
The European Union's Environmental Policy and Long-Term Investments of Enterprises

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Abstract:

Purpose: Current European Union efforts are focused on creating regulations that are conducive to long-term investor commitment, i.e. they are fighting short-termism on financial markets. Enterprises that implement the European Union's environmental policy are seen to engage long-term financial resources, which should therefore dominate the structure of their assets. The primary goal of the paper is to ascertain whether a company's high environmental performance (E-index) is positively correlated with the value of its long-term investments.

Design/Methodology/Approach: The empirical research is carried out in two parts. The first part presents the correlation between the company's E-index and the share of its long-term investments in total assets. For comparison, we examine these relationships with ESG, as well as the S and G scores. In the second part, we assess the character and strength of the impact of the company's E-index on the value of its long-term investments. This study includes companies listed on 14 Western European stock exchanges, covering the period 2002 to 2019.

Findings: Contrary to our assumptions, we find, first, that the environmental index is negatively related to the share of long-term investments in assets in most countries. Second, using panel dataset for the analysed European Union markets, we find evidence that the environmental index negatively affects the value of long-term investments, indicating that the current actions undertaken by the European Union have no empirical justification.

Practical Implications: The results of the research may be useful for researchers, practitioners, and regulators from the European Union and the European Union countries in understanding the relationship between a company's E-index and its investments.

Originality/Value: There is no research which proves that the increase in long-term investments, and thus the increase in the availability of long-term capital, is of key importance for enterprises, so our research is pioneering and unique.

Keywords: Environmental policy, E-index, long-term investments, European Union.

JEL classification: G18, G31, G32, Q01, Q56.

Paper Type: Research article.

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1. Introduction

As a result of the changes currently taking place in the global economy, it has become necessary to create a classification of economic entities from the point of view of their real impact on society. The starting point for such a classification can be the selection of enterprises that implement corporate social responsibility (CSR) principles, as well as financial institutions that follow the socially responsible investing (SRI) principles. The European Commission considers CSR “the responsibility of enterprises for their impacts on society” (European Commission 2011).

A wide discussion on the conditions for the creation and functioning of CSR was conducted by Kitzmueller and Shimshack (2012), who defined it from an economic perspective and developed a CSR taxonomy that connects disparate approaches to the subject. Meanwhile, according to Christensen *et al.* (2019), the term CSR denotes corporate activities and policies that assess, manage and govern a firm’s responsibilities for and its impact on society and the environment. Finally, Ali *et al.* (2017) examined determinants of CSR disclosure in developed and developing countries.

SRI is seen as a rather old term, and it is most closely associated with avoiding morally questionable businesses. Nowadays, it is usually referred to as responsible investing and sustainable investing, which are usually characterised with the help of ESG (Environmental, Social, Governance) analysis (CFA Institute, 2015). Boffo and Patalano (2020) distinguished: (i) social investing – which focuses on social/environmental outcomes and the financial return; (ii) impact investing – which intends to have a measurable environmental/social return; and (iii) ESG investing (otherwise sustainable and responsible investment) – promoting long-term value by using ESG factors to mitigate risks and identify growth opportunities. Sustainable and responsible investment is seen as a long-term oriented investment approach that integrates ESG factors in the research, analysis and selection process of securities within an investment portfolio (Eurosif, 2018). The ESG measure was created in response to the market demand for a way to measure economic entities’ impact on the social environment (stakeholders). The relationships between CSR/SRI and ESG are understood and defined differently, although some researchers equate these concepts (Christensen *et al.*, 2019; Bannier *et al.*, 2019).

According to Jagannathan *et al.* (2017), there is a consensus among scientists that excessive carbon emissions are a concern to society because they contribute to global warming. Thus, from the point of view of the natural environment, the development of the E-index is of key importance, as it is for this article, as it aggregates a company’s rating in relation to its impact on the natural environment. Li and Ramanathan (2020) found that environmental investment (pollution control investments and pollution prevention investments) has a positive effect on environmental performance. Current European Union (EU) efforts to rebuild the production and service sector following the requirements of pro-ecological standards are focused on creating regulations that

are conducive to investors' long-term commitments, i.e. the fight against short-termism on financial markets (Final Report, 2018). A question arises whether enterprises that meet high environmental standards (a high E-score) really invest a significant part of their financial resources in the long term, i.e. whether long-term investments dominate in the structure of their assets.

Our research is therefore pioneering and unique, and its purpose is to ascertain whether a company's high environmental performance (E-index) is positively correlated with the value of its long-term investments (long-term investments are assets that a company hold for a period of more than three years). In other words, we want to indirectly check whether, from the point of view of environmentally neutral enterprises (implicitly, those that implement long-term pro-environmental investments), the increase in the availability of long-term investment capital on the market is significant. In addition, we want to check whether companies' environmental performance affects the volume of their long-term investments. If so, then actions taken at the European Union level to reduce short-termism are justified, if not, the increase in the availability of long-term capital for enterprises is not a *sine qua non* condition for shaping their environmental profile.

The structure of the article is as follows. The first part presents the literature review and our hypotheses. The second part contains the research sample, while the research methods are presented in the third part. The fourth part describes the empirical results, and the last part presents the conclusions from the research and gives recommendations.

