in hypothesis 2, we would have expected that the ESG Any variable would be significant too. Nonetheless, we reject the fourth hypothesis that there is an association between ESG Any and profitability.

Turning to the control variables, the results are similar as earlier hypotheses. We find no significant association between ROE and D/C although the firms' capital structure and ROA are significantly negatively associated at the 1% level. Furthermore, size is significantly positively associated with ROE and ROA, respectively, at the 5% levels. The ratio of Operating

Income/Total Revenue has a strong positive association with both the profitability measures at levels of 1%. We find no association between interest rate and the dependent variables.

We do acknowledge that the profitability measures and ESG measures are positively correlated in Table 3 while showing a negative association in Table 5. Table 4 indicates that the P/B and D/C variables could be possible drivers in the model. However, when testing the model without the the P/B and D/C variables, the ESG measures remain negatively associated with profitability. Hence, we cannot determine what causes the inconsistency between Table 3 and Table 5 but recognize that it exists.

**Table 6: Regression Results**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ROE	ROE	ROE	ROE	ROA	ROA	ROA	ROA
ESG GRI	-0.558 (-0.297)				-0.542 (-0.853)			
ESG Reuters		-4.069** (-2.151)				-1.333* (-1.735)		
ESG GRESB			-2.788 (-1.352)				-1.397** (-2.038)	
ESG Any				-2.360 (-1.158)				-1.080 (-1.327)
P/B	0.998 (1.407)	1.001 (1.369)	0.980 (1.345)	0.964 (1.365)	0.354 (1.444)	0.350 (1.454)	0.335 (1.389)	0.341 (1.427)
D/C	-0.073 (-0.875)	-0.067 (-0.798)	-0.066 (-0.783)	-0.070 (-0.844)	-0.068*** (-3.105)	-0.068*** (-3.115)	-0.066*** (-3.034)	-0.067*** (-3.091)
ln Total Assets	1.536** (2.284)	1.310** (2.032)	1.279* (1.833)	1.488** (2.087)	0.609*** (2.599)	0.614*** (2.619)	0.560** (2.262)	0.624** (2.466)
Operating Income/ Total Revenue	0.035*** (4.771)	0.035*** (4.761)	0.035*** (4.749)	0.035*** (4.754)	0.011*** (4.878)	0.011*** (4.891)	0.011*** (4.856)	0.011*** (4.874)
Interest Rate	1.523 (1.436)	1.581 (1.452)	1.593 (1.464)	1.568 (1.473)	0.454 (1.172)	0.449 (1.173)	0.467 (1.206)	0.461 (1.204)
Constant	-13.841** (-2.109)	-11.918* (-1.785)	-11.451 (-1.608)	-13.538* (-1.937)	-2.909 (-1.065)	-2.968 (-1.085)	-2.491 (-0.837)	-3.142 (-1.085)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	929	929	929	929	929	929	929	929
Number of firms	240	240	240	240	240	240	240	240
R-squared	0.312	0.310	0.310	0.310	0.330	0.328	0.329	0.330

*Robust z-statistics in parentheses*  
\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

## 5. Conclusion

This study has raised the importance of contributing to a more sustainable world and more specifically, the actions of the real estate sector. There is an alarming need to make changes to save the planet and the real estate sector has the power to do so. Moreover, the introduction of the 2030 Agenda for Sustainable Development and the European Green Deal has put pressure on real estate firms to become greener. However, investing in sustainability and green buildings is costly. Studies have found that the initial cost of entering into a more sustainable business strategy acts as an obstacle for firms to take that first step (Mariani et. al., 2018). However, the majority of previous studies do highlight the benefits that sustainable investments have on firm performance (Leskinen, Vimpari and Junnila, 2020). Due to this, we found our results surprising as our study only shows negative significant results for two of our chosen sustainability proxies; ESG Reuters and ESG GRESB.

We reject our first hypothesis as we find no significant association between ESG GRI and profitability. This was surprising if leaning on previous research. However, as discussed, it might be logical due to the normality in producing such reports and the difficulties for investors and customers to put a value on them. For our second hypothesis, we find a significant negative association between ESG Reuters and ROE and ROE. Thus, we do not reject the hypothesis. Although several studies find that investing in sustainability has a positive effect on financial performance, many also find that these investments are costly. Furthermore, the fact that this study takes a relatively short-term perspective by looking at only four years of data is a likely explanation to the negative association we find between profitability and the ESG Reuters proxy. However, it is possible that benefits may exceed the costs in the longer-term as firms become more accustomed with their sustainability work.

We find no significant association between ESG GRESB and ROE. However, we find a significant negative association between ESG GRESB and ROA. This is contrary to Morri, Anconetani and Benfari (2020) that find that GRESB has a positive association with both ROE and ROA. Their study is also relatively short, looking at five firm years. However, they looked at a small sample of 50 REITs and used various components of the GRESB rating in their regressions. This is possibly why their results are the opposite of ours. Still, we conclude that it makes sense that GRESB membership has a negative association with ROA as there is an

annual fee of EUR 4,000 to be paid per submission and hence a direct cash outflow. This fee might be a small cost for larger companies while it might act as a constraint for smaller companies. In addition to the fee, firms also need to allocate resources to produce the reports which also means increased costs. Moreover, this can be quite burdensome, especially for smaller firms. Furthermore, the costs associated with the membership is also likely to be the reason for why few firms in our sample are members of the GRESB organization.

To our surprise, we find no significant association between profitability and the ESG Any variable. Nonetheless, we conclude that investing in sustainability can have long term benefits in the form of higher rental income, selling prices, and not to mention contributing to the preservation of earth. However, from a financial perspective, it is costly, and the potential benefits are not visible, at least not in the short-term.

The tradeoff between short term financial rewards and long-term sustainability benefits is a discussed topic within financial research. Firm directors struggling with the dilemma of realizing large initial expenditures with the aim of gaining long term benefits in terms of the financials but also in terms of reputation and legitimacy by investing in sustainability or by not investing in sustainability and receive financial rewards as per their usual operations. Moreover, as demonstrated by prior research this is not a straightforward topic due to the difficulties of measuring sustainability performance and engagement. The real estate industry is as described, a sector that could take large and increased actions towards building a greener future. Due to the rationale of maximizing gain, there is a need of enlightening the relationship between financial rewards and sustainability. This study contributes to prior research by analyzing the real estate sector as a whole regardless of property portfolio structure with the aim of investigating firm's sustainability engagement and its effect on profitability. Although, the results find negative effect on profitability for the chosen time period, we acknowledge that sustainability engagement can yield financial benefits in the long-term.

## **6. Future Research**

Altogether, our research does provide new insights to how working with sustainability may impact the profitability of real estate firms. By taking a comprehensive approach, using all types of real estate firms and using several ESG proxies, we capture the similarities and differences between the various measures. Still, our study's outcome is contradictory to several past studies in the sense that investing in sustainability is costly according to our results. Thus, it may be of interest for future researchers to look at a longer time horizon to see if and when the benefits of investing in sustainability exceeds its costs. It could also be of interest to investigate whether the outcome would have been different if separating the different types of real estate firms to grasp the differences in company orientation. Furthermore, as ours and other researchers' studies show various results depending on the sustainability proxy used, it may be of interest to establish a unified definition of sustainability to obtain consistent results.

Lastly, future researchers may also want to look at stock returns in relation to ESG as stock markets, if efficient and liquid, reflect information instantly. Furthermore, as stocks contain the future expectations of the firm's performance, it would be interesting to study how the market perceives firms that actively work with sustainability in comparison to those that do not.

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