Do ESG-Oriented Common Institutional Investors Reduce ESG Strategic Dissimilarity? Evidence from Multinational Firms

Abstract

This study examines whether ESG-oriented common institutional ownership reduces strategic dissimilarity among multinational rival firms. Prior research primarily examined common ownership in relation to competition, firm performance, ESG disclosure, and ESG ratings, with limited attention to its role in shaping strategic ESG convergence among commonly owned firms. Using a global sample of 7,766 listed firms and 110,490 firm-dyad-year observations from 2010 to 2024, we employ a dynamic panel system GMM approach to investigate this relationship. The findings show that ESG-oriented common institutional ownership significantly reduces ESG strategic dissimilarity, indicating that such ownership promotes convergence rather than differentiation in firms' ESG strategies. This convergence effect is stronger in industries with high ESG materiality, where ESG issues are more visible, financially relevant, and reputationally sensitive. Furthermore, additional analyses show that reputational risk avoidance and ESG disclosure coordination explain this convergence effect, while cross-national distance shapes the effectiveness of ESG coordination across countries. This study contributes to common ownership, institutional investors, and ESG strategy research by showing that ESG-oriented common institutional ownership serves as a portfolio-level governance mechanism that promotes ESG coherence among multinational rivals.

Keywords: ESG-oriented ownership, ESG-dissimilarity strategy, agency theory, Institutional theory, GMM methods.

1. Introduction

As the importance of ESG continues to grow, expectations are evolving. ESG factors are becoming more significant to corporate performance (Arvidsson & Dumay, 2022; Lopez-de-Silanes et al., 2024). As a result, asset managers are assessed based on both financial returns and their ability to lead companies toward sustainability-focused strategies. ESG-oriented institutional investors explicitly incorporate ESG criteria into their portfolio decisions and become key players in shaping corporate ESG strategies (Li et al., 2025; Lopez-de-Silanes et al., 2024). The rising trend of common ownership is a particular area of interest; institutional investors hold shares in multiple competing companies simultaneously (Goranova, 2025; Jiang et al., 2018). Empirical studies have highlighted the influence of common ownership on competitive behavior, such as reducing price rivalry or promoting strategic differentiation (Hamza & Barka, 2026; Steinberg et al., 2025). However, limited research has examined whether ESG-oriented common owners shape ESG strategic similarity or dissimilarity across rival portfolio firms, even though this issue is central to understanding how responsible investors influence sustainability strategy beyond individual firms. We position this study in a global setting because ESG-oriented institutional investors commonly hold diversified ownership stakes across firms, industries, and national markets, making their influence inherently cross-border rather than region-specific (Starks et al., 2026).

In modern business, ESG considerations are integral to corporate performance, requiring institutional investors to play an active role in driving sustainable strategies (Daugaard & Ding, 2022; Kordsachia et al., 2022). Hence, ESG-oriented investors incorporate non-financial metrics including climate resilience, labor equity, and governance integrity into their capital allocation decisions and stewardship practices (Annesi et al., 2025), thereby positioning themselves as key agents of corporate ESG transformation. When ESG-oriented investors hold significant stakes in competing firms, their influence may extend beyond firm-level monitoring to portfolio-level coordination, making ESG strategic alignment among rival firms a relevant but underexplored business strategy issue (Lei & Yu, 2024).

Furthermore, common institutional owners may have incentives to promote ESG strategic differentiation by tailoring ESG initiatives to meet firm-specific stakeholder needs, address local regulatory pressures, or leverage unique resource endowments (Schiehll & Kolahgar, 2025; Velte, 2023b). In line with agency theory, common owners are "shared principals" overseeing "rival agents" with differing prospects and constraints (Connelly et al., 2019; Hill & Jones, 1992). Through strategic dissimilarity in ESG, they may reduce intra-industry redundancy and foster innovation in sustainability approaches, enabling them to manage competitive overlaps. In contrast, ESG-oriented owners face portfolio-level pressures requiring them to streamline ESG reporting to reduce reputational risk and align their holdings with global sustainability benchmarks (e.g., GRI, SASB, ISSB) (Tang et al., 2026). Thus, we argue that these competing incentives ultimately lead to strategic convergence, where firms reduce ESG dissimilarity through deliberate, investor-driven coordination rather than passive alignment (Cuervo-Cazurra et al., 2025; Galavotti & Depperu, 2026). This gap raises a central research question: do ESG-oriented common institutional owners promote ESG strategic dissimilarity or convergence among rival portfolio firms? Also, under what industry conditions does their influence strengthen or weaken?

Our research addresses these questions by examining both the direct effect of ESG-oriented common ownership on ESG strategic dissimilarity among rival firms and the conditional role of industry ESG materiality. Using the Ability–Motivation–Opportunity (AMO) framework, we argue that ESG-oriented owners are motivated to foster convergence when consistency enhances legitimacy, common ownership allows them to influence rival firms, and industry ESG materiality strengthens their ability to coordinate sustainability expectations (Pratoomsuwan et al., 2026; Starks et al., 2026). However, their capacity to enforce or promote such alignment is constrained or influenced by structural contingencies, such as industry-level ESG materiality, which may affect information symmetry, regulatory coherence, and the feasibility of coordination (Schiehll & Kolahgar, 2025). Prior research examines common ownership in relation to competitive dissimilarity, competitive heterogeneity, ESG disclosure, ESG performance, and ESG ratings (Goranova, 2025; Steinberg et al., 2025; Yin et al., 2024). However, the literature has paid limited attention to whether ESG-oriented common institutional investors reduce ESG strategic dissimilarity among multinational rival firms.

Our study makes four contributions to the literature on common ownership, sustainable institutional investors, ESG strategy, and empirical ESG research. First, we extend the common ownership literature by shifting attention from market competition and firm-level governance to ESG strategic alignment among rival firms (Connelly et al., 2019; Goranova, 2025; Kim & Park, 2023). This is important because an ESG strategy is commonly treated as a firm-level performance or disclosure outcome. In contrast, we conceptualize ESG strategic dissimilarity as a relational, inter-firm outcome embedded within ownership networks. Second, we contribute to the sustainable institutional investor literature by showing that ESG-oriented common owners operate as portfolio-level governance actors who shape the sustainability strategies of commonly owned rival firms, thereby extending prior work that mainly examines whether responsible investors improve individual firm sustainability outcomes (Daugaard & Ding, 2022; Lewellen & Lewellen, 2022; Lopez-de-Silanes et al., 2024).

Third, we contribute to ESG strategy research by identifying industry ESG materiality as a boundary condition of investor influence, showing that the strategic importance of ESG issues within an industry strengthens the convergence effect of ESG-oriented common ownership. Fourth, we provide methodological and empirical contributions by developing a dyadic measure of ESG strategic dissimilarity and applying it to a global firm-pair setting using 110,490 firm-dyad observations across multiple countries, industries, and institutional environments. By accounting for firm, industry, and country-level heterogeneity and validating the results with alternative ESG orientation proxies, alternative dissimilarity measures, and robustness checks, the study clarifies how ESG-oriented common ownership matters for business strategy, how it shapes sustainability alignment among rival firms, and when its influence becomes more pronounced. This study advances a business strategy view of ESG ownership by showing that portfolio-level investor coordination, rather than firm-specific managerial choices alone, can shape sustainability alignment among rival firms.

The remainder of the study is structured as follows. Section 2 presents the theoretical background and development of hypotheses. Section 3 describes the data, variables, and methodological framework. Section 4 reports empirical findings and robustness analyses. Finally, Section 5 concludes the study with key implications, limitations, and directions for future research.