2. Literature Review and Hypotheses

The availability of long-term financing sources for enterprises, including pro-environmental investments, is a part of the sustainable finance concept. Experts from the High-Level Expert Group on Sustainable Finance (HLEG) indicate that sustainable finance is about two imperatives (Final Report, 2018, p. 6): (i) improving the contribution of finance to sustainable, inclusive growth, and mitigate climate change; (ii) strengthening financial stability by incorporating ESG factors into investment decision-making. The European Commission (2018, p. 1) defines ESG as follows: E refers to mitigating and adapting to climate change and related risks; S refers to issues of inequality, inclusiveness, labour relations, human capital and communities; G refers to the governance of public and private institutions, including management structures, employee relations and executive remuneration.

ESG investing has evolved in recent years to meet the demands of investors and public sector authorities, which want to incorporate long-term financial risks and opportunities into their investment decision in order to generate long-term value (Boffo and Patalano, 2020, p. 11), although earlier Fayers *et al.* (2000) found that in Australia there is a modest shift towards environmental considerations among investment professionals. As noted in the European Securities and Markets Authority

(ESMA) Report (ESMA, 2020, p. 61), investment in education, housing, infrastructure and renewable energy and mitigating climate change all require a long-term horizon, often over several years if not decades; this means more upfront capital in long-lasting assets (Final Report, 2018, p. 9). However, according to the HLEG, many enterprises that wish to invest long-term are subject to short-term market and regulatory pressures, and they under-invest in human, technological and natural capital. The result is maturity mismatches between long-term projects and risk materialisation and short-term market liabilities (Interim Report, 2017, p. 16).

Companies are beginning to focus more on the short-term meeting of investors' expectations than on long-term development prospects, e.g., they abandon long-term pro-development investments (Ladika and Sautner, 2019). Investors increasingly prefer shorter periods of financial commitment due to growing risk aversion (Yanovski *et al.*, 2020). By contrast, Wang *et al.* (2014) found that investors pay more attention to a company's environmental assessment and long-run sustainability (both economic prosperity and pollution prevention) than profitability in the short run.

Currently, investments with a horizon of more than three (Atherton *et al.*, 2007) or six years (ESMA, 2019) are considered long-term. The shortening of the investment horizon has direct consequences for how enterprises function as they are forced to redefine their long-term plans. Opinions on whether short-termism is a consequence of market pressure (an exogenous factor) or results from actions taken by the company's management board, whose remuneration is related to the financial results achieved (an endogenous factor), are divided. However, the effects of managers' myopic decisions are indicated by Edmans *et al.* (2013), Lavery (2004), Marinovic and Varas (2019) and Shleifer and Vishny (1990), among others.

The increase in the volume of long-term investments, perceived as necessary for implementing long-term pro-environmental projects, implies one of the postulates of reconstructing markets in the spirit of sustainable development, i.e. limiting short-termism. Theoretically, enterprises that implement pro-environmental investments engage long-term financial resources, which should therefore dominate the structure of their assets. To finance them, according to the matching principle of finance, it is necessary to obtain long-term capital (both equity and debt), which necessitates engaging long-term investors.

Research on the relationship between CSR/ESG and corporate finance began in the early 1970s (Friede *et al.*, 2015) when Yale University established its advisory committee on investor responsibility in 1972 (Jagannathan *et al.*, 2017). Interest in the use of CSR/ESG by entities operating on financial markets increased only in the mid-2000s when the United Nations established the Principles for Responsible Investment (PRI). The PRI were launched in April 2006 at the New York Stock Exchange. Most research combines the degree of compliance with the CSR/ESG criteria with corporate financial performance (CFP).

The impact of ESG on CFP is examined in relation to various aspects of a company's finances. El Ghouli *et al.* (2011) found that firms with better CSR scores exhibit cheaper equity financing. In particular, investment in improving responsible employee relations, environmental policies, and product strategies contributes substantially to reducing the cost of equity. Goss *et al.* (2011), examining loans to US firms, found that firms that are concerned about social responsibility actually pay more than firms that are more responsible. Using a large cross-section of firms, Cheng *et al.* (2014) investigated whether superior CSR activities lead to better access to finance; they found that firms with better CSR performance face significantly lower capital constraints.

They also demonstrated that both better stakeholder engagement and transparency around CSR performance are important in reducing capital constraints and that the relationship is driven by both the social and environmental dimensions of CSR. According to Ferrell *et al.* (2016), CSR is considered an agency problem and a waste of corporate resources. They found that well-governed firms that suffer less from agency concerns engage more in CSR. Additionally, they found evidence that a positive correlation exists between CSR and Tobin's q in firms with few agency problems, and that CSR and firm governance that induces CSR counterbalances the negative association between firm value and managerial entrenchment.

