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THE IMPACT OF SUSTAINABLE DEVELOPMENT ON RETURN ON EQUITY (ROE, ROC) IN COMPANIES IN THE LOGISTICS SECTOR IN EUROPE

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Purpose: The objective of this article is to examine the impact of individual elements of the ESG strategy on the capital efficiency of logistics companies operating in Europe in the years 2017-2023.
Design/methodology/approach: The study was conducted on logistic companies from Europe. The main tool of the analysis is the OLS (Ordinary Least Squares) model with heteroscedasticity correction to examine the relationship between ROE, ROC and ESG indices and control variables.
Findings: The analysis confirms that ESG factors influence capital returns in logistics companies, with the social dimension (SCR) playing a notably positive and statistically significant role across all subsectors. This suggests that efforts toward employee welfare, ethical practices, and stakeholder engagement enhance both operational and financial performance. Conversely, the environmental index (ENV) negatively impacts profitability only in maritime transport, likely due to the high costs of ecological compliance. Corporate governance (CG) shows a negative correlation with profitability in the overall sample, implying potential misalignment with sector-specific needs. Additionally, asset size and liquidity are crucial, emphasizing the importance of integrated, balanced financial management.
Research limitations/implications: Due to the limited duration of the research sample, the conclusions drawn have a relatively short shelf life, which is one of the limitations of the analysis. Another limitation may be the use of linear models for potentially nonlinear relationships between ESG scores and financial returns.
Practical implications: The article makes a significant contribution to the literature on the financial aspects of sustainable development by presenting empirical evidence on the diverse impact of individual ESG components on capital efficiency in the logistics industry. The results of the study can provide a basis for a better understanding of the mechanisms of responsible investment and help managers, investors, and public policy makers formulate effective ESG strategies that support both environmental and social goals and the long-term profitability of companies.
Originality/value: Despite the growing importance of ESG issues, there is still a lack of clear and widely documented empirical evidence on the impact of implementing sustainability policies on key financial indicators of companies, especially in high-carbon industries such as the logistic sector. The results can be an important contribution to the debate on the role of sustainability in shaping investment decisions and financial strategies of companies.

Keywords: Sustainable development, CAPEX, profitability, ROE.
Category of the paper: Research paper.

1. Introduction

Modern enterprises operate in a dynamically changing economic, social, and regulatory environment, which increasingly forces the integration of financial goals with the principles of sustainable development. The Environmental, Social, Governance (ESG) strategy, which combines environmental, social, and corporate responsibility, is no longer perceived as a cost, but is becoming a key element in building the long-term value of an enterprise (Hoang, 2018). In this context, the importance of assessing the extent to which ESG activities translate into efficiency of capital use in companies, especially in capital-intensive sectors such as logistics, is growing (Ridwan, Alghifari, 2025).

The logistics sector, which is an important element of Europe's economic infrastructure, is currently under pressure from regulators and investors expecting responsible operating practices. Transformation toward sustainable development requires significant investment outlays, the effects of which are not immediate, but spread over time. For this reason, the evaluation of the effectiveness of implementing ESG policies should take into account not only classic profitability indicators but also capital measures such as ROE (Return on Equity) and ROC (Return on Capital), which allow for capturing the relationship between the capital employed and the achieved operational and financial results (Yoo, 2025).

The objective of this article is to examine the impact of individual elements of the ESG strategy on the capital efficiency of logistics companies operating in Europe in the years 2017-2023. Particular attention was paid to the analysis of individual dimensions – Environmental (ENV), Social (CSR) and Corporate Governance (CG) – and their impact on ROE and ROC indicators. The study is based on financial and nonfinancial data from the S&P Global Market Intelligence database, using control variables such as company size, financial liquidity, debt, and asset dynamics.

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2. The Impact of Sustainable Development Strategies on Capital Efficiency: The Role of ROE and ROC in Evaluating ESG Implementation - literature review

Sustainable development of an enterprise, defined as a strategy that combines economic goals with social and environmental responsibility, has a significant impact on the way invested capital is used and its efficiency (Edwards, 2021). Modern companies, which implement environmental, social and governance policies, increasingly treat sustainable development not as a cost, but as an investment in the long-term value of the company (Lassala et al., 2021).

