THEORY METHODOLOGY PRACTICE | Review of Business and Management
2026 VOLUME 22 NUMBER 2
https://doi.org/10.18096/TMP.2026.02.01

# Sustainable Development and Foreign Direct Investment: An Environmental, Social and Governance Perspective Based on the Sustainable Development Goals

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SUMMARY

This study examines the relationship between environmental, social, and governance (ESG) performance and foreign direct investment (FDI) inflows across countries, with particular attention to the individual ESG pillars. The analysis covers 189 countries over 2011–2025, using period averages to construct a cross-sectional dataset. ESG performance is derived from Sustainable Development Goal indicators and analysed both as an aggregate index and through its environmental, social, and governance pillars. Descriptive statistics, Pearson correlation analysis, and ordinary least squares regression with macroeconomic controls are employed. The aggregate ESG index is not significantly associated with FDI inflows. Governance is negatively and significantly associated with FDI, while the environmental pillar is positive but insignificant in the main model and becomes significant after excluding two influential observations. The social pillar remains insignificant. Overall, the results indicate substantial heterogeneity across ESG dimensions.

HOW TO CITE:
Grofčíková, J., & Izáková, K. (2026). Sustainable development and foreign direct investment: An environmental, social and governance perspective based on the sustainable development goals. *THEORY METHODOLOGY PRACTICE: Review of Business and Management, 22*(2), 3-14. https://doi.org/10.18096/TMP.2026.02.01

ARTICLE HISTORY
Received 24 September 2026
Revised 04 October 2026
Accepted 24 October 2026
Published 03 November 2026

KEYWORDS
ESG; foreign direct investment, sustainability, sustainable development goals, cross-country analysis

JEL CLASSIFICATION
C21, F21, O19, Q56

## 1. INTRODUCTION

Foreign direct investment (FDI) represents an important source of capital, technology transfer, knowledge diffusion, and integration into global value chains. Traditionally, the location of FDI has been explained primarily by economic and institutional determinants, including market size, labour costs, trade openness, taxation, macroeconomic stability, and the quality of institutions. However, technological change, geopolitical tensions, global crises, and the growing emphasis on sustainable development have gradually transformed the environment in which international investment decisions are made. Environmental, social, and governance (ESG) considerations have consequently become increasingly relevant to investors and policymakers seeking to reconcile economic development with sustainability objectives.

The growing importance of sustainability in international investment decisions is reflected in recent empirical research. Foreign institutional investors tend to favour firms with stronger corporate social responsibility performance, particularly in environments characterized by greater transparency and stronger corporate governance (Ben Yahia et al., 2023). Investment decisions may also be influenced by the institutional environment and sustainability norms prevailing in investors' home countries (van Zanten & Rein, 2023), as well as by reputational risks associated with potential host locations (Nujen et al., 2021). Recent firm-level evidence further suggests that ESG performance may be relevant to inward FDI by mitigating the adverse consequences of climate-related risks for foreign investment (Qing et al., 2024).

Nevertheless, the relationship between sustainability performance and FDI remains theoretically and empirically ambiguous. The environmental dimension illustrates this ambiguity particularly well. Stricter environmental policies may increase compliance costs and discourage environmentally intensive investment, in line with the pollution haven hypothesis, whereas credible environmental regulation, technological orientation, and higher environmental standards

may attract more sustainable and higher-quality investment. Recent evidence indicates that these relationships vary according to the type of environmental policy, the characteristics of multinational enterprises, and the level of economic development of the host country (De Beule et al., 2022; Satoğlu & Salmon, 2024; Pan, 2025; Acquah et al., 2026). Similar heterogeneity can be observed in the social and governance dimensions, whose relevance for FDI depends on institutional quality, human capital, social conditions, and the development level of host economies (Bothner, 2024; Cieślik & Ryan, 2024; Lee et al., 2024).

These findings suggest that treating ESG as a single composite construct may conceal important differences among its constituent dimensions. This issue is particularly relevant in cross-country research, where environmental, social, and governance conditions differ substantially across economies. Moreover, although the relationship between selected sustainability dimensions and FDI has received increasing attention, evidence based on a comprehensive ESG framework remains relatively limited and inconclusive. Examining both aggregate ESG performance and its individual pillars may therefore provide a more nuanced understanding of whether and how sustainability characteristics are associated with countries' ability to attract foreign investment.