Bannier *et al.* (2019) showed that a portfolio long in stocks with the highest ESG scores and short in those with the lowest scores yields a significantly negative abnormal return, and this is caused by the strong positive return of firms with the lowest ESG activity. Gibson *et al.* (2019) used ESG ratings from seven different data providers for a sample of S&P 500 firms between 2010 and 2017. They found that stock returns are positively related to ESG rating disagreement, suggesting a risk premium for firms with higher ESG rating disagreement. Giese *et al.* (2019) examined the impact of ESG information on companies' valuation and performance using a standard discounted cash flow model. Their research proved that companies' ESG information was transmitted to their valuation and performance. Finally, Ting *et al.* (2020) examined the impact of firms' ESG initiatives on financial performance in developed and emerging market firms. They found that emerging market firms had higher ESG combined scores, ESG controversy scores, category scores of resource use, workforce, human rights and corporate social responsibility strategy scores.

To sum up, most studies do not deny the existence of a relationship between a company's compliance with the CSR/ESG criteria and its financial performance. In fact, in most cases, the effect of ESG on CFP is positive. Gunnar *et al.* (2015) gathered the findings of about 2200 individual studies searching for a relationship between ESG criteria and CFP. They showed that the business case for ESG investing is empirically very well-founded: roughly 90% of studies found a nonnegative ESG-CFP relationship, and importantly, a large majority of studies reported positive findings. Additionally, they found that the positive ESG impact on CFP appears stable over time. Drawing on stakeholder theory and the resource-based view, Diebecker *et al.*

(2017) indicated that CFP differs significantly across the life cycle stages and was lower before and after the mature stage; in consequence, it may affect the ESG-CFP relationship.

As far as the environmental category is concerned, there are few studies on this category's impact on CFP. Although the ESG categories were not yet defined in 1996, Klassen and McLaughlin (1996) conducted research that linked environmental management and perceived future financial performance (measured by stock market performance). Almost a decade later, Al-Tuwaijri *et al.* (2004) analysed the interrelations among three categories: environmental disclosure, environmental performance and economic performance, and obtained results that environmental performance is significantly associated with economic performance and more extensive quantifiable environmental disclosures. Zhongfu *et al.* (2011) examined the correlation between economic performance and environmental information disclosure of Chinese enterprises.

The empirical results show that environmental information disclosure has a positive effect on Tobin's Q of economic performance. Pástor *et al.* (2020) modelled investing that considers ESG criteria and found that in equilibrium, green assets have low expected returns because investors enjoy holding them, and they hedge climate risk. Utomo *et al.* (2020) indicated that in Indonesia, environmental disclosure does not affect firm value and does not mediate the effect of environmental performance on firm value. Finally, Pedron *et al.* (2021) analysed whether environmental disclosure in public firms in Brazil affects their profitability and value. The results show significant differences in characteristics between firms that disclose and those that do not disclose environmental information, and the positive impact of environmental disclosure on the value of publicly traded Brazilian companies.

The literature review, some of which was included in the article, confirms our earlier conclusion that the issues we have taken up have not been of interest to researchers. Moreover, in most of those studies, the aggregated ESG measure is used, with the E-index being tested significantly less frequently. In view of these facts, the aim of the study is defined as follows: to determine the relationship between the development of the environmental performance – the E-index (which is part of the ESG rating), and the share of long-term investments in the asset structure of companies.

The relations between the structure of assets and the structure of capital are very important matters connected with the capital structure theories, in particular, the Pecking Order Theory, which builds upon asymmetric information between managers and investors (Modigliani and Miller, 1958; Myers, 1984). Companies choose internal resources (a form of inside equity, e.g. retained earnings), then debt, and, only as a last resort, outside equity from investors. So, an increase in long-term capital for enterprises is not essential for their ecological transformation. This further means that the problem with green business reform is not related to the insufficient availability

of long-term finance. To the best of our knowledge, no one has studied this relationship before.

Based on the discussion and the literature surveyed above, we propose the following hypothesis:

H1: On Western European regulated markets the value of a company's E-index is positively correlated with the share of its long-term investments in total assets.

In enterprises that implement a pro-ecological policy, there should also be a relationship between the degree of its implementation and the investment expenditure incurred. If we assume that enterprises with higher environmental performance incur higher investment outlays, then we can formulate another hypothesis:

H2: The environmental performance of an enterprise positively affects the value of its long-term investments.

If these hypotheses are not verified, it means that there is no empirically proven relationship between pro-environmental policy and long-term investments. Consequently, such a financing strategy does not imply the use of long-term capital resources and does not conducive to long-term investor commitment.

3. Material and Methods

3.1 Material

In the article, we use ESG data from the Refinitiv databases (formerly Thomson Reuters). Importantly for our research, Hooks and van Staden (2011) examined the environmental reporting of the same group of companies in various media and found that the various content analysis methods used to assess the extent and quality of disclosure are highly correlated with one another. The relatively high convergence of how factor E is presented by different data providers/rating agencies was also confirmed by Amariei (2019, p. 5). This means that the data taken from Refinitiv can be treated as representative from the point of view of the environmental performance.

To provide evidence on the relationship between E-indexes and long-term investments, we used the institutional setting of the EU for two reasons. Firstly, reporting regulations and financial disclosure are strongly harmonised in the EU. In 2014, the European Union adopted the Non-Financial Reporting Directive (NFRD; Directive 2014/95/EU), although its rules apply only to large public-interest companies with more than 500 employees. Since 2018, these companies have been required to include statements concerning environmental protection, social responsibility and treatment of employees, respect for human rights, anti-corruption and bribery, and diversity on company boards in their annual reports. Secondly, the current EU attitude against short-termism on the financial markets is focused on the pro-ecological policy and creating regulations that are conducive to long-term investment.