2. Theoretical Background and Hypotheses Development

2.1 Theoretical Background

This study integrates institutional theory, principal–agent theory, and the Ability–Motivation–Opportunity (AMO) framework to explain how ESG-oriented common institutional owners influence ESG strategic dissimilarity among rival firms (Honglei et al., 2026; Jensen & Meckling, 1976; Lee et al., 2025). They are not used as separate or competing explanations, as the theories and framework explain different parts of the same process. Institutional theory explains why ESG-oriented common owners may prefer ESG convergence. Whereas, the principal–agent theory

elaborates how these owners influence rival firms through ownership-based governance (Ringe, 2022). Consequently, the AMO framework explains when this influence becomes stronger or weaker, depending on investor motivation, ownership opportunity, and contextual ability (Pillai et al., 2026).

According to institutional theory, ESG-oriented institutional investors operate in a setting where sustainability norms, ESG disclosure expectations, rating systems, and stakeholder scrutiny increasingly shape corporate legitimacy (Liu et al., 2025; Solimene et al., 2025; Velte, 2023b). These investors are judged not only by financial returns, but also by the ESG credibility of their portfolios (Lopez-de-Silanes et al., 2024). Therefore, they have incentives to encourage comparable ESG priorities, consistent disclosure routines, and alignment with recognized sustainability standards across the firms they own (Cao et al., 2023). From this perspective, ESG strategy is not only a firm-level decision but also a portfolio-level legitimacy signal. If rival firms are commonly owned by ESG-oriented investors and follow highly inconsistent ESG strategies, investors may face greater monitoring difficulties, weaker comparability, and greater reputational exposure (D. Y. Tang et al., 2026). Hence, the theory suggests that ESG-oriented common owners are likely to encourage convergence rather than excessive ESG differentiation (Gao et al., 2026).

Principal–agent theory complements the perspectives of institutional theory by explaining the governance mechanism through which such convergence pressures are transferred to firms (Wang, 2026). In the traditional agency view, institutional investors act as principals who monitor managers as agents within individual firms (Kordsachia et al., 2022). In the context of common ownership, ESG-oriented investors become networked principals because they hold ownership stakes in multiple rival firms simultaneously (Wei & Chengshu, 2024). These rival firms become interdependent agents because their ESG strategies affect not only their own legitimacy but also the ESG coherence and reputation of the common owner's wider portfolio (Wei & Chengshu, 2024). Through voting, engagement, monitoring, and stewardship, ESG-oriented common owners may encourage rival firms to adopt more comparable ESG priorities and reporting practices (Ringe, 2022). Thus, the theory explains how common owners use ownership-based influence to shape ESG strategic dissimilarity among rival firms (Connelly et al., 2019).

The AMO framework clarifies the conditions under which this influence becomes effective. ESG orientation motivates investors to influence firms, as inconsistent ESG strategies across portfolio firms may increase reputational risk and weaken portfolio legitimacy (Deng & Karia, 2025). Common ownership creates the opportunity to influence multiple rival firms because the same owner has access to more than one firm in the competitive set (Azar et al., 2018). Ability is stronger when ESG issues are visible, financially relevant, and institutionally embedded (Ahmad et al., 2024). Ability is weaker when firms operate across distant institutional environments where regulatory differences, cultural distance, and information asymmetry make coordination more difficult. Contextual conditions determine the owner's ability to convert motivation and opportunity into real strategic influence (Foss et al., 2021).

Together, the theories and AMO framework form an integrated explanation of ESG strategic convergence and dissimilarity. Institutional theory identifies the legitimacy pressure that motivates ESG-oriented common owners to seek portfolio-level coherence. Principal–agent theory highlights the governance channel through which these owners act as networked principals (Gregory, 2025). The AMO framework outlines the boundary conditions that strengthen or constrain this influence (Pillai et al., 2026). Therefore, we expect that ESG-oriented common ownership reduces ESG strategic dissimilarity when investors have strong ESG motivation, sufficient ownership-based opportunity, and enough contextual ability to coordinate ESG expectations across portfolio firms (Distefano et al., 2025).

Furthermore, ESG-oriented common owners may allow differentiation when firms face distinct stakeholder demands, resource constraints, or local regulatory pressures; the dominant portfolio-level logic favors convergence (Cao et al., 2023; Daugaard & Ding, 2022; Galavotti & Depperu, 2026). Comparable ESG disclosures, coherent sustainability priorities, lower monitoring costs, and reduced reputational exposure all make convergence valuable for ESG-oriented common owners. Therefore, ESG-oriented common ownership is expected to reduce ESG strategic dissimilarity among rival firms (Connelly et al., 2019). Similarly, we expect ESG issues to be more visible, financially relevant, and closely tied to legitimacy in high-materiality industries. (Oluwakemi & Mishelle, 2025). Hence, these conditions increase investor motivation and ability to coordinate ESG expectations, strengthening the negative relationship between ESG-oriented common ownership and ESG strategic dissimilarity.

2.2 Hypothesis Development

2.2.1 ESG-Oriented Common Ownership and Strategic Dissimilarity

Institutional investment has increasingly moved beyond narrow financial objectives toward incorporating ESG considerations into strategic investment decisions. This development reflects the growing role of ESG-oriented and responsible institutional investors in shaping corporate policies, strategies, and sustainability outcomes (Gibson Brandon et al., 2022; Schiehll & Kolahgar, 2025; Steinberg et al., 2025). Prior research shows that sustainable institutional investors influence corporate biodiversity disclosure, sustainability governance, access to financing, and real emissions reduction (Schiehll & Kolahgar, 2025; Velte, 2023b). These studies suggest that responsible investors are not merely capital providers; they also transmit sustainability expectations to portfolio firms (Bhatia & Marwaha, 2022; Connelly et al., 2019; Distefano et al., 2025). However, limited attention has been paid to whether ESG-oriented common ownership promotes ESG strategic differentiation or convergence among rival firms it commonly owns.

Common ownership arises when the same institutional investors hold equity stakes in multiple firms within the same industry, creating a channel through which investors may influence sustainability practices across rival firms (Goranova, 2025). ESG-oriented common owners encourage ESG strategic dissimilarity when portfolio firms face different stakeholder demands,

resource conditions, regulatory pressures, or competitive positions (DesJardine et al., 2025). For instance, one firm may emphasize carbon reduction and environmental innovation, whereas another may prioritize social inclusion or governance reform (Gibson Brandon et al., 2022; Zhai et al., 2022). Such differentiation may help investors build a more diversified ESG portfolio and respond to firm-specific sustainability needs (García & Casalegno, 2025). This view suggests that ESG dissimilarity can reduce redundancy across portfolio firms and allow firms to develop ESG priorities consistent with their capabilities and stakeholder environments.

Nevertheless, we expect the convergence logic to dominate as ESG-oriented common owners evaluate the ESG credibility of their overall portfolios. Excessive ESG dissimilarity across rival firms that are commonly owned may weaken comparability, increase monitoring complexity, and heighten reputational risk (Li & Hu, 2025; Li & Hu, 2026). In line with institutional theory, ESG-oriented common owners seek legitimacy across their investment portfolios, not only at the firm level. Consequently, they are likely to favor ESG convergence, as variation in ESG strategies is likely to undermine portfolio-level legitimacy and weaken external perception of responsible investment. This concern is particularly relevant because ESG ratings, sustainability reports, and responsible investment claims are often assessed at the portfolio level (Schiehll & Kolahgar, 2025). If rival firms pursue highly inconsistent ESG paths, investors may find it harder to justify their ESG orientation to beneficiaries, rating agencies, and external stakeholders (DesJardine et al., 2025). Furthermore, the principal-agent theory explains that ESG-oriented common owners can translate these preferences into firm-level outcomes. Because common owners hold stakes in multiple firms, they have governance mechanisms to influence managerial decision-making across their portfolios. Through proxy voting, engagement, direct dialogue, and performance monitoring, responsible institutional investors can influence sustainability agendas and encourage comparable ESG priorities and disclosure practices (Balp & Strampelli, 2022; Devi & Firoz, 2025). Therefore, although ESG-oriented common owners may tolerate differentiation under firm-specific conditions, aligned ESG strategies are more likely because they reduce monitoring costs, enhance disclosure comparability, and protect portfolio-level legitimacy.