The impact of sustainable development on invested capital manifests itself primarily in changes in the structure of resource allocation. Logistics companies investing in low-emission technologies, energy efficiency, responsible supply chains, or good management practices often invest capital in projects whose return is not immediate but appears over a period of several years (Bhattacharjee et al., 2024). Such a strategy requires appropriate capital management, both own and external, in order to maintain financial liquidity and operational stability in the transformation phase (Le et al., 2024; Fallah Shayan et al., 2022).

From the point of view of capital owners, i.e. investors and shareholders, sustainable development can significantly increase the attractiveness of the company, especially in conditions of growing regulatory pressure and social awareness. Investors increasingly expect not only rates of return but also compliance of the company's activities with social and environmental values (Gniadkowska-Szymańska et al., 2024b; Park et al., 2022). Companies with high ESG standards gain easier access to capital, more favourable financing conditions, and a higher market valuation (Yoo, 2025). As a result, a well-implemented sustainable development strategy can increase the efficiency of the use of invested capital, which translates into higher financial indicators such as ROE (Return on Equity) and ROC (Return on Capital) (Chen et al., 2023; Sanga, 2024).

However, the lack of a coherent ESG policy or its superficial implementation can lead to reputational risks, regulatory penalties, and increased operating and financial costs. The changing legal environment and social pressure mean that capital invested in companies that do not comply with the principles of sustainable development is more exposed to the risk of loss of value (Sadowski et al., 2024; Gniadkowska-Szymańska et al., 2024a; Cheska et al., 2022).

In the context of analysing the impact of sustainable development strategies (ESG) on the financial results of companies, capital efficiency indicators such as ROE (Return on Equity) and ROC (Return on Capital) are of particular importance (Plaskova, 2022). Both of these measures allow us to assess how effectively a company uses its available capital – equity and total – to generate profits, which is of significant importance in the context of implementing costly but strategically important ESG initiatives (Chang et al., 2024; Khatami et al., 2025).

ROE, or return on equity, illustrates the effectiveness of using the funds entrusted to the company by owners and shareholders. A high ROE value in the context of implementing an ESG strategy may indicate that activities in the field of social responsibility, environmental protection and corporate governance not only do not burden the company, but actually contribute to increasing its profitability and increasing shareholder value (Yustrianthe et al., 2021; Ningrum, 2023). Investors, especially those interested in ESG criteria, often treat ROE as one of the main indicators of management efficiency, which emphasises its importance in the context of assessing the success of a sustainable development strategy (Lin et al., 2025).

However, it should be noted that a low ROE value in companies implementing ESG does not necessarily indicate the ineffectiveness of these activities. It may result from the high investment outlays incurred in the initial phase of transformation, the positive financial effects of which will only be visible in the longer term. Therefore, a complementary analysis of the second indicator, the ROC, is necessary (Damodaran, 2007).

Return on Capital measures the return on total capital, i.e. both equity and debt. This is particularly important in capital-intensive sectors such as logistics, where a large part of the activity is financed by debt or leasing (Banerjee, Deb, 2023; Ichsani et al., 2015). In this context, ROC allows for a more objective assessment of the impact of ESG activities on the operational efficiency of the company, regardless of its financing structure (Lutfiani, Hidayah, 2022). If pro-ecological, social, and corporate governance activities lead to an increase in ROC, it means that they bring real benefits in the form of higher operating profitability. In turn, a low ROC, especially in the initial phase of the implementation of ESG, may indicate the need for a patient investment approach and the potential need for external support, both financial and regulatory (Jun et al., 2022). It is worth noting that both ROE and ROC provide information not only on the current state but also on the long-term effects of strategic decisions made by the company (Damodaran, 2007). Their simultaneous analysis allows for a more comprehensive assessment of the impact of ESG policy on financial efficiency, on the one hand from the point of view of capital owners and on the other from the perspective of total resources engaged in operational activity. In the context of ESG, this is particularly important as many initiatives require balanced development, the return of which occurs only after several years (Iazzolino et al., 2023; Lu et al., 2022). The ROE and ROC indicators play an important role in analysing the effectiveness of implementing ESG policies (Shmelev et al., 2025). They allow us to assess whether a company can transform investments in sustainable development into real financial value (Bolek et al., 2025). Their interpretation, taking into account both the short- and long-term perspective, is of key importance for managers, investors, and decision makers responsible for shaping pro-ecological and socially responsible strategies (Rydzewska, 2023, Bolek et al., 2025; Lutfiani, Hidayah, 2022).