Against this background, the aim of this study is to examine the relationship between ESG performance and foreign direct investment (FDI) inflows across a sample of countries worldwide, with particular attention given to the heterogeneous associations of the individual ESG pillars with FDI. The study contributes to the existing literature in three respects. First, it adopts a broad cross-country perspective covering 189 economies over the period 2011–2025, thereby extending the geographical scope of the analysis beyond studies focused on particular regions or groups of countries. Second, it constructs country-level ESG measures from Sustainable Development Goal (SDG) indicators, providing a sustainability-oriented framework that differs from conventional institutional or corporate ESG measures. Third, by comparing an aggregated ESG index with its individual environmental, social and governance pillars, the study examines whether aggregation conceals heterogeneous associations with FDI inflows. This distinction is particularly relevant in light of previous findings indicating that the relationships between sustainability dimensions and foreign investment may differ across countries and ESG pillars (Chipalkatti et al., 2021; Mahna et al., 2025).

The remainder of the paper is organized as follows. The next section reviews the relevant literature and develops the research hypotheses. Section 3 describes the data and methodology, while Section 4 presents and discusses the empirical results. The final section concludes by summarizing the main findings and outlining directions for future research.

## 2. Literature Review

Foreign direct investment is traditionally explained by a combination of economic, institutional, and location-specific factors that determine the attractiveness of host economies. In recent years, however, sustainability considerations have increasingly entered international investment decisions. This development reflects a broader shift towards responsible investment, in which environmental, social, and governance criteria complement conventional financial and macroeconomic determinants. Evidence from institutional investment indicates that foreign investors tend to prefer firms with stronger corporate social responsibility performance, particularly where information disclosure and corporate governance mechanisms are more developed (Ben Yahia et al., 2023). Sustainable investment decisions are also shaped by the institutional and normative environment of investors' home countries (van Zanten & Rein, 2023), while reputational risks associated with host locations may influence the exclusion of particular investment destinations (Nujen et al., 2021). These findings suggest that sustainability characteristics may be relevant not only to portfolio investment decisions but also to the international allocation of productive capital through FDI.

Recent research on emerging economies further indicates that the individual pillars of sustainability may be differently associated with FDI inflows, reinforcing the need to distinguish among environmental, social, and governance dimensions rather than treating sustainability as a homogeneous construct (Mahna et al., 2025). Despite the growing relevance of ESG considerations, empirical evidence on their relationship with FDI remains limited and heterogeneous. One of the studies explicitly addressing ESG factors from a cross-country FDI perspective is Chipalkatti et al. (2021), who examined 161 countries and demonstrated that the relevance of environmental, social, and governance factors differs across country groups and sustainability dimensions. In particular, their findings indicate that good governance is positively associated with FDI in the full sample, while the relationships involving environmental and social factors vary depending on the characteristics and level of development of the countries considered. More recent evidence similarly suggests that ESG performance may be relevant to inward FDI by mitigating the adverse effects of climate-related risks on foreign investment (Qing et al., 2024). At the same time, the heterogeneous nature of ESG implies that an aggregate measure may conceal substantial differences among its environmental, social, and governance components.

The relationship between the environmental dimension and FDI is theoretically ambiguous. According to the pollution haven hypothesis, multinational enterprises, particularly those operating in pollution-intensive industries, may prefer countries with less stringent environmental regulation because weaker standards reduce compliance costs. Evidence

supporting such location effects has been reported in the literature, although their magnitude depends on firm, industry, and host-country characteristics (De Beule et al., 2022; Pan, 2025). Conversely, the "race-to-the-top" perspective suggests that stringent environmental regulation need not discourage foreign investment and may instead attract investors seeking technologically advanced, institutionally stable, and environmentally sustainable locations. Kim and Rhee (2019), using cross-country panel data for 120 developing countries, provide empirical support for this argument by showing that more stringent environmental regulation can attract FDI. Satoğlu and Salmon (2024) similarly report a positive relationship between environmental policy stringency and FDI, particularly in high-income countries and for selected types of environmental policies. Recent evidence from OECD countries further indicates that environmental taxes and environmental policy stringency can influence the composition and location of environmentally harmful FDI (Acquah et al., 2026). Overall, these findings demonstrate that the environmental–FDI relationship is conditional rather than uniform.