Our empirical research includes companies listed on 14 European stock exchanges (see Appendix A), the so-called “old” EU member states (once EU-15, now EU-14). This approach allows us to maintain relative comparability between companies listed on these exchanges. The “new” EU member states (which joined in 2004 and later) might not adapt to all ESG reporting procedures and EU standards implemented on these markets. The data of the companies listed on the 14 European regulated markets on 1 October 2020 were obtained from the Refinitiv Eikon database. The period of analysis spanned 18 years, from 2002 to 2019, which resulted from the availability of ESG data reported by companies.³

Our initial sample starts with 14,214 companies listed on the 14 European markets. In the first step, we evaluate the number of years in which these companies present ESG reports compared to financial statements. We focus on checking how many companies report E-indexes in any given year, and those that present them in at least three, five, or ten years (Table 1).

Table 1. *E-index reporting versus financial reporting by companies on the EU markets*

| EU markets | Financial statements | | E-indexes (in any year) | | At least 3 years of E-indexes | | At least 5 years of E-indexes | | At least 10 years of E-indexes | |
|-----------------|----------------------|--------------|-------------------------|--------------|-------------------------------|--------------|-------------------------------|--------------|--------------------------------|-----------|
| | Number of companies | Share [%] | Number of companies | Share [%] | Number of companies | Share [%] | Number of companies | Share [%] | Number of companies | Share [%] |
| Greece | 175 | 28 | 16.0 | 19 | 10.9 | 18 | 10.3 | 16 | 9.1 | |
| Austria | 742 | 677 | 91.2 | 589 | 79.4 | 539 | 72.6 | 468 | 63.1 | |
| Belgium | 160 | 75 | 46.9 | 55 | 34.4 | 51 | 31.9 | 47 | 29.4 | |
| Denmark | 156 | 51 | 32.7 | 34 | 21.8 | 30 | 19.2 | 28 | 17.9 | |
| Finland | 160 | 42 | 26.3 | 30 | 18.8 | 28 | 17.5 | 27 | 16.9 | |
| France | 658 | 170 | 25.8 | 119 | 18.1 | 102 | 15.5 | 94 | 14.3 | |
| Germany | 10,384 | 5,468 | 52.7 | 4,447 | 42.8 | 3,396 | 32.7 | 2,368 | 22.8 | |
| Ireland | 46 | 22 | 47.8 | 15 | 32.6 | 15 | 32.6 | 13 | 28.3 | |
| Italy | 456 | 194 | 42.5 | 146 | 32.0 | 133 | 29.2 | 123 | 27.0 | |
| Luxembourg | 42 | 11 | 26.2 | 11 | 26.2 | 9 | 21.4 | 4 | 9.5 | |
| Portugal | 44 | 18 | 40.9 | 13 | 29.5 | 11 | 25.0 | 9 | 20.5 | |
| Spain | 233 | 80 | 34.3 | 55 | 23.6 | 50 | 21.5 | 41 | 17.6 | |
| Sweden | 839 | 237 | 28.2 | 110 | 13.1 | 93 | 11.1 | 73 | 8.7 | |
| The Netherlands | 119 | 62 | 52.1 | 44 | 37.0 | 36 | 30.3 | 28 | 23.5 | |
| Total | 14,214 | 7,135 | 50.2 | 5,687 | 40.0 | 4,511 | 31.7 | 3,339 | 23.5 | |

Source: *Own study based on the Refinitiv databases.*

An overview of the results shows that only ca. 40%, 32%, and 24% of all companies reported E-indexes for at least three, five, and ten years, respectively. The largest number of companies that reliably approached E-index reporting was recorded in Austria and Germany and in the three Euronext markets, i.e. located in the Netherlands, Belgium and Ireland. Interestingly, companies from other Euronext

³We initially assumed a twenty-year research period (2000–2019), but in the 2000–2001 period, only 56 of the more than 14,000 companies reported ESG scores.

markets (i.e., France and Portugal), and those belonging to OMX (Denmark, Finland, and Sweden), reported much worse E-indexes.

To conduct the long-term study and to manage the analysis of the relationship between the E-index and long-term investment, we focus only on the 3,339 companies for which we were able to obtain E-index data for at least ten subsequent years. However, in order to rule out the randomness of the research sample selection, we additionally verify the share of the market capitalisation of these companies in the total market capitalisation for the given EU markets on the example of the last given year, i.e., 2019. This approach is consistent with previous research which demonstrated that the ESG reporting by public companies is still low when assessed by the number of companies but visibly higher when measured by market capitalisation (Boffo and Patalano 2020, pp. 42-43), although large-cap companies have significantly higher ESG disclosure scores than mid-cap companies (Tamimi and Sebastianelli, 2017).