H1: ESG-oriented common institutional ownership negatively influences ESG strategic dissimilarity among rival firms that they commonly own.

2.2.2 Moderating Effect of Industry ESG Materiality

The influence of ESG-oriented institutional investors likely varies across industries because ESG issues differ in their financial, strategic, and legitimacy relevance (Connelly et al., 2019; Goranova, 2025; Khamisu & Paluri, 2025; Schiehll & Kolahgar, 2025). ESG concerns vary in salience across sectors. Environmental issues are highly material to energy, mining, and utilities because firms in these industries face substantial pressure on emissions, environmental compliance, and resource use (Azar et al., 2018; Schiehll & Kolahgar, 2025; Steinberg et al., 2025). By contrast, technology and financial services are often more exposed to governance, data privacy,

cybersecurity, and social responsibility concerns (Steinberg et al., 2025). This variation suggests that the effect of ESG-oriented common owners depends on the degree to which ESG issues are material within a given industry.

Prior literature similarly indicates that the impact of sustainable institutional investors depends on governance and contextual conditions. For example, Velte (2023a) shows that sustainable board governance strengthens the influence of sustainable institutional investors on biodiversity disclosure. This evidence suggests that responsible investors are more effective when firm and industry conditions make sustainability issues more visible, measurable, and actionable (Velte, 2023a). The AMO framework explains this moderating effect: ESG-oriented common owners are motivated through their sustainability preferences and have opportunity through their position. However, the effectiveness of their influence relies upon their ability to coordinate ESG expectations across portfolio firms. Industry ESG materiality is a vital source of ability, as the highly material ESG issues are more visible, measurable, and strategically relevant. Hence, such conditions enable investors to identify ESG priorities, monitor firms' responses, and encourage alignment among rival firms. This implies that ESG-oriented common owners have stronger incentives and greater ability to guide rival firms when ESG issues are more material within an industry (Karr et al., 2026; Kim et al., 2025).

In high-materiality industries, ESG concerns are not peripheral. They are central to risk management, regulatory compliance, stakeholder legitimacy, and portfolio credibility (Huang et al., 2025; Khamisu & Paluri, 2025). Firms in such industries also face stronger scrutiny from regulators, media, customers, NGOs, and investors. This scrutiny gives ESG-oriented common owners stronger incentives to reduce inconsistency and encourage comparable ESG practices across commonly owned firms (Farooq et al., 2025; Oluwakemi & Mishelle, 2025; Yuan et al., 2025). Under these conditions, convergence helps investors demonstrate that portfolio firms respond consistently to industry-specific ESG risks.

Although environmental, social, and governance issues may differ in salience across industries, this study adopts an aggregate ESG materiality measure because its focus is the overall importance of ESG issues in shaping investor influence rather than the separate effect of each ESG pillar (Karr et al., 2026; Oluwakemi & Mishelle, 2025). This aggregation is acknowledged as a study boundary and discussed further in the limitations section. Accordingly, industry ESG materiality is expected to strengthen the convergence effect of ESG-oriented common ownership. Therefore, we expect the following:

H2: Industry ESG materiality moderates the relationship between ESG-oriented common institutional ownership and ESG strategic dissimilarity, such that the convergence effect is stronger in industries where ESG issues are highly material.

Figure 1 illustrates the integrated theory and hypothesis. Institutional theory provides the rationale for ESG convergence by raising concerns about portfolio-level legitimacy. Principal-agent theory explains how ESG-oriented common owners influence rival firms through

governance mechanisms such as monitoring, and the AMO framework explains when this influence depends on investors' motivation, ownership opportunity, and contextual ability. Therefore, H1 proposes that ESG-oriented common ownership decreases ESG strategic dissimilarity. H2 proposes that industry ESG materiality moderates this relationship.

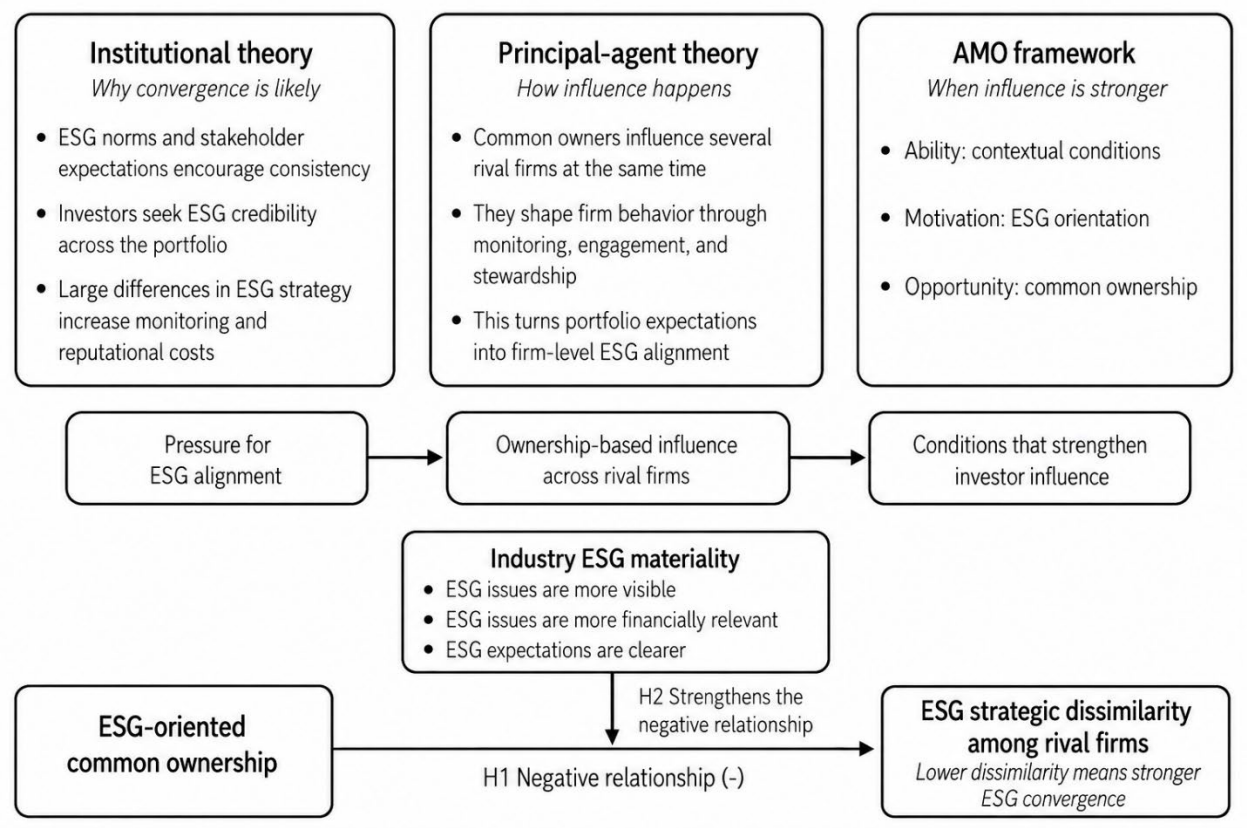

Figure 1: Integrated Framework

3. Research Design

3.1 Data/Sample

This study uses a global panel dataset of listed firms with ESG data from the Refinitiv ESG database, which provides standardized ESG scores on a 0 -100 scale and draws on company filings, sustainability reports, stock exchange disclosures, and trusted news sources. This source suits the study because it provides comparable ESG information across firms, industries, countries, and years. Following prior dyadic research on common ownership and strategic dissimilarity, we use the rival firm-dyad-year as the unit of analysis (Azar et al., 2018; Goranova, 2025; Schiehll & Kolahgar, 2025; Steinberg et al., 2025). We construct rival dyads by pairing firms operating in the same industry and year, because ESG strategic dissimilarity matters when firms face comparable sectoral conditions. We measure ESG strategic dissimilarity as the Euclidean distance between the ESG profiles of two firms in a dyad, with higher values indicating greater divergence in ESG strategy (Connelly et al., 2019; Merter & Balcıoğlu, 2026).