The social dimension encompasses factors related to human capital, education, labour conditions, social inclusion, and broader societal development. These characteristics may increase the attractiveness of host economies by improving labour productivity, reducing social risks, and providing multinational enterprises with a more skilled workforce. Nevertheless, empirical evidence regarding the social dimension is less consistent than for governance and remains sensitive to the level of economic development. Cieślik and Ryan (2024) show that the relevance of institutional and development-related factors for foreign investment varies across host economies, while Lee et al. (2024) find that social factors play a more prominent role in attracting FDI in developed economies than in developing ones. Chipalkatti et al. (2021) likewise report heterogeneous results for social sustainability indicators across different country groups. This suggests that the relationship between social performance and FDI may depend on the specific social indicators employed and on structural characteristics of host economies.

Among the three ESG dimensions, the governance pillar is most directly related to the institutional conditions traditionally considered in the FDI literature. Political stability, regulatory quality, the rule of law, protection of property rights, transparency, and control of corruption can reduce uncertainty and transaction costs and thereby improve the investment environment. Empirical research generally supports a positive association between institutional quality and FDI. Peres et al. (2018) and Sabir et al. (2019) document the importance of institutional quality for FDI inflows across developed and developing countries, although its relevance differs between country groups. More recent evidence confirms the role of institutions in shaping FDI location decisions (Bothner, 2024), while Cieślik and Ryan (2024) emphasise that the relationship between institutional quality and foreign investment is conditioned by the level of development of host economies. Consistent with this evidence, Chipalkatti et al. (2021) identify good governance as an important factor associated with FDI inflows.

Taken together, the literature provides a theoretical basis for expecting a positive association between sustainability performance and foreign investment, but it also reveals considerable heterogeneity across individual ESG dimensions. This distinction is important because composite ESG measures combine environmental, social, and governance characteristics that may be associated with FDI through different—and potentially opposing—mechanisms. Evidence from the broader ESG literature also suggests that aggregation may obscure differences across individual dimensions (Friede et al., 2015). Moreover, the relationship between ESG-related characteristics and FDI appears to depend on the level of economic development, institutional environment, type of investment, and measurement approach. Consequently, analysing both the aggregated ESG index and its individual pillars provides a more comprehensive framework for assessing the ESG–FDI relationship.

Based on the theoretical background and the findings of previous empirical studies, the following research hypotheses were formulated:

H1: The aggregated ESG index is positively associated with foreign direct investment (FDI) inflows.

H2: The individual ESG pillars differ in the strength and direction of their associations with foreign direct investment (FDI) inflows.

## 3. Methodology

The empirical analysis is based on data for 189 countries worldwide covering the period 2011–2025. Data on countries' performance in achieving the Sustainable Development Goals (SDGs), which were used to construct the ESG index, were obtained from the Sustainable Development Report database (Sachs et al., 2026). Macroeconomic data, including foreign direct investment inflows, GDP per capita, GDP growth, inflation, population, trade openness, and unemployment, were obtained from the World Bank's World Development Indicators database. To reduce the influence of short-term annual fluctuations, average values over the entire study period were calculated for all variables, resulting in one observation per country. This approach was adopted to focus on persistent cross-country differences in sustainability performance and FDI inflows rather than short-term annual fluctuations. The resulting dataset therefore provides a long-term cross-sectional perspective on the ESG–FDI relationship. However, averaging observations over time removes within-country variation and does not allow the analysis to capture dynamic relationships, temporal adjustments or potential lagged associations between ESG performance and FDI inflows. The number of available observations varied across variables due

to missing data. After listwise deletion of observations with missing values in the variables included in the regression models, the effective estimation sample consisted of 163 countries in both models.

The dependent variable was net foreign direct investment (FDI) inflows expressed as a percentage of GDP. The main explanatory variable was an aggregated ESG index, calculated as the arithmetic mean of the environmental (E), social (S), and governance (G) pillars. Each pillar was constructed as the average of the corresponding Sustainable Development Goal (SDG) indicators. The regression models included a set of control variables that have been identified in previous empirical studies as important determinants of FDI inflows, namely GDP per capita, GDP growth, inflation, population size, trade openness, and the unemployment rate. Due to their skewed distributions, GDP per capita and population were transformed using the natural logarithm. Definitions of all variables and their expected signs are presented in Table 1.