Table 2. *E-index reporting for at least 10 years versus market capitalisation by companies on the EU markets*

| EU markets | Number of companies | Share in all companies [%] | Share in total market capitalisation [%] |
|-----------------|---------------------|----------------------------|--|
| Greece | 16 | 9.1 | 45.8 |
| Austria | 468 | 63.1 | 89.7 |
| Belgium | 47 | 29.4 | 98.4 |
| Denmark | 28 | 17.9 | 76.5 |
| Finland | 27 | 16.9 | 94.1 |
| France | 94 | 14.3 | 89.8 |
| Germany | 2,368 | 22.8 | 78.5 |
| Ireland | 13 | 28.3 | 88.3 |
| Italy | 123 | 27.0 | 92.4 |
| Luxembourg | 4 | 9.5 | 47.7 |
| Portugal | 9 | 20.5 | 70.0 |
| Spain | 41 | 17.6 | 84.1 |
| Sweden | 73 | 8.7 | 64.5 |
| The Netherlands | 28 | 23.5 | 74.3 |
| Total | 3,339 | 23.5 | 78.8 |

Source: *Own study based on the Refinitiv databases.*

Table 2 shows that the market penetration of the E-index (the share of companies in total market capitalisation) was greater than 78%. Importantly, it turned out that in two markets, i.e., Greece and Luxembourg, this share was less than 50%. Additionally, it is worth mentioning that only less than 10% of companies listed on these markets published information about the E-index for at least ten years. Combining these two aspects (the small number of companies and low market penetration), we decided to limit our analysis to 12 markets (without Greece and Luxembourg).⁴ As a result, by

⁴In Sweden, we observed that only 8.7% of companies reported E-indexes for at least ten years, but their market penetration measured with market capitalisation was ca. 65%. Thus, we decided to include this market in our analysis.

excluding 20 companies from these exchanges, the average market penetration of the E-index was 83.4%. Our research sample ultimately consisted of 3,319 companies.

3.2 Methods

The empirical research is carried out in two parts. The first part presents the correlation between the company's E-index and the share of its long-term investments in total assets (conducted using Pearson's correlation coefficient). For comparison, we examine these relationships with ESG, as well as the S and G scores. In the second part, we assess the character and strength of the impact of the company's E-index on the value of its long-term investments. For our analysis, we construct an empirical model with an endogenous variable of LTI that we measure by the yearly value of the company's long-term investment. As enterprise profitability is associated with the productivity of specific outlays (e.g., assets), and it determines the scale of investments, the values of long-term investments in absolute terms used in these calculations were calibrated by using the book value of total assets. This approach treats the LTI as a standard measure of the assets and capital structure (Lim *et al.*, 2020). It is justified by excluding the possible impact of the scale of activities on long-term investment policy by companies.

The measure of E (E-index based on the Refinitiv), which shows the decomposition of aggregate ESG measure into environmental dimensions of sustainability performance, is a critical independent variable in our analysis. We expect a positive impact of this measure on long-term investments. In the face of the absence of theoretical guidance about estimating the impact of the E-index on a company's long-term investments, our empirical framework is based largely on examining the effect of CSR on investment efficiency. According to prior research (e.g. Khediri, 2021; Cook *et al.*, 2019; Shahzad *et al.*, 2018; Bhandari and Javakhadze, 2017), we estimate the following model with a few accounting and market measures that might potentially affect the company's long-term investments:

$$LTI_{t,i} = \beta_0 + \beta_1 E_{i,t} + \beta_2 TQ_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 ROTA_{i,t} + \beta_5 LEV_{i,t} + \beta_6 NEG_{i,t} + \varepsilon_{i,t}$$

where β_0 is the intercept and $\varepsilon_{i,t}$ is the error term. Subscripts i and t refer to firm and year, respectively.

These control variables include TQ (Tobin's Q) (Tobin, 1969), SIZE (firm size), ROTA (return on total assets), LEV (leverage effect), and NEG (loss). To be consistent with academic research (Cahan *et al.*, 2016; Gao and Zhang, 2015; Kim *et al.*, 2018; Wang and Sariks, 2017), we estimate Tobin's Q as the market value of equity (market capitalisation), minus the book value of equity, plus the book value of assets, all divided by the book value of assets. TQ is used as a firm growth option, which is one of the most widely spread measures for determining a firm's value. The expected sign can be positive or negative. To take into account the economies of scale and to separate them from the influence of business volumes (Bratten *et al.*, 2016), we

use in our model the firm size (SIZE) measured by the natural logarithm of the total assets (Bhandari and Javakhadze, 2017; Cook *et al.*, 2019; Shahzad *et al.*, 2018). For this variable, a positive sign is expected. ROTA is a typical return on total assets that measures a company's earnings before interest and taxes (EBIT) relative to its average value of total assets. We expect a negative sign. Following various authors (Khediri, 2021; Shirasu and Kawakita, 2020), the financial leverage was calculated by using the ratio of the book value of total debt to the book value of equity. A negative sign is expected. NEG is a dummy variable that takes a value of 1 for a loss and 0 for a profit. It is recommended by conditional conservatism (Basu, 1997) to differentiate between positive and negative periods for a company. We expect a negative sign. All variables are defined in Appendix B.