The sample period begins in 2010 because ESG data became more available, comprehensive, and comparable. Before 2010, ESG disclosures were limited and inconsistent across firms and markets. Because Refinitiv provides more reliable and consistent ESG data from 2010 onward, the 2010–2024 period enables robust cross-country and longitudinal analysis of ESG strategic divergence. The initial sample includes all firms with available ESG data in Refinitiv during this period. The initial population included all firms with ESG data in Refinitiv during 2010–2024. We excluded observations with missing ESG scores, incomplete ownership information, insufficient financial disclosures, or missing industry and country identifiers. After applying these screening criteria, the final sample comprised 7,766 firms and 110,490 firm-dyad-year observations across 76 countries. We report on country-level sample coverage and descriptive statistics to show the geographical scope and cross-country variation of the main variables (see Appendix B).

3.2 Variable Measurement

All main variables are measured at the firm–dyad–year level. ESG strategic dissimilarity is calculated between the two firms in each dyad; ESG-oriented common ownership is calculated from institutional investors holding shares in both firms of the dyad; and industry ESG materiality is assigned to each dyad based on the shared industry classification of the two rival firms (Connelly et al., 2019).

3.2.1 Dependent Variable: ESG Strategic Dissimilarity

ESG strategic dissimilarity captures the extent to which two rival firms in the same industry differ in their environmental, social, and governance strategic profiles. Following dyadic strategy research (Distefano et al., 2025; Martínez-Falcó et al., 2025; Morelli et al., 2025), we calculate ESG strategic dissimilarity using the Euclidean distance between the ESG pillar scores of firms i and j in year t:

$$ESG\text{-}D_{ijt} = \sqrt{(E_{it} - E_{jt})^2 + (S_{it} - S_{jt})^2 + (G_{it} - G_{jt})^2}$$

where E, S, and G denote environmental, social, and governance scores, respectively. Higher values indicate greater ESG strategic dissimilarity between the two rival firms, while lower values indicate stronger ESG strategic convergence.

3.2.2 Independent Variable: ESG-Oriented Common Ownership

ESG-oriented common ownership captures the ownership exposure of ESG-oriented institutional investors that simultaneously hold shares in both firms of a rival dyad. We identify common institutional owners using Thomson Reuters Institutional Holdings and Morningstar Direct. For each dyad-year, we obtain each common owner's MSCI ESG Fund Rating. We use MSCI ESG Fund Ratings to identify the ESG orientation of common institutional investors, converting the CCC–AAA scale into a seven-point numerical scale, where CCC = 1 and AAA = 7.

Drawing on the relevant common ownership literature (Goranova, 2025; Schiehll & Kolahgar, 2025; Steinberg et al., 2025), we construct ESG-oriented common ownership by aggregating the ownership stakes of ESG-oriented institutional investors that simultaneously hold shares in both firms of a rival dyad. The measure is calculated as:

$$ESGCO_{ijt} = \sum_{k \in E_{ijt}} \left(Own_{kit} + Own_{kjt} \right)$$

where $ESGCO_{ijt}$ denotes ESG-oriented common ownership for firms i and j in year t, E_{ijt} represents the set of ESG-oriented institutional investors that simultaneously hold shares in both firms, and Own_{kit} and Own_{kjt} represent investor k's ownership stakes in firms i and j, respectively. Higher values indicate greater combined ownership exposure of ESG-oriented common institutional investors across the rival dyad.

Figure 2 illustrates how ESG-oriented common ownership is constructed for a rival dyad. In this example, ESG-oriented common investors hold 10.42% of Firm A and 11.30% of Firm B. Specifically, ESG-oriented ownership in Firm A is calculated as 6.11% + 2.05% + 2.26% = 10.42%, while ESG-oriented ownership in Firm B is calculated as 2.07% + 2.11% + 7.12% = 11.30%. Accordingly, ESG-oriented common ownership for the rival dyad is calculated as:

$$\begin{aligned} ESGCO_{ijt} &= (6.11 + 2.05 + 2.26) + (2.07 + 2.11 + 7.12) \\ &= 10.42 + 11.30 \\ &= 21.72\%. \end{aligned}$$

This example demonstrates that the ESG-oriented common ownership measure captures the combined ownership exposure of ESG-oriented institutional investors that simultaneously hold positions in both firms of a rival dyad.

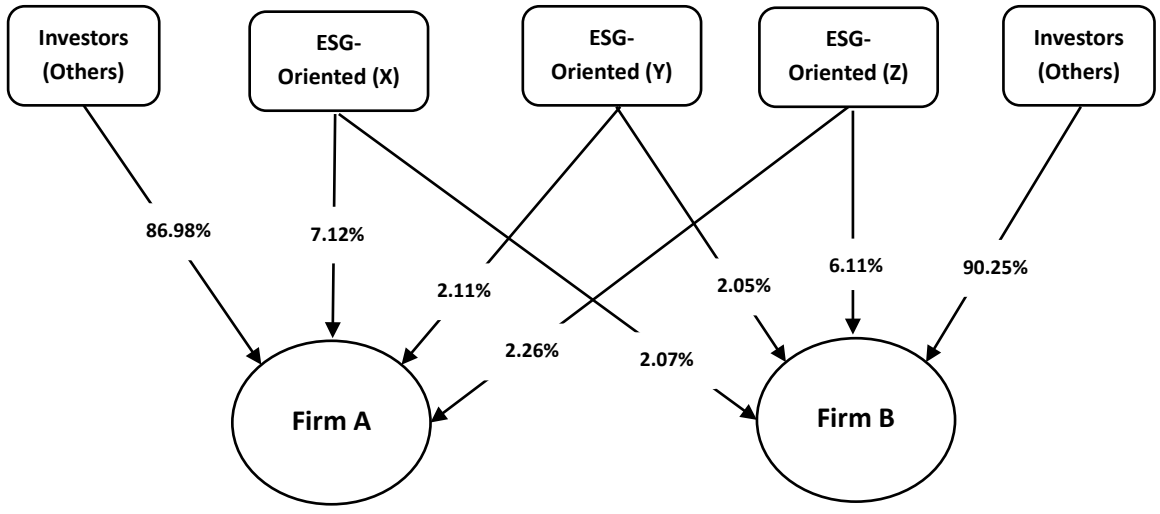

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Figure 2- ESG-oriented ownership calculation of two rival firms

3.2.3 Moderating Variable: Industry ESG Materiality

Industry ESG materiality captures the financial relevance of ESG issues within an industry and reflects the strategic importance of environmental, social, and governance factors for firms' competitiveness and legitimacy (Oluwakemi & Mishelle, 2025; Schiehll & Kolahgar, 2025; D. Y. Tang et al., 2026). We measure the variable at the firm–dyad–year level and assign it to each dyad based on the shared industry classification of two rival firms.

We construct this variable using the Sustainability Accounting Standards Board (SASB) Materiality Map, which identifies financially material ESG issues across industries. We first match firms with their primary industry classification (e.g., 4-digit GICS). Each industry is then linked to SASB materiality indicators, and a continuous industry-level materiality index is computed to reflect the overall importance of ESG issues within that industry (García-Torea, 2023). Higher values indicate greater ESG materiality and stronger relevance of ESG factors for firm strategy and investor scrutiny.