*Table 1*

*Definition of Variables*

| Variable | Measurement | Expected effect |
|---|---|---|
| FDI | FDI net inflows (% of GDP) | Dependent Variable |
| ESG | $ESG = \frac{E + S + G}{3}$ | + |
| E | $E = \frac{SDG6 + SDG7 + SDG12 + SDG13 + SDG14 + SDG15}{6}$ | ± |
| S | $S = \frac{SDG1 + SDG2 + SDG3 + SDG4 + SDG5 + SDG8 + SDG10 + SDG11}{8}$ | + |
| G | $G = \frac{SDG16 + SDG17}{2}$ | + |
| GDPpc | GDP per capita (constant 2015 US$) | + |
| GDPgr | GDP growth (annual %) | + |
| Inflation | Inflation, consumer prices (annual %) | - |
| Population | Total | + |
| Trade | Trade openness (as % of GDP) | + |
| Unemployment | Total (% of total labor force) | ± |

Source: Authors' compilation based on the Sustainable Development Report and World Development Indicators.

The empirical analysis consisted of descriptive statistics, Pearson correlation analysis, and multiple linear regression estimated using the ordinary least squares (OLS) method. To test the proposed hypotheses, two multiple regression models were estimated. The first model examined the relationship between the aggregated ESG index and foreign direct investment (FDI) inflows, whereas the second model replaced the aggregated ESG index with its individual pillars (E, S, and G) to assess their respective associations with FDI while controlling for the remaining ESG dimensions. The estimated models can be expressed as follows:

Model 1 (aggregated ESG):

$$\mathrm{FDI}_i = \beta_0 + \beta_1 \mathrm{ESG}_i + \beta_2 \ln\mathrm{GDPpc}_i + \beta_3 \mathrm{GDPgr}_i + \beta_4 \mathrm{Inflation}_i + \beta_5 \ln\mathrm{Population}_i + \beta_6 \mathrm{Trade}_i + \beta_7 \mathrm{Unemployment}_i + \varepsilon_i, \quad (1)$$

where *FDI* denotes net foreign direct investment inflows (% of GDP), *ESG* is the aggregated ESG index, $\beta_0$ is the intercept, $\beta$ represents the estimated regression coefficients, and $\varepsilon$ is the error term.

Model 2 (individual ESG pillars):

$$FDI_i = \beta_0 + \beta_1 E_i + \beta_2 S_i + \beta_3 G_i + \beta_4 \ln GDPpc_i + \beta_5 GDPgr_i + \beta_6 Inflation_i + \beta_7 \ln Population_i + \beta_8 Trade_i + \beta_9 Unemployment_i + \varepsilon_i, \quad (2)$$

where *E*, *S*, and *G* denote the environmental, social, and governance pillars of ESG, respectively; $\beta_0$ is the intercept, $\beta$ represents the estimated regression coefficients, and $\varepsilon$is the error term.

Multicollinearity was assessed using the variance inflation factor (VIF), while potentially influential observations were examined using Cook's distance. Given the presence of extreme FDI-to-GDP values, particular attention was paid to observations that could disproportionately affect the OLS estimates. As a robustness check, both regression models were re-estimated after excluding observations identified as particularly influential by the regression diagnostics. All statistical analyses were performed using IBM SPSS Statistics. The OLS framework was selected to provide an interpretable assessment of the conditional linear associations between ESG performance and FDI inflows across countries. Nevertheless, the specification assumes a common linear relationship across a heterogeneous sample and does not explicitly model possible nonlinearities, interaction effects or differences in the relationships across country groups. The estimated coefficients should therefore be interpreted as average conditional associations within the analysed cross-sectional sample.

## 4. Empirical Results and Discussion

Table 2 presents the descriptive statistics of the variables included in the analysis. The sample consists of 189 countries, although the number of observations varies across variables due to missing data.

*Table 2*

*Descriptive Statistics*

| Variables | N | Minimum | Maximum | Mean | Std. Dev. |
|---|---|---|---|---|---|
| FDI | 189 | -6.252 | 339.189 | 6.841 | 27.709 |
| ESG | 189 | 40.584 | 85.134 | 65.098 | 9.494 |
| E | 189 | 38.263 | 81.871 | 66.491 | 7.937 |
| S | 189 | 23.647 | 93.068 | 64.434 | 16.459 |
| G | 189 | 32.471 | 89.812 | 64.368 | 10.898 |
| GDPpc | 189 | 262.790 | 167187.157 | 14432.512 | 21642.825 |
| GDPgr | 188 | -9.002 | 17.177 | 2.844 | 2.600 |
| Inflation | 184 | 0.374 | 87.776 | 7.248 | 13.839 |
| Population | 189 | 10489 | 7674651176 | 92821190 | 586555097 |
| Trade | 170 | 14.679 | 357.423 | 88.158 | 53.184 |
| Unemployment | 179 | 0.081 | 32.423 | 7.470 | 5.546 |

Source: Authors´ calculations.