All variables are measured at the end of the fiscal year. To mitigate the potential effects of outliers, we winsorize the data at the 5th and 95th percentile levels. Additionally, following an existing approach (McClean *et al.*, 2012), we exclude the cases of negative book values of equity. Our final sample consists of an unbalanced panel of 22,370 firm-year observations representing 3,035 public companies listed on 12 Western European markets. We use ordinary least squares (OLS) specifications. To control for changing economic conditions (Samet and Jarboui, 2017), we estimate three versions of our model: without fixed effects (Panel A), with year fixed effects (panel B), and with two fixed effects – firm and year (Panel C).

4. Research Results

4.1 The Correlation between LTI and E by EU Markets

Based on the research results, it can be stated that a company's long-term investments are, in general, negatively correlated with E-indexes (Table 3).

Table 3. Results of the correlation analysis

| EU markets | N | Correlation coefficients between LTI and: | | | |
|-----------------|--------|---|---------|---------|---------|
| | | E | S | G | ESG |
| Austria | 7,446 | -0.082* | -0.054* | -0.052* | -0.068* |
| Belgium | 798 | -0.168* | -0.305* | -0.155* | -0.179* |
| Denmark | 453 | -0.250* | -0.127* | -0.062 | -0.121* |
| Finland | 445 | -0.109* | -0.169* | -0.043 | -0.142* |
| France | 1,493 | 0.010 | -0.010 | -0.052* | 0.029 |
| Germany | 34,734 | -0.042* | -0.024* | -0.053* | -0.017* |
| Ireland | 201 | 0.209* | 0.274* | 0.377* | 0.317* |
| Italy | 2,054 | -0.104* | -0.096* | -0.078* | -0.064* |
| Portugal | 135 | -0.085 | -0.095 | -0.037 | -0.112 |
| Spain | 659 | -0.194* | -0.179* | -0.135* | -0.168* |
| Sweden | 1,215 | -0.120* | -0.051 | -0.080* | -0.078* |
| The Netherlands | 461 | -0.169* | -0.173* | -0.356* | -0.237* |

Note: * Significant at the 5% level of significance.

Source: Own study based on the Refinitiv databases.

The research results are not homogeneous, but after excluding the stock exchanges located in Ireland and France, the correlation coefficients are negative in all cases. It is worth emphasising that there are very weak relationships between LTI and E but, except for Portugal, statistically significant at the 0.05 level. Slightly stronger negative correlations are observed on four EU markets, i.e. the Netherlands, Belgium, Italy, and Denmark. In Denmark, the correlation coefficient is -0.25. Ireland is an interesting case, where the correlation coefficient between LTI and E is 0.209 and statistically significant.

The study also shows that long-term investments are weakly but also negatively correlated with ESG, as well as S and G. The only exception is Ireland. In three exchanges (located in the Netherlands, Belgium, and Finland), slightly stronger negative and statistically significant correlations are determined between LTI and ESG, as well as between LTI and S, than between LTI and E. However, the differences are minor. Only on the Belgian market does the relationship between LTI and S prove to be almost half as strong as the relationship between LTI and E. In contrast, in companies listed on the stock exchange in Denmark, the correlation coefficients between LTI and ESG, and between LTI and S, are twice as high as between LTI and E. Weaker, but negative and statistically significant relationships are found between LTI and G than between LTI and E. The Netherlands and Germany are also interesting countries. On these markets, the values of correlation coefficients between LTI and G are lower than between LTI and E (in The Netherlands, they are twice as low).

4.2 Regression Results

Table 4 presents the Pearson correlation coefficients between the main variables used in our regression model for all EU markets. All coefficients are statistically significant at the 0.01 level, but they indicate that the variables are mostly negatively associated with a company's long-term investments. Contrary to our assumptions, we find that LTI turned out to be weakly but negatively correlated with E. The value of the correlation coefficient between ROTA and E was almost the same.

Table 4. *Pearson correlation coefficients between the variables*

| Variable | LTI | E | TQ | SIZE | ROTA | LEV |
|----------|-----------|-----------|-----------|-----------|-----------|-------|
| LTI | 1.000 | | | | | |
| E | -0.089*** | 1.000 | | | | |
| TQ | -0.145*** | 0.021*** | 1.000 | | | |
| SIZE | 0.202*** | 0.184*** | -0.241*** | 1.000 | | |
| ROTA | -0.084*** | -0.025*** | 0.633*** | -0.181*** | 1.000 | |
| LEV | -0.114*** | 0.104*** | -0.174*** | 0.116*** | -0.294*** | 1.000 |

Note: *** Significant at the 1% level of significance.

Source: Own study based on the Refinitiv databases.

Slightly stronger but also negative correlations were determined between E and TQ, and E and LEV. Interestingly, the correlation coefficient between SIZE and LTI was positive, similar to the relationship between SIZE and E. These findings are consistent with the results reported by the authors of recent correlation analyses between firm size and CSR measure (eBenlemlih and Bitar, 2018; Cook *et al.*, 2019; Khediri, 2021). We also find that E-indexes are positively associated with the accounting and market performance (excluding ROTA). The results of prior studies on capital markets (Amel-Zadeh and Serafeim, 2018; Cahan *et al.*, 2016; Gao and Zhang, 2015; Shahzad *et al.*, 2018) also show that ESG activities increase the company's performance and market value (Tobin's Q). Our results are also consistent with the character of TQ, which is positively associated with the company's book performance, i.e., ROTA.