3. Research methodology

The study was carried out in a group of logistics companies operating in Europe. The period from 2017 to 2023 was adopted for the study, because these companies reported their ESG activities only from 2017.

The study used annual data. All data used in the study came from the S&P Global Market Intelligence database. Prices were adjusted for changes in equity, such as subscription rights, dividends, and splits. The following data was used for the calculations:

- Pref - measured using ROC and ROE.
- ESG Index - The S&P Global Market Intelligence ESG Index includes all disclosures regarding environmental factors, social and governance indicators of the company (i), in the period (t).
- ENV index - S&P Global Market Intelligence EVN Index, which measures the disclosure of energy consumption, waste, pollution, protection of natural resources and treatment of animals in company (i) in period (t).
- CRS Index – S&P Global Market Intelligence CSR Index measures the disclosure of business relationships, donations, volunteering, health and safety of employees of company (i), in period (t).
- CG Index – S&P Global Market Intelligence CG Index measures disclosure of the corporate governance code of company (i) in period (t).
- TA – company size; a control variable measured by the total assets of company (i) in period (t).
- Lev – financial leverage; a control variable measured as the ratio of total debt to total assets of company (i) in period (t) (Akbar et al., 2025).
- Turn(TA) – asset turnover, measured by net sales as a percentage of total assets.
- Gr(TA) – asset growth, measured by annual change in total assets.
- CR – current liquidity ratio.

Return on Capital (ROC), also known as Return On Invested Capital (ROIC), or Return On Capital Employed (ROCE), is a financial ratio that measures a company's profitability relative to the amount of capital invested. It indicates how effectively a company uses its capital to generate profits. This ratio is calculated by dividing Net Operating Income After Tax (NOPAT) by the average book value of Invested Capital (IC). Since financial theory states that the value of an investment is determined by both the amount and the risk of expected cash flows to the investor, ROIC and its relationship to the Weighted Average Cost of Capital (WACC). The cost of capital is the return expected from investors to bear the risk that the projected cash flows of an investment deviate from expectations. It is said that for investments in which future cash flows are progressively less certain, rational investors require progressively higher rates of return as compensation for bearing a higher degree of risk. In corporate finance, WACC is

a common measure of the minimum expected weighted average return of all investors in a company, given the riskiness of its future cash flows (Damodaran, 2007; Luhtaniemi, 2023).

ROE is one of the most important indicators in ratio analysis. The higher the value of this indicator, the more favourable the company situation. ROE stands for Return on Equity, or Return on Equity. This is a profitability indicator that indicates how much profit the company managed to generate from the contributed equity (Serzante, Stankevych, 2024).

The return-on-equity indicator provides valuable information to shareholders. When calculating ROE, the profit for a given period is calculated relative to the state of equity at the beginning of a given period. This indicator is created by dividing net profit by equity expressed as a percentage (Mudzakar, Wardanny, 2021).

High values of the indicator and an increase in its level over time are positively assessed (this indicates a high or increasing return on equity). Low values of the indicator and a decrease in its level over time are negatively assessed (this indicates a low or decreasing return on equity). It is worth knowing that the ROE indicator can have negative values. This can occur when the company generated a loss in a given period, i.e. did not obtain an accounting surplus of revenues over costs. Negative values indicate an unfavourable company situation. It should also be remembered that ROE is not a constant value. This indicator is highly dependent on the phase of the cycle in which the capital market is (Heikal et al., 2014). The most favourable signal for shareholders is a situation where a company achieves a high ROE indicator and is above the industry average. This is a proof that the company effectively manages its capital. There may also be a situation where the ROE indicator is even three times higher than the industry average. It is worth analysing the company's financial results in such cases (Ichsani et al., 2015). Perhaps this only means that the company is doing surprisingly well compared to the competition. But such a situation may also be a proof that the company has excessive debt. This can significantly increase ROE, because equity is assets minus debt. Therefore, the more a company becomes in debt, the lower the equity, which may affect ROE (Damodaran, 2007).

The table 1 presents the data data statistics for the analysed used in the study.