The mean ESG index score was 65.10, with the environmental pillar recording the highest average value (66.49). Average net foreign direct investment inflows amounted to 6.84% of GDP, although considerable cross-country variation was observed. The descriptive statistics reveal substantial cross-country heterogeneity in the analysed variables, particularly in FDI inflows.

Table 3 reports the results of the Pearson correlation analysis among the analysed variables.

*Table 3*

*Pearson Correlations*

| | | FDI | ESG | E | S | G | GDPpc | GDPgr | Inflation | Popula-tion | Trade |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ESG | r | -.002 | | | | | | | | | |
| | Sig. | .977 | | | | | | | | | |
| | N | 189 | | | | | | | | | |
| E | r | -.024 | .535** | | | | | | | | |
| | Sig. | .740 | .000 | | | | | | | | |
| | N | 189 | 189 | | | | | | | | |
| S | r | -.026 | .935** | .353** | | | | | | | |
| | Sig. | .727 | .000 | .000 | | | | | | | |
| | N | 189 | 189 | 189 | | | | | | | |
| G | r | .051 | .811** | .135 | .677** | | | | | | |
| | Sig. | .487 | .000 | .064 | .000 | | | | | | |
| | N | 189 | 189 | 189 | 189 | | | | | | |
| GDPpc | r | .479** | .393** | -.187** | .464** | .464** | | | | | |
| | Sig. | .000 | .000 | .010 | .000 | .000 | | | | | |
| | N | 189 | 189 | 189 | 189 | 189 | | | | | |
| GDPgr | r | .144* | -.043 | -.027 | -.055 | -.011 | -.124 | | | | |
| | Sig. | .049 | .554 | .711 | .454 | .882 | .090 | | | | |
| | N | 188 | 188 | 188 | 188 | 188 | 188 | | | | |
| Inflation | r | -.070 | -.225** | .006 | -.190** | -.307** | -.193** | -.379** | | | |
| | Sig. | .343 | .002 | .931 | .010 | .000 | .009 | .000 | | | |
| | N | 184 | 184 | 184 | 184 | 184 | 184 | 184 | | | |
| Population | r | -.027 | .001 | .046 | .023 | -.066 | -.016 | .031 | -.027 | | |
| | Sig. | .711 | .994 | .533 | .755 | .365 | .825 | .676 | .714 | | |
| | N | 189 | 189 | 189 | 189 | 189 | 189 | 188 | 184 | | |
| Trade | r | .296** | .186* | -.276** | .269** | .283** | .431** | .028 | -.231** | -.104 | |
| | Sig. | .000 | .015 | .000 | .000 | .000 | .000 | .719 | .003 | .179 | |
| | N | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 167 | 170 | |
| Unemployment | r | -.056 | .057 | .119 | -.033 | .108 | -.136 | -.187* | .045 | -.050 | .092 |
| | Sig. | .456 | .445 | .111 | .663 | .152 | .069 | .013 | .549 | .504 | .242 |
| | N | 179 | 179 | 179 | 179 | 179 | 179 | 178 | 177 | 179 | 164 |

Note: **. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed). The number of observations varies across variables due to missing data for selected macroeconomic indicators.
Source: Authors´ calculations.

No statistically significant correlation was found between FDI inflows and the aggregated ESG index ($r = -0.002$, $p > 0.05$). In contrast, FDI inflows were moderately positively correlated with GDP per capita ($r = 0.479$, $p < 0.01$) and trade openness ($r = 0.296$, $p < 0.01$), while a weak positive correlation was observed with GDP growth ($r = 0.144$, $p < 0.05$). The ESG pillars exhibited varying degrees of intercorrelation, with the strongest correlation observed between the social and governance dimensions ($r = 0.677$, $p < 0.01$). These relationships were further considered in the regression analysis, including the assessment of multicollinearity.