The measure of the leverage effect was both positively and negatively correlated to other control variables. LEV is positively associated with SIZE, but negatively with accounting and the company's market performance, i.e., ROTA and TQ. Some researchers (Cheryta *et al.*, 2017; Dutta *et al.*, 2018; Kim *et al.*, 2015) have also pointed out the lack of impact of LEV on a firm's market value, measured by Tobin's Q.

Table 5. *The impact of E-index (E) on long-term investments (LTI)*

| | Panel A | Panel B | Panel C |
|------------------------|-----------|-----------|----------|
| E | -0.001*** | -0.001*** | 0.000 |
| TQ | -0.020*** | -0.021*** | -0.002** |
| SIZE | 0.014*** | 0.014*** | -0.001 |
| ROTA | -0.001*** | -0.001*** | 0.000*** |
| LEV | -0.000*** | -0.000*** | 0.000*** |
| NEG | -0.006*** | -0.005*** | 0.002 |
| Year-fixed effects | No | Yes | Yes |
| Firm-fixed effects | No | No | Yes |
| Observations | 22,370 | 22,370 | 22,370 |
| F | 354.60*** | 94.25*** | 86.24*** |
| Adj-R ² (%) | 18.69 | 18.84 | 10.97 |

Note: ***, **, * Denote significance at the 1%, 5%, and 10% levels, respectively.

Source: Own study based on the Refinitiv databases.

Table 5 reports the results of regression models that were designed to test whether a company's E-index is associated with its long-term investments. In the first model (Panel A), we regress long term investments on the E-index without considering the fixed effects. In the second model, we regress this association with a setting of firm-level controls (Panel B). The third version presents this impact with both the year fixed effect and firm fixed effect (Panel C).

Contrary to our expectation, the coefficients on E in Panels A and B are negative and statistically significant at the 0.01 level, suggesting that the company's environmental performance negatively affects its long-term investments. Consistent with the results

in Panel C, this impact is positive but statistically insignificant. Based on the prior research dedicated to CSR activities, one can observe inconclusive results. On the one hand, there is a positive relationship between CSR and investment efficiency, as well as long-term stock returns (Cook *et al.*, 2019; Khediri, 2021; Samet and Jarboui, 2017; Shahzad *et al.*, 2018). On the other hand, CSR reduces both accounting and stock-based corporate performance (Bhandari and Javakhadze, 2017).

Regarding the control variables, the results in Table 5 indicate that a company's market value measured by Tobin's Q is negatively associated with its long-term investments. The prior analyses of the relationship between long-term financial performance and corporate social responsibility evidenced the inconclusive research results of this issue. As we assumed, the coefficients on SIZE in Panel A and B are statistically significant and have positive signs (in Panel C, they are negative, but insignificant at any of the assumed levels). These findings are similar to previous studies, suggesting that firm size positively affects corporate investment efficiency (Benlemlih and Bitar, 2018; Cook *et al.*, 2019). In line with our expectations, as well as prior research into corporate investments (Khediri, 2021), the coefficients on ROTA, LEV, and NEG have negative signs in Panels A and B. The results presented in the third version of our model (Panel C) are different, but in the case of NEG, the estimated coefficient is statistically insignificant.

5. Conclusions

Our research was inspired by the changes taking place in the global economy today related to the widespread implementation of the principles of sustainable development. We are particularly interested in enterprises' pro-ecological activities, which are directly related to limiting the degradation of the environment. As pro-environmental investments are seen to be long-term (ESMA, 2020), it is necessary to change the attitudes of entities that operate on the financial market. On the one hand, companies are seen to focus on achieving short-term goals and profits at the expense of implementing long-term strategies and benefits (Ladika and Sautner, 2019; Yanovski *et al.*, 2020). On the other, the investment horizon is shortened (Atherton *et al.*, 2007; ESMA, 2019). The EU has explicitly accepted the assumption about the long-term nature of enterprises' pro-ecological investments (Interim Report, 2017); therefore, verifying the assumption is a necessary condition to confirm the legitimacy of the EU's plans to combat short-termism (Final Report, 2018).

We assumed that a company's E-index reflects the extent to which it has implemented a pro-ecological policy. Theoretically, an enterprise should have a relatively large share of long-term investments in total assets, reflecting its pro-ecological policy. Thus, there should be a positive correlation between the E-index and the share of long-term investments in the total assets of the enterprise. However, our research did not confirm such a relationship. What is more, we found that the dependence is contrary to what is expected – enterprises that are characterised by a high E-index do not show a significant share of long-term investments (negative correlation), and long-term

investments do not show a significant relationship with the development of the E-index, or the S and G indexes (i.e., the total ESG index).

Furthermore, we found that the company's environmental performance negatively affects its long-term investments. Contrary to the assumptions adopted by the EU (Interim Report, 2017), an enterprise's higher E-index does not mean an increase in the share of long-term investments in their assets. If the E-index reflects the environmental performance of enterprises, it can be concluded that the enterprises that implement pro-ecological policies do not report an increased need for long-term capital. Thus, from the point of view of companies' environmental performance, the EU policy of combating short-termism and persuading investors who operate on capital markets to extend the horizon of their investments has no empirical justification.