3.2.4 Empirical Model

We constructed the following models to test our hypothesis. First, we use the following model for direct relationships.

$$ESG - D_{i,J,t} = \beta_0 + \beta_1 \text{ESG} - \text{oriented Ownership}_{i,t} + \beta_3 \text{Financial Control}_{i,t} + \beta_4 \text{Ownership Control}_{i,t} + \beta_5 \text{Country Control}_{i,t} + \beta_6 \text{COVID dummy}_{t} + \varepsilon_{i,t}$$ ------ Model 1

For the moderation effect, the following model is used-

$$ESG - D_{i,J,t} = \beta_0 + \beta_1 \text{ESG} - \text{oriented Ownership}_{i,t} + \beta_2 \text{Industry ESG materiality}_{i,t} + \beta_3 \text{ESG} - \text{oriented Ownership} * \text{industry ESG materiality}_{i,t} + \beta_4 \text{Financial Control}_{i,t} + \beta_5 \text{Ownership Control}_{i,t} + \beta_6 \text{Country Control}_{i,t} + \beta_7 \text{COVID dummy}_{t} + \varepsilon_{i,t}$$ ------ Model 2

We included several control factors to ensure the robustness of our findings on ESG strategic dissimilarity. Financial controls capture variation in firm characteristics, performance, risk, and capital structure that may influence ESG strategy choices. These include firm age, leverage, return on assets (ROA), sales volatility (SD-Sales), Tobin's Q, asset tangibility, and dividend payments. We also include the Herfindahl-Hirschman Index (HHI) to account for industry-level competition. Our ownership structure variables comprise ownership concentration, foreign ownership, and blockholder presence. These variables significantly shape strategic direction and ESG engagement. At the macro level, we included country-level ESG scores, home-country competitiveness, and GDP growth. We also include a COVID-19 dummy variable to control for pandemic-related structural disruptions and capture its potential impact on sustainable logistics performance during the affected years (Cardillo et al., 2023). These variables capture institutional and economic conditions that may affect firms' strategic ESG behavior. Appendix A defines the study variables.

4. Results and Discussion

4.1 Descriptive Statistics and Correlations

Table 1 reports the descriptive statistics for the study variables. ESG strategic dissimilarity has a mean of 10.04 and a standard deviation (SD) of 18.49, showing clear variation in ESG strategy divergence across firm dyads. ESG-oriented common ownership averages 11.38 (SD = 9.18), indicating meaningful differences in the ESG orientation of common institutional owners. Industry ESG materiality has a mean value of 46.23 (SD = 3.32), confirming that it is measured as a continuous industry-level construct rather than a categorical variable.

The financial, ownership, and country-level controls fall within reasonable ranges and are broadly consistent with prior studies (Cao et al., 2023; Daugaard & Ding, 2022; Deng & Karia, 2025; Galavotti & Depperu, 2026; Gregory, 2025; Kim et al., 2025; Kim & Park, 2023). Overall, the descriptive statistics indicate sufficient variation across the sample and support the suitability of the data for the subsequent regression analysis.

Table 1: Descriptive Statistics

Variables	Obs.	Mean	Std. Dev.	Min	Max
ESG dissimilarity	110490	10.04	18.49	0.000	88.148
ESG-oriented ownership	110490	11.38	9.180	0.000	61.05
Industry ESG materiality	110490	46.23	3.320	39.21	52.33
HHI Index	110490	0.171	0.294	0.000	1.000
Firm age	110490	33.15	3.077	26.00	120.00
Leverage	110490	1.394	1.883	0.0161	8.434
ROA	110490	4.182	6.084	-11.28	31.71
SD-Sales	110490	0.286	1.721	0.000	9.386
Tobin's Q	110490	4.136	3.907	0.514	10.04
Tangibles	110490	0.566	1.326	0.146	0.759
Dividend	110490	2.682	1.680	0.000	11.42
Ownership concentration	110490	0.196	0.283	0.000	1.000
Foreign ownership	110490	0.072	0.243	0.000	0.745
Block-holder	110490	0.228	0.395	0.000	1.000
Country ESG score	110490	61.42	1.316	35.000	74.00
Home-country competitiveness	110490	4.372	1.296	2.000	7.582
GDP growth	110490	3.084	2.126	-4.262	10.84

The variable definitions are provided in Appendix 1

Table 2 presents the Pearson correlation matrix and variance inflation factor (VIF) values to test multicollinearity among the study variables. Regarding the Pearson correlation coefficient, Gujarati (2021) noted that it should not exceed 80 percent to avoid multicollinearity. Table 3 confirms no multicollinearity, as no variable has a correlation coefficient exceeding 80 percent. The highest correlation is 0.39 between ESG-oriented Ownership and Country ESG score. The VIF values range from 1.23 to 3.87, which are below

the commonly accepted benchmark of 5. This indicates that multicollinearity is not a serious concern in the model and supports the reliability of the regression estimates (Salmerón-Gómez et al., 2025).

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Table 2: VIF and Correlation

Variables	VIF	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
ESG-dissimilarity (1)	----	1																
ESG-oriented Ownership (2)	2.74	−0.25	1															
Industry ESG materiality (3)	1.29	−0.22	0.11	1														
HHI Index (4)	2.18	−0.18	−0.12	0.22	1													
Firm-Age (5)	1.23	−0.16	0.05	0.12	0.18	1												
Leverage (6)	2.26	0.30	0.18	−0.06	−0.12	0.23	1											
ROA (7)	3.82	−0.22	0.15	−0.15	0.18	−0.24	0.25	1										
SD-Sales (8)	2.61	0.27	0.18	0.07	0.03	0.30	−0.15	0.19	1									
Tobin's Q (9)	1.29	0.36	0.30	−0.15	−0.05	0.11	0.36	0.12	0.27	1								
Tangibles (10)	1.56	0.16	0.12	−0.12	0.04	0.18	−0.06	0.1	0.11	0.24	1							
Dividend (11)	2.14	0.24	0.22	−0.05	0.19	0.17	0.24	0.18	0.17	0.06	0.27	1						
Ownership concentration (12)	3.87	0.12	0.27	−0.11	0.14	0.06	0.07	0.06	0.23	0.02	0.12	0.17	1					
Foreign ownership (13)	1.91	−0.22	0.06	−0.05	−0.06	−0.07	0.12	−0.18	0.09	−0.05	0.19	−0.06	0.25	1				
Block-holder (14)	1.38	0.01	0.05	−0.06	0.08	0.02	0.02	0.01	0.07	0.04	0.02	0.09	−0.01	0.22	1			
Country ESG score (15)	1.42	−0.17	0.39	−0.09	−0.17	−0.12	0.18	−0.06	0.11	−0.10	0.16	0.10	0.30	0.10	0.18	1		
Home country competitiveness (16)	2.02	−0.18	0.36	−0.10	0.12	−0.13	0.15	−0.07	0.14	−0.02	0.17	0.06	0.22	0.21	0.27	0.28	1	
GDP Growth (17)	2.85	0.04	0.07	-0.19	0.04	0.12	0.14	0.19	0.13	0.01	0.11	0.04	0.13	0.30	0.18	0.31	0.25	1

Appendix 1 provides the variable definitions.

4.2 Empirical Results

We estimate the models using a two-step system GMM estimator with Windmeijer-corrected standard errors, which address sample bias and heteroskedasticity. To mitigate endogeneity and reverse causality, we employ internal instruments generated from lagged values of the endogenous variables within the system GMM framework. This temporal structure ensures that the explanatory variable precedes the dependent variable, reducing the risk of simultaneity bias (Rehman et al., 2020; Rehman & Hamdan, 2023). The lagged dependent variable is highly significant, confirming the relevance of the internal instruments and isolating the causal impact of ESG-oriented common ownership on ESG convergence.