The results of the multiple regression analysis are presented in Tables 4 and 5. Both estimated models were statistically significant. Model 1, including the aggregated ESG index, explained 12.1% of the variance in FDI inflows ($R^2 = 0.121$; adjusted $R^2 = 0.081$; $F = 3.052$; $p = 0.005$), whereas Model 2, including the individual ESG pillars, showed higher explanatory power ($R^2 = 0.178$; adjusted $R^2 = 0.129$; $F = 3.677$; $p < 0.001$).

*Table 4*

*Model Summary and ANOVA Results*

| Model | R | R Square | Adjusted R Square | Durbin-Watson | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | .348[a] | .121 | .081 | 1.952 | 3.052 | .005[b] |
| 2 | .422[a] | .178 | .129 | 1.960 | 3.677 | .000[b] |

Source: Authors´ calculations.

In the model including the aggregated ESG index, no statistically significant association was found between ESG performance and FDI inflows (β = 0.034, $p$ = 0.751). However, when the aggregated ESG index was decomposed into its individual pillars, only the governance pillar remained statistically significant after controlling for the other ESG dimensions, exhibiting a negative association with FDI inflows (β = −0.273, $p$ = 0.015).

*Table 5*

*Regression Analysis - Coefficients*

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | VIF |
|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | |
| 1 | (Constant) | -.785 | 13.356 | | -.059 | .953 | |
| | ESG | .051 | .161 | .034 | .318 | .751 | 1.975 |
| | ln(GDPpc) | .494 | 1.228 | .049 | .402 | .688 | 2.589 |
| | GDPgr | 1.231 | .581 | .191 | 2.117 | .036 | 1.436 |
| | Inflation | .094 | .090 | .090 | 1.046 | .297 | 1.306 |
| | ln(Population) | -.708 | .608 | -.103 | -1.165 | .246 | 1.381 |
| | Trade | .062 | .026 | .234 | 2.371 | .019 | 1.720 |
| | Unemployment | -.039 | .203 | -.015 | -.192 | .848 | 1.115 |
| 2 | (Constant) | -.416 | 18.925 | | -.022 | .982 | |
| | E | .298 | .164 | .169 | 1.820 | .071 | 1.600 |
| | S | .088 | .135 | .101 | .654 | .514 | 4.419 |
| | G | -.362 | .147 | -.273 | -2.453 | .015 | 2.307 |
| | ln(GDPpc) | 1.395 | 1.411 | .138 | .989 | .324 | 3.607 |
| | GDPgr | 1.319 | .569 | .205 | 2.319 | .022 | 1.451 |
| | Inflation | .056 | .089 | .053 | .622 | .535 | 1.369 |
| | ln(Population) | -1.197 | .622 | -.174 | -1.925 | .056 | 1.527 |
| | Trade | .069 | .026 | .263 | 2.629 | .009 | 1.867 |
| | Unemployment | -.029 | .204 | -.011 | -.140 | .889 | 1.193 |

Note: a. Dependent Variable: FDI net inflows (% of GDP).

Source: Authors´ calculations.

The environmental pillar (β = 0.169) and the social pillar (β = 0.101) exhibited positive coefficients, although neither association reached statistical significance at the 5% level (p = 0.071 and p = 0.514, respectively). Among the control variables, GDP growth and trade openness were consistently positively and significantly associated with FDI inflows in both models. The variance inflation factor (VIF) values were below 5 in all cases, indicating that multicollinearity was not a serious concern.

To assess the sensitivity of the results to influential observations, both regression models were re-estimated after excluding Malta and Cyprus, which exhibited the two largest FDI-related residuals and were identified as influential cases by Cook's distance (Cook's D = 0.898 and 0.149, respectively). The aggregated ESG index remained statistically insignificant (β = −0.023, p = 0.820), confirming the main finding of Model 1. In the pillar-based specification, the environmental pillar exhibited a stronger positive and statistically significant association with FDI inflows (β = 0.332, p < 0.001), while the governance pillar retained its significant negative association (β = −0.220, p = 0.037). The social pillar remained statistically

insignificant (β = −0.213, p = 0.136). The explanatory power of the pillar-based model increased from $R^2$ = 0.178 (adjusted $R^2$ = 0.129) in the main analysis to $R^2$ = 0.305 (adjusted $R^2$ = 0.264) in the robustness specification. Overall, the robustness analysis confirms the absence of a significant association between the aggregated ESG index and FDI inflows and provides further evidence of heterogeneous associations across the individual ESG dimensions.