6. Limitations and Recommendations

We are aware of the limitations that may have influenced the results of our research. First of all, ESG reporting by public companies has a relatively short history; therefore, after conducting our preliminary analysis, we had to limit the research period to 2002–2019. Of the originally adopted sample of 14,214 companies, only 3,339 qualified for the research – they are companies that had prepared at least ten annual ESG reports over the eighteen-year period. Considering the share of capitalisation of companies that prepare ESG reports in the total capitalisation of the individual exchanges, there is a clear dominance of large, listed companies, confirming the conclusions of other researchers that ESG reports are prepared mainly by large entities (Gamerschlag *et al.*, 2011).

Furthermore, ESG data should be interpreted with great caution due to the fact that, unlike financial reports, there are no standardised criteria for such reporting, nor for verifying the information provided by companies (Amel-Zadeh and Serafeim, 2018). Therefore it can be assumed that, at least in some cases, the quality of reporting may fall short.

In the study, we considered long-term investments undertaken by companies. It should be borne in mind, however, that such investments do not necessarily mean a pro-ecological restructuring of the company; they may also be associated with long-term investments of a different nature (e.g., mergers and acquisitions, foreign direct investment, etc.). This argument is important because the large companies covered by the study often conduct large-scale investments in international markets.

Taking into account the above limitations, our preliminary study may constitute a starting point for further studies that can be carried out in the coming years (using a longer time series), as the number of companies reporting ESG is constantly growing (providing a larger research sample). Thus, the results do not allow us to generalise the conclusions drawn, although they do allow us to formulate recommendations.

Currently, the EU is fighting against short-termism on financial markets and implementing obligatory ESG reporting requirements by public companies. In our opinion, both activities, carried out in such a wide scope at the supranational level, are debatable. Short-termism is an inherent feature of the capital market, thanks to which market liquidity is maintained. The domination of stable and long-term investors in the company means, in most cases, a lack of trading in the company's securities and its current market valuation. When it comes to the social impact of public companies (ESG), the idea of SRI is developing widely, and investors expect companies to present ESG reports.

For this reason, the key is not so much to create top-down regulations that will impose further reporting obligations on companies, but a transparent taxonomy thanks to which individual ESG reports prepared by various entities that operate on the market will become comparable. As there is no consistent global taxonomy for the compilation of the ESG index methodology, ESG ratings can vary greatly from one provider to another (Eccles and Stroehle, 2018). This raises a significant problem related to data comparability and the lack of reporting standards (as pointed out by e.g., Amariei (2019), Amel-Zadeh and Serafeim (2018), and Escrig-Olmedo *et al.* (2010). The concept of such a taxonomy of an integrated reporting was proposed by, e.g., Lueg and Lueg (2021), who called it "a taxonomy of annual/sustainability reports". Following this priority, in June 2021, the EU finally adopted the EU Taxonomy Climate Delegated Act. The main objective of this document is to indicate which economic activities are most important to meet the EU's environmental objectives, among others, in companies.

The current change in the attitudes and expectations of the market, i.e. investors who increasingly consider a company's environmental impact in their investment decisions, will be an important factor in companies' adaptation activities. Thus, we believe that wide-ranging activities at the institutional (EU) level should be limited to regulatory issues (which also prevent greenwashing), as non-financial reporting is currently understood by the market very broadly and ambiguously (Baret and Helfrich, 2019; Dumay *et al.*, 2017; Stolowy and Paugam, 2018). An example of the EU's failed engagement in the fight against short-termism is the issue of short-term reporting by public companies, which ultimately resulted in the EU's capitulation in this regard (Janicka *et al.*, 2020). The fight for long-term investments of companies that implement environmental policies (and, indirectly, the increase in the availability of long-term financing) may end similarly.

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Appendix A. Western European stock exchanges

| Country | Stock exchange | Number of companies |
|-----------------|---------------------------|---------------------|
| Greece | Athens Stock Exchange | 175 |
| Austria | Vienna Stock Exchange | 742 |
| Belgium | Euronext Brussels | 160 |
| Denmark | OMX Copenhagen | 156 |
| Finland | OMX Helsinki | 160 |
| France | Euronext Paris | 658 |
| Germany | Frankfurt Stock Exchange | 10,384 |
| Ireland | Euronext Dublin | 46 |
| Italy | Milan Stock Exchange | 456 |
| Luxembourg | Luxembourg Stock Exchange | 42 |
| Portugal | Euronext Lisbon | 44 |
| Spain | BME Spanish Exchange | 233 |
| Sweden | OMX Stockholm | 839 |
| The Netherlands | Euronext Amsterdam | 119 |

Source: Own study based on the Refinitiv databases.

Appendix B. Variable descriptions

| Variable | Description |
|----------|--|
| LTI | Yearly value of company's long-term investments calibrated by the book value of total assets |
| TQ | The market value of equity (market capitalisation), minus the book value of equity, plus the book value of assets, all divided by the book value of assets |
| SIZE | The natural logarithm of the book value of total assets |
| ROTA | Return on total assets |
| LEV | The ratio of book value of total debt to book value of equity |
| NEG | The dummy variable that takes a value of 1 for a loss and 0 for a profit |

Source: Own study.