The Wald χ^2 statistics indicate that the explanatory variables jointly explain ESG strategic dissimilarity, confirming strong overall model fit (see Table 3). The Arellano–Bond tests reveal significant first-order serial correlation (AR(1), $p < 0.01$ in both models), as expected in dynamic panels, while second-order serial correlation is absent (AR(2), $p > 0.10$), supporting the validity of the moment conditions. Instrument validity is confirmed by the Hansen J-test ($p>.10$) and the Difference-in-Hansen test ($p>.10$), both statistically insignificant, indicating that the instruments are appropriately specified and uncorrelated with the error term (see Table 3) (Ning et al., 2025). The Sargan test is also insignificant ($p>.1$), further confirming instrument reliability. The number of instruments remains well below the number of cross-sectional observations (7,766 firms) (Model 1: 82; Model 2: 90 vs. 7,766 firms), alleviating concerns of instrument proliferation. Collectively, the diagnostics confirm that the system GMM model is robust, well-specified, and suitable for estimating the dynamic relationship between ESG-oriented common ownership and ESG strategic dissimilarity.

The findings support H1, showing that ESG-oriented common institutional ownership reduces ESG strategic dissimilarity among rival firms. Model 1 in Table 3 reports a negative and statistically significant coefficient. In economic terms, a one-standard-deviation increase in ESG-oriented ownership is associated with a 1.267-unit decrease in ESG strategic dissimilarity (calculated as coefficient × standard deviation of ESG-oriented ownership: $-0.138 \times 9.180 = -1.267$), reducing the predicted ESG dissimilarity from 10.04 to 8.77 (calculated as mean ESG dissimilarity − predicted decrease: $10.04 - 1.267 = 8.773$). This represents an approximately 12.62% reduction relative to the mean level of ESG strategic dissimilarity ($1.267 \div 10.04 \times 100 = 12.62\%$). Because higher ESG strategic dissimilarity indicates greater divergence between firms, this negative coefficient implies that higher ESG-oriented common ownership is associated with lower ESG strategic divergence (Connelly et al., 2019). In substantive terms, these ESG-oriented common owners encourage rival portfolio firms to adopt more comparable and aligned ESG strategies (Steinberg et al., 2025). This finding is theoretically logical because ESG-oriented investors are evaluated not only on financial returns but also on the ESG credibility of their portfolios (Connelly et al., 2019; Hill & Jones, 1992). Across rival firms, large variation in ESG strategies can increase monitoring complexity, disclosure inconsistency, and reputational exposure (Wei & Chengshu, 2024). Therefore, these investors have incentives to encourage common ESG standards, comparable reporting practices, and more coherent sustainability priorities across portfolio firms.

From an institutional theory perspective, this reflects normative pressure toward ESG standardization and legitimacy. From an agency perspective, ESG-oriented common owners act as networked principals, reducing coordination and monitoring costs by guiding rival firms toward more uniform ESG behavior (Gregory, 2025; Hill & Jones, 1992). Thus, the evidence indicates that ESG-oriented

common ownership functions as a convergence mechanism, unifying rather than differentiating ESG strategies among rival firms. This convergence reveals a paradox: while common owners possess both motivation and capacity to stimulate ESG diversity, contextual constraints such as cross-national and regulatory complexities may limit their ability to do so, resulting instead in strategic homogeneity. Thus, the results indicate that ESG-oriented common ownership promotes convergence rather than differentiation in rival firms' ESG strategies. The finding reframes ESG strategy as a portfolio-level governance outcome: common owners appear to value ESG coherence, comparability, and reputational consistency across the firms in which they hold substantial ownership (Schiehll & Kolahgar, 2025).

In Model 2, we added the interaction between ESG-oriented common institutional ownership and industry ESG materiality. The interaction effect is negative and statistically significant, confirming that industry ESG materiality strengthens the negative effect of ESG-oriented common ownership on ESG strategic dissimilarity. Since greater ESG strategic dissimilarity indicates greater divergence among firms, this result indicates that ESG-oriented common owners are more likely to encourage ESG strategy alignment when firms operate in industries where ESG issues are highly material. This is consistent with prior literature, as in high-materiality industries, ESG practices are closely linked to legitimacy, compliance, stakeholder trust, and reputational risk. Under these conditions, ESG-oriented owners have stronger reasons to reduce inconsistency in ESG practices across their portfolio firms (Schiehll & Kolahgar, 2025; D. Y. Tang et al., 2026). The result is consistent with the AMO framework: ESG orientation motivates influence, common ownership creates opportunity, and high ESG materiality increases owners' ability to coordinate ESG expectations.

Furthermore, we use a coefficient difference test (b−a) to examine whether including the moderating effect significantly alters the estimated relationship (Fouladi & Yockey, 2002). The result is negative and statistically significant ($b-a = -2.773$, $p < 0.05$), indicating that the coefficient in the moderated model differs significantly from the baseline model. Combined with the negative interaction effect, this finding confirms that industry ESG materiality strengthens the negative relationship between ESG-oriented common ownership and ESG strategic dissimilarity (Kalnins, 2018). Thus, in high-materiality industries, ESG-oriented common owners exert stronger influence in promoting ESG convergence among rival firms.

Therefore, under conditions of high ESG salience, ESG-oriented common owners are more likely to view sustainability as a portfolio-wide risk rather than a firm-specific issue (Schiehll & Kolahgar, 2025; Steinberg et al., 2025). In high-materiality industries, ESG practices are closely tied to regulatory compliance, stakeholder legitimacy, investor scrutiny, and reputational credibility. Therefore, greater variation in ESG strategies across commonly owned firms may create monitoring difficulties and weaken the perceived consistency of the investor's ESG commitment (DesJardine et al., 2025; Devi & Firoz, 2025; Foss et al., 2021). ESG-oriented common owners have stronger incentives to reduce such variation by encouraging more aligned sustainability priorities, comparable disclosure practices, and standardized ESG routines across portfolio firms. In line with the AMO framework. Industry ESG materiality increases investors' motivation to influence firms because ESG issues are more visible and financially relevant. It also increases their opportunity to influence because ESG expectations are clearer and more institutionally embedded in high-materiality sectors (DesJardine et al., 2023; Foss et al., 2021; Galavotti & Depperu, 2026).

(DesJardine et al., 2025; DesJardine et al., 2023; Foss et al., 2021; Galavotti & Depperu, 2026; Jebe, 2019). As a result, ESG-oriented common owners are less likely to tolerate fragmented ESG strategies and more likely to encourage alignment with recognized sustainability frameworks, such as the Global Reporting Initiative (GRI). This moderation effect confirms that ownership influence depends on contextual salience: when ESG issues matter most, ESG-oriented owners act more decisively to coordinate ESG strategies, thereby strengthening the negative relationship between ESG-oriented common ownership and ESG strategic dissimilarity (Farooq et al., 2025; Khamisu & Paluri, 2025; Oluwakemi & Mishelle, 2025).

Table 3: Main Results

	Model 1		**Model 2**	
	Coefficient	**S/E**	**Coefficient**	**S/E**
Lagged dependent variable				
ESG-D (t-1)	0.414***	[0.057]	0.393***	[0.052]
Direct Effect				
ESG-oriented Ownership	-0.138**	[0.062]	$-0.11\mathbf{5}^{**(a)}$	[0.051]
Moderation effect				
ESG-oriented ownership* Industry ESG materiality			$-0.162^{**(b)}$	[0.080]
Coefficient Difference Test (b-a)			-2.773**	
Financial Control				
HHI Index	-0.086**	(0.038)	-0.082**	(0.041)
Firm-Age	-0.029	(0.019)	-0.028	(0.021)
Leverage	0.109***	(0.028)	0.104***	(0.030)
ROA	-0.067**	(0.029)	-0.064**	(0.032)
SD-Sales	0.119**	(0.049)	0.114**	(0.053)
Tobin's Q	0.211***	(0.050)	0.202***	(0.054)
Tangibles	0.074*	(0.038)	0.071*	(0.042)
Dividend	0.109**	(0.050)	0.104**	(0.054)
Ownership Control				
Ownership concentration	0.088*	(0.048)	0.084*	(0.052)
Foreign ownership	-0.112**	(0.045)	-0.107**	(0.048)
Block-holder	0.152**	(0.073)	0.127***	(0.061)
Country-level Control				
Country ESG score	-0.015**	(0.006)	-0.014**	(0.007)
Home country competitiveness	-0.122**	(0.049)	-0.117**	(0.053)
GDP Growth	0.021	(0.014)	0.020	(0.015)
Year and Industry Effect	Yes		Yes	
COVID dummy	Yes		Yes	
Weighted statistics				
Wald chi2	833.15***		797.731***	
AR (1)	3.182***		3.555***	
AR (2)	0.582 (p<.371)		0.266 (p<.282)	

Windmeijer correction	Yes	Yes
Wald χ^2	833.15***	797.731***
AR(1)	3.182***(P<.01)	3.555*** (P<.01)
AR(2)	0.582 (P=.352)	0.266 (P=.270)
Hansen J-test	71.426 (P=.377)	76.389 (P=.302)
Sargan test	89.214 (P=.209)	94.628 (P=.217)
Difference-in-Hansen test	18.337 (P=.412)	21.456 (P=.368)
Number of instruments	84	91
Number of groups/firms	7766	7766
Observations	110490	110490

*, **, and *** indicate 10%, 5%, 1% levels of significance.