Table 1.
Summary statistics of all variables

	Mean	**Median**	**Max**	**Min**	**S.D.**
Current Ratio (x)	1.154	1.05	3.41	0.38	0.50
ROC	8.470	5.93	60.43	0.05	8.52
ROE	43.805	13.71	917.95	0.03	109.31
Turn(TA)	0.791	0.70	2.05	0.07	0.50
TA	11162693.358	2475549.23	93680000.00	285640.38	19732131.28
Lev	62.537	61.44	109.15	18.40	20.64
ENV Index	46.711	43.00	95.00	10.00	24.06
SCR Index	42.361	39.50	88.00	9.00	21.15
CG Index	43.720	42.00	81.00	0.00	19.21

Source: own study.

The study decided to test the following research question:

1. The ROC indicator is influenced by variables that are components of the ESG index (ENV index, SCR index, CG index).
2. The ROE indicator is influenced by variables that are components of the ESG index (ENV Index, SCR Index, CG Index).

The analysis related to the preferences of companies regarding the impact on ROC and ROE was presented in the form of parameter estimation of OLS models with heteroscedacity correction and panel models. Cross-sectional OLS models were used, in which the results related to the size of the company measured by assets constitute a logarithmic variable, which is explained by the nonlinearity of this indicator in relation to the explained variables. The study used cross-sectional regression analysis and panel data. Tests for the presence of fixed and random effects were also conducted (redundant fixed effects - Wald test, random effects - Breusch-Pagan test).

The model for the total sample is presented in Equation 1.

$$Pref_{it} = \alpha_0 + \alpha_1 EVN_{it} + \alpha_2 CSR_{it} + \alpha_3 CG_{it} + \alpha_4 \ln(TA)_{it} + \alpha_5 Gr(TA)_{it} + \alpha_6 \mathrm{Turn}(TA)_{it} + \alpha_7 Lev_{it} + \varepsilon_{it} \quad (1)$$

The independent variables were not collinear, since most of the VIF values were <5.

4. Research results

After conducting a descriptive analysis of the variables and testing the assumptions of the regression analysis, we use regression analysis to examine the components of the impact of the ESG index [CG, EVN, and CSR (independent variables)] on the company's ROC or ROE [dependent variables]. First, using an OLS model with heteroscedasticity correction, the relationship between ROC and ROE and CG, EVN and CSR indices and control variables was examined using equation 1. The study was carried out for all logistics companies regardless of their business profile and divided into companies dealing with air, sea, and land logistics (rail and road).

The RESET test was also used to analyse the model specification, which showed the correctness of the applied model (p value > 0.05). The results obtained from the RESET test show that the specification of the variables in the model is correct. The results of this estimate are presented in Table 2.

Table 2.
Estimation of model parameters from equation (1) using the OLS method

	ROC	ROE
All		
const	−0.635476	69.8962
Lev	−0.00556664	0.928123 ***
lnAT	0.164231	−10.2649 ***
Turn(AT)	6.243 ***	12.3985
CR	9.59037 ***	19.8014 **
Gr(TA)	0.0722589 **	0.305256 ***
ENV Index	−0.123606	0.524586
SCR Index	0.294098 ***	1.69407 ***
CG Index	−0.360219 **	−1.76754 ***
R2	80%	73%
AIR		
const	−16.7079	14.7261
Lev	0.117394 *	1.87414 ***
lnAT	0.624197	−11.3392 **
Turn(AT)	6.35266 **	58.256 **
CR	3.5422	−17.5605
Gr(TA)	−0.0149999	0.215857 *
ENV Index	0.232465	−0.711730
SCR Index	0.347229 ***	0.207926*
CG Index	-0.0911948	-0.740656 *
R2	78%	85%
MARINE		
const	32.391 **	27.9534
Lev	−0.0931756	0.316496
lnAT	−2.41721 *	−6.86077 **
Turn(AT)	−2.63521	−6.08623
CR	8.6497 ***	22.2357 ***
Gr(TA)	0.0845535 **	0.325394 **
ENV Index	−0.194068 *	−0.668233 ***
SCR Index	0.752434 ***	2.59955 ***
CG Index	−0.224103	−0.102839*
R2	90%	89%
Ground		
const	47.4745	804.326 *
Lev	0.200228	−0.0792611
lnAT	−3.76162	−61.5458 *
Turn(AT)	−3.00489	33.0815
CR	−24.2072	46.2461
Gr(TA)	0.0913333	0.0505877
ENV Index	−0.0691649	1.44367
SCR Index	0.97535 **	3.37535 *
CG Index	−0.134584	−1.80877 *
R2	99%	98%

Note: ∗/∗∗/∗∗∗ Indicators are significant at 10% / 5% / 1% respectively.