Overall, H1 was not supported, as the aggregated ESG index was not significantly associated with FDI inflows in either the main or the robustness specification. The results provide partial support for H2, as the individual ESG pillars exhibited heterogeneous coefficients in terms of magnitude and direction. In the main model, only the governance pillar reached statistical significance at the 5% level, whereas the robustness analysis additionally revealed a statistically significant positive association for the environmental pillar.

This finding is consistent with the broader ESG literature suggesting that aggregation across ESG dimensions may obscure heterogeneous relationships among the individual pillars (Friede et al., 2015). In the context of FDI, it also supports the view that an aggregated ESG index may not adequately capture the heterogeneous associations of its individual dimensions, particularly across countries at different stages of economic development (Chipalkatti et al., 2021).

Decomposing the aggregated ESG index into its individual dimensions revealed substantial heterogeneity in their associations with FDI inflows. Although the environmental pillar did not reach statistical significance at the 5% level in the main specification, its coefficient was positive, and the association became stronger and statistically significant after excluding two influential observations identified by the regression diagnostics. This finding is directionally consistent with the "race-to-the-top" hypothesis, empirically supported by Kim and Rhee (2019) using panel data for 120 developing countries, according to which stricter environmental regulations may attract FDI. It is also consistent with Chipalkatti et al. (2021), who reported a positive association between the environmental dimension of ESG and investment inflows. The robustness results nevertheless indicate that the magnitude and statistical significance of the environmental association are sensitive to extreme FDI observations and should therefore be interpreted with appropriate caution. In contrast, the social pillar was not statistically significant in either specification, which is consistent with the mixed and, in some samples, relatively weak association of the social dimension documented by Chipalkatti et al. (2021).

By contrast, the governance pillar exhibited a statistically significant negative association with FDI inflows in both the main and robustness specifications. This finding differs from much of the existing literature, which generally reports a positive relationship between institutional quality and FDI inflows (Peres et al., 2018; Sabir et al., 2019). Several possible explanations should therefore be considered.

First, the governance pillar used in this study differs conceptually from conventional measures of institutional quality. It is constructed from SDG 16 (Peace, Justice and Strong Institutions) and SDG 17 (Partnerships for the Goals), capturing a broader range of governance-related aspects of sustainable development. Consequently, it should not be interpreted as directly equivalent to indicators such as regulatory quality, government effectiveness or the rule of law. Differences in measurement may partly explain why the estimated association diverges from findings based on conventional institutional indicators.

Second, the negative association may reflect structural differences across host economies. Countries with relatively weaker governance performance may nevertheless record substantial FDI inflows relative to GDP because of other location-specific characteristics, including natural resource endowments, investment incentives or particular economic structures. Previous studies provide evidence that these factors may be relevant to FDI location decisions, although their role in explaining the negative governance–FDI association observed in this study has not been directly tested. Resource-seeking investment is well documented in economies that possess abundant natural resources but lack the capital or technical expertise to exploit them, so that the investment decision is driven more by resource availability than by host-country profitability or market size (Tegegne, 2024), and natural resource endowment has been found to exert a significantly positive effect on FDI inflows in African countries (Rjoub et al., 2017). Investment incentives operate in a comparable way, since multinational executives acknowledge their growing importance for investment decisions, with direct financial subsidies mainly influencing the location decision itself (Blomström & Kokko, 2003), and financial incentives had a positive and statistically significant direct effect on FDI inflows in Slovakia between 2002 and 2019, whereas fiscal incentives displayed the opposite effect (Hintošová et al., 2021); other evidence nevertheless indicates that tax incentives neither significantly affect the amount of direct investment nor usually determine its location (Wells et al., 2001). Structural characteristics point in the same direction, as market size, infrastructure availability and trade openness were the most significant determinants of FDI in the BRICS and MINT economies (Asongu et al., 2018), and market size measured by per capita GDP has been identified as the most important factor attracting FDI to less developed countries (Shamsuddin, 1994). These mechanisms should therefore be regarded as plausible explanations rather than as relationships established by the present data. Conversely, countries with stronger governance performance may exhibit lower FDI inflows as a percentage of GDP despite receiving substantial investment in absolute terms. These possibilities are especially relevant when comparing economies that differ considerably in size, development level and economic structure.

Third, the negative governance coefficient represents a conditional association estimated while controlling for the environmental and social pillars and selected macroeconomic characteristics. It therefore reflects the relationship

between governance performance and FDI inflows after accounting for these other variables, rather than the unconditional relationship between institutional quality and foreign investment. Given the correlations among ESG dimensions, the coefficient should not be interpreted as evidence that improvements in governance discourage foreign investment.

Overall, the negative governance–FDI association should be regarded as a context-dependent empirical finding rather than a general contradiction of the established institutional literature. Further research using alternative governance measures, country-group comparisons and panel data methods would be needed to assess the possible mechanisms underlying this relationship. The results also show consistent positive and statistically significant associations between economic growth and trade openness and FDI inflows across both models. In their empirical analysis of political risk and institutional quality, Busse and Hefeker (2007) identified GDP/GNI growth and trade openness as statistically significant positive determinants of FDI inflows. These findings have subsequently been confirmed by numerous studies focusing on developing economies (Sabir et al., 2019). Overall, our findings are consistent with the broad body of empirical evidence on the determinants of FDI inflows.

## 5. Conclusion

This study examined the relationship between ESG performance and foreign direct investment inflows using cross-country data for 189 countries over the period 2011–2025. The results indicate that the aggregated ESG index is not significantly associated with FDI inflows, and this finding remains unchanged after excluding two influential observations identified by regression diagnostics. At the pillar level, governance exhibits a statistically significant negative association with FDI inflows across both specifications. The environmental pillar shows a positive but statistically non-significant association in the main model; however, the relationship becomes stronger and statistically significant in the robustness analysis. The social dimension remains statistically insignificant. Overall, the differences in the magnitude, direction, and robustness of the estimated pillar-specific coefficients suggest that aggregating ESG performance may conceal important heterogeneity across its individual dimensions. In addition, GDP growth and trade openness were positively and significantly associated with FDI inflows.

The findings contribute to the literature on sustainability and foreign investment by highlighting the importance of examining environmental, social and governance dimensions separately rather than relying exclusively on an aggregated ESG measure. The negative association between governance and FDI, which differs from much of the existing institutional literature, also highlights the need to consider differences in governance measurement and the structural characteristics of host economies. This finding should therefore be interpreted as a conditional statistical association rather than evidence that stronger governance discourages foreign investment.

The study has several methodological limitations. First, the use of period averages produces a cross-sectional dataset that captures long-term differences between countries but does not account for within-country changes over time. Consequently, the analysis cannot identify dynamic or lagged relationships between ESG performance and FDI inflows or establish causality. Second, the use of OLS regression imposes a common linear specification across a heterogeneous sample of countries, potentially concealing nonlinear relationships and differences across income groups or regions. Third, the statistical significance of the environmental pillar is sensitive to the exclusion of two influential observations, indicating that the estimated associations may be affected by extreme FDI-to-GDP values.

Future research could address some of these limitations by employing panel data methods that capture temporal variation and account for unobserved country-specific heterogeneity. In addition, interaction terms, subgroup analyses and alternative econometric specifications could provide further insights into possible nonlinear relationships and differences across country groups. Particular attention could be given to examining whether the negative governance–FDI association persists across alternative governance measures, income groups and regions.

### *Declaration of competing interests*

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## *Data availability statement*

The data used in this study are derived from publicly available sources, namely the Sustainable Development Report database and the World Bank's World Development Indicators database. The dataset used for the analysis is available from the corresponding author (Janka Grofčíková, jana.grofcikova@umb.sk) upon reasonable request.

## *Sources of funding (Acknowledgment)*

This paper has been supported by the Scientific Grant Agency of the Slovak Republic under project VEGA No. 1/0120/25 "Research of paradigms and determinants of management processes and ESG implementation in the context of the required financial performance of companies and changes resulting from the CSRD directive". The authors would like to express their gratitude to the Scientific Grant Agency of the Ministry of Education, Research, Development and Youth of the Slovak Republic for financial support of this research and publication.

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Writing – original draft: Janka Grofčíková, 60%; Katarína Izáková, 40%.
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## *Generative AI declaration statement*

The authors used selected artificial intelligence (AI) tools, including ChatGPT (OpenAI), to support the language editing, stylistic refinement, and literature search during the preparation of this manuscript. All scientific interpretations, methodological decisions, data analyses, and final content of the manuscript remain the sole responsibility of the authors.

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