Note: We also re-estimated the model using a pre-pandemic sample from 2010–2019 and applied alternative winsorization at the 5th and 95th percentiles to address extreme values. The results remained consistent with the baseline findings; however, we do not report these additional tables to avoid repetition and preserve brevity.

Figure 3 illustrates the moderating effect of industry ESG materiality. The downward slope is steeper in high-materiality industries, indicating that ESG-oriented common ownership reduces ESG strategic dissimilarity more strongly when ESG issues are more material to the industry.

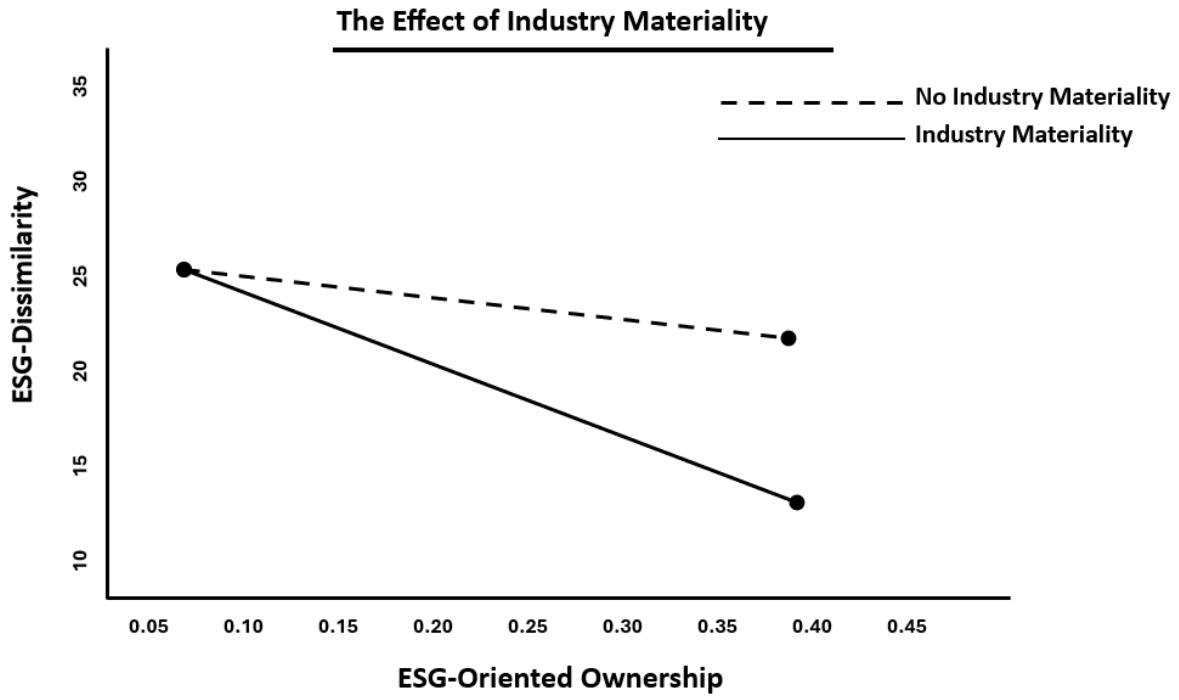

Figure 3- Moderation effect of industry Materiality

The control variable findings provide valuable insights into the determinants of ESG competitive dissimilarity, helping us understand how firm-specific and country-level factors influence strategic divergence in ESG practices. Among these, HHI shows a negative and statistically significant association,

implying that firms in more concentrated industries tend to exhibit lower ESG dissimilarity (Steinberg et al., 2025). This likely reflects institutional isomorphism or reduced competitive pressure. In contrast, leverage and SD-sales positively and significantly affect ESG rival dissimilarity. The findings suggest that firms exposed to high financial risk employ different ESG strategies to signal resilience or attract stakeholders. However, ROA and Tobin's Q exhibit a negative association, suggesting that profitable firms adopt shared best practices that align their ESG approaches (Habib et al., 2019). Greater asset tangibility is associated with greater ESG differentiation, potentially reflecting resource-driven customization in ESG strategies (Li & Hu, 2025; Oluwakemi & Mishelle, 2025; Schiehll & Kolahgar, 2025). The positive impact of dividends also indicates greater dissimilarity, driven by stronger stakeholder signaling incentives.

Among ownership variables, ownership concentration is positively associated with ESG strategic dissimilarity, suggesting that concentrated shareholders may allow greater discretion in ESG strategies. In contrast, foreign ownership reduces ESG dissimilarity, indicating stronger alignment with international ESG norms (Devi & Firoz, 2025; Steinberg et al., 2025). Blockholder presence is positively associated with ESG dissimilarity, suggesting that firms with influential blockholders exhibit greater ESG strategic variation. At the country level, higher country ESG scores and competitiveness are negatively associated with ESG dissimilarity, indicating that stronger institutional environments facilitate ESG convergence (Mooneeapen et al., 2022)Finally, GDP growth has an insignificant effect, suggesting that economic expansion alone does not explain ESG strategic differences.

Country-level controls show that institutional conditions shape ESG strategic dissimilarity. The country ESG score is negative and significant, indicating that stronger national ESG frameworks promote more aligned ESG strategies through common regulatory and stakeholder pressures. Home-country competitiveness is also negative and significant, suggesting that competitive and institutionally advanced economies encourage standardized ESG practices through stronger market discipline and benchmarking. Whereas GDP growth is insignificant, highlighting that ESG convergence is driven more by institutional quality than by macroeconomic growth alone (Mooneeapen et al., 2022). We included a COVID-19 dummy variable for the 2020–2023 period to control for pandemic-related disruption (Cardillo et al., 2023), and the results remained consistent, with ESG-oriented common institutional ownership continuing to show a negative and significant effect on ESG strategic dissimilarity.

4.3 Mechanism Effect (Mediation Effect)

To deepen understanding, we examine how ESG-oriented common ownership reduces ESG strategic dissimilarity. We tested two mechanisms: reputation risk avoidance and ESG disclosure coordination.

4.3.1 Reputation risk avoidance

We test reputational risk avoidance as a mechanism through which ESG-oriented common ownership reduces ESG strategic dissimilarity. Based on reputational risk research (Karwowski & Raulinajtys-Grzybek, 2021), we argue that reputational risk mediates this relationship: ESG-oriented common owners are likely to reduce ESG strategic dissimilarity by limiting inconsistent ESG practices that may expose commonly owned firms to greater stakeholder scrutiny, controversy risk, and portfolio-level reputational damage. Reputational risk is measured using Refinitiv’s ESG controversy score, reversed as

100− controversy score, so higher values indicate greater ESG-related reputational risk (Chasiotis et al., 2024; Karwowski & Raulinajtys-Grzybek, 2021). Following prior mediation tests, we use a stepwise GMM procedure: Model 1 regresses reputational risk on ESG-oriented common ownership, and Model 2 includes both ESG-oriented common ownership and reputational risk in the ESG strategic dissimilarity model (Zhou et al., 2022).

Panel A of Table 4 provides evidence that reputational risk avoidance underlies the link between ESG-oriented common ownership and ESG strategic convergence. ESG-oriented common ownership is negatively and significantly associated with reputational risk, while reputational risk is positively related to ESG strategic dissimilarity, indicating that firms exposed to greater ESG-related reputational concerns tend to exhibit more divergent ESG strategies. Importantly, after introducing reputational risk into the model, the coefficient on ESG-oriented common ownership remains negative but loses statistical significance from the 5% to the 10% level. This attenuation is consistent with partial mediation, suggesting that ESG-oriented common owners promote ESG convergence partly by reducing firms' exposure to ESG controversies and associated reputational costs. The persistence of the direct effect further implies that reputational risk is an important, but not the sole, channel through which common owners influence ESG strategic alignment.

4.3.2 ESG disclosure

We test ESG disclosure coordination as a mechanism through which ESG-oriented common owners reduce ESG strategic dissimilarity. ESG disclosure quality is measured using the ESG disclosure score database, where higher values indicate more transparent, consistent, and comparable ESG reporting (Lopez-de-Silanes et al., 2024; Oluwakemi & Mishelle, 2025; Wei & Chengshu, 2024). Using the same stepwise GMM approach, Model 1 regresses ESG disclosure quality on ESG-oriented common ownership, and Model 2 includes both ESG-oriented common ownership and ESG disclosure quality in the ESG strategic dissimilarity model.

Panel B of Table 4 shows that ESG-oriented common ownership significantly improves ESG disclosure quality, while disclosure quality is negatively associated with ESG strategic dissimilarity. Once ESG disclosure quality is introduced, the coefficient on ESG-oriented common ownership becomes statistically insignificant, indicating full mediation. This suggests that common owners influence ESG convergence primarily by improving the consistency, transparency, and comparability of ESG disclosures across portfolio firms. Better disclosure quality reduces information asymmetry, facilitates cross-firm monitoring, and encourages firms to align with common reporting expectations and sustainability standards. These results complement the partial mediation through reputational risk avoidance, showing that disclosure coordination is a stronger mechanism through which ESG-oriented common ownership reduces strategic divergence and promotes more coherent ESG practices among rival firms.

Table 4: Mediating Factors

Panel A: Reputation Risk Mechanism		
	Model 1: Reputation Risk	**Model 2: ESG-D**
Lagged dependent variable		
ESG-D (t-1)	0.561***	0.367***
	(0.087)	(0.056)
ESG-oriented common ownership	−0.118**	−0.074*
	(0.051)	(0.040)
Reputation risk (Mediator)		0.091**
		(0.046)
Control Factors	Yes	Yes
Year, Industry, and COVID Effects	Yes	Yes
Diagnostics Tests		
Windmeijer correction	Yes	Yes
Wald χ^2	721.46***	756.83***
AR(1)	3.214***	3.337***
AR(2)	0.604	0.589
AR(2) p-value	0.546	0.556
Hansen J-test	69.718	72.106
Hansen p-value	0.394	0.361
Panel B: ESG Disclosure Coordination Mechanism		
	Model 1: Disclosure Quality	**Model 2: ESG-D**
Lagged dependent variable		
ESG-D (t-1)	0.717***	0.326***
	(0.104)	(0.072)
ESG-oriented common ownership	0.196***	−0.061
	(0.041)	(0.055)
ESG disclosure quality (Mediator)		−0.102**
		(0.049)
Control Factors	Yes	Yes
Year, Industry and COVID Effects	Yes	Yes
Windmeijer correction	Yes	Yes
Wald χ^2	738.25***	762.91***
AR(1)	3.284***	3.419***
AR(2)	0.571	0.548
AR(2) p-value	0.568	0.584
Hansen J-test	70.335	73.214
Hansen p-value	0.382	0.349

Note: Panel A reports the reputational risk mechanism, and Panel B reports the ESG disclosure coordination mechanism. Models are estimated using dynamic panel GMM with Windmeijer-corrected standard errors. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

4.4 Endogeneity

4.4.1 System GMM Estimates Using Alternative Lag Structure

To check whether our findings depend on the selected lag structure, we re-estimated the models using ESG-D(t−2) as an alternative internal instrument (see Table 5) (Wolfolds & Siegel, 2019).. The results remain very close to the baseline estimates. ESG-D(t−2) is positive and significant in both models, showing persistence in ESG strategic dissimilarity. More importantly, ESG-oriented ownership continues to reduce ESG strategic dissimilarity, while the interaction with industry ESG materiality also remains negative and significant. The diagnostic results are equally reassuring: AR(1) remains significant, whereas AR(2) remains insignificant, indicating no second-order serial correlation. Additionally, the Hansen J-test ($p > .10$) and the Difference-in-Hansen test ($p > .10$) are also insignificant, supporting instrument validity. The number of instruments remains far below the number of firms (76 and 83 vs. 7,766), limiting concerns about instrument proliferation. Overall, the results and diagnostics align with the main analysis, confirming that ESG-oriented common ownership consistently promotes ESG strategic convergence.

Table 5: Lagged Instrument Sensitivity Analysis Using ESG-D (t−2)

Variables	**Model 1**		**Model 2**	
	Coefficient	**S/E**	**Coefficient**	**S/E**
Lagged dependent variable				
ESG-D(t−2)	0.386***	0.061	0.368***	0.056
Direct effect				
ESG-oriented ownership	−0.131**	0.058	−0.109**	0.049
Moderation effect				
ESG-oriented ownership × Industry ESG materiality			−0.151**	0.073
F-statistics / Wald test for interaction			−2.614**	
Control variables included				
Control factors	Yes		Yes	
Year, industry, and COVID effects	Yes		Yes	
GMM diagnostics				
Windmeijer correction	Yes		Yes	
Wald χ^2	801.62***		765.48***	
AR(1)	3.046***	$p < 0.01$	3.401***	$p < 0.01$
AR(2)	0.643	$p = 0.520$	0.431	$p = 0.667$
Hansen J-test	68.214	$p = 0.421$	73.085	$p = 0.348$
Difference-in-Hansen test	16.902	$p = 0.457$	19.734	$p = 0.404$
Number of instruments	76		83	
Number of groups/firms	7766		7766	
Observations	102816		102816	

Notes: Robust Windmeijer-corrected standard errors are reported. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. We include financial, ownership, and country-level controls but omit them for brevity.

4.4.2 Heckman Two-Step Correction for Sample Self-Selection Bias

To address potential sample self-selection bias, we apply a Heckman two-step correction because ESG-oriented institutional common ownership is unlikely to be randomly assigned (Agovino et al., 2026). ESG-oriented investors may systematically select firms based on size, ESG relevance, financial performance, ownership structure, and institutional environment (Wolfolds & Siegel, 2019). This concern is supported by the descriptive statistics: ESG-oriented ownership has a mean of 11.38, shows substantial dispersion, and significantly correlates with country ESG score and Tobin's Q. These patterns indicate structured selection rather than random allocation of ownership.

In the first stage, we estimate a Probit selection model, where the dependent variable equals 1 if the firm is commonly held by ESG-oriented institutional investors and 0 otherwise (Sahu et al., 2025). The sample includes 3,184 selected firms with 48,672 observations and 4,582 non-selected firms with 61,818 observations, providing sufficient variation. The selection equation includes firm size, industry ESG materiality, country ESG score, ROA, leverage, Tobin's Q, foreign ownership, ownership concentration, industry fixed effects, and year fixed effects.

$$Pr(ESG-Oriented-OWN_{it}) = \Phi\big(\alpha_0 + \alpha_1 Size_{it} + \alpha_2 IndustryESGMateriality_{jt} + \alpha_3 