Source: own study.

The regression analysis performed showed that among the components of the ESG index, the SCR (Social Corporate Responsibility) variable has a positive and statistically significant impact on the ROC (Return on Capital) indicator, both in the case of a collective analysis of all logistics companies, as well as in the analysis conducted by specialisation (land, sea, air transport).

In the case of the ENV (Environmental Index) variable, a significant but small negative impact on ROC was observed only in the group of companies specialising in sea transport. In turn, CG (Corporate Governance) shows a negative correlation with ROC, but the statistical significance of this relationship is maintained only in the general analysis (for the entire sample) and disappears after breaking the data into industry groups.

When analysing control variables, the greatest impact on ROC is exerted by current liquidity (CR) ratios and the annual growth of total assets. The remaining control variables do not show a significant impact on the formation of this indicator in the companies surveyed.

Similar relationships were observed in the case of the impact of ESG on the ROE (Return on Equity) indicator. The SCR variable also has a positive and significant impact here, regardless of the logistics industry. However, the CG variable has a statistically significant but negative impact on ROE in the general analysis, but it is not significant from an industry perspective. The ENV variable has a negative and significant impact only on the ROE indicator of companies involved in sea transport.

In the case of control variables, in the analysis of the entire sample and in the groups of sea and air companies, all the variables included have a statistically significant impact on ROE. On the other hand, in the case of land transport (rail and road), only the variable (natural logarithm of the value of assets) shows a significant impact on ROE, while the remaining variables did not reach the level of statistical significance.

The tests used - the Wald test for fixed effects and the Breusch-Pagan test for random effects - allowed us to determine the best panel regression model. Models with random effects did not produce significant results, so models with fixed effects were adopted for further analysis, the results of which were consistent with previous analyses.

5. Discussion and Conclusions

The observed positive and statistically significant relationships between the social dimension of ESG (SCR) and return on capital indicators (ROE and ROC) support the thesis that corporate social responsibility can be a source of competitive advantage and increase the operational efficiency of enterprises.

These results are consistent with the growing trend of financial literature that treats the social component of ESG as a value-creating factor, not just a cost. At the same time, the negative impact of the environmental component (ENV) in the maritime sector emphasizes the need for further research on the nonlinearity and temporal nature of returns on pro-ecological investments, which indicates the potential of using the ESG investment life cycle theory and dynamic models (Cheska et al., 2022).

The negative correlation for the corporate governance component (CG) may suggest the limitations of agency theory in sectors with high operational complexity, which is an important contribution to the discussion on the contextual effectiveness of supervision mechanisms.

In terms of control variables, a significant impact on profitability was demonstrated for the current liquidity ratio (CR) and the value of assets (lnAT). This indicates the need to pursue a balanced financial policy in which the ESG strategy should go hand in hand with responsible management of assets and liabilities (Banerjee, Deb, 2023).

From a managerial and investor perspective, the results suggest that the greatest potential for improving capital efficiency in the logistics sector lies in social investments – in human capital, stakeholder relations and organizational culture. Companies should prioritize SCR strategies as an element enhancing shareholder value. At the same time, the results indicate the need for a realistic assessment of the impact of environmental initiatives, especially in subsectors requiring high capital expenditures, such as maritime transport. When implementing environmental strategies, companies should plan for a longer payback horizon and consider the use of regulatory support and external financing mechanisms (e.g. green bonds). In terms of corporate governance, companies should adapt management structures to the specifics of the business, avoiding excessive formalization, which may limit operational flexibility.

To deepen the understanding of the relationship between ESG and financial performance, it would be advisable to use more advanced econometric models that allow for the identification of causality (e.g., dynamic effects panel models, GMM models). Moreover, the inclusion of a qualitative approach, e.g., case studies, interviews with ESG managers, would allow for capturing the organizational and cultural context that influences the effectiveness of implemented strategies. Integration of quantitative results with ESG finance theory, such as the theory of socially responsible investing, stakeholder theory, or long-term value creation theory, could significantly strengthen the theoretical contribution of the manuscript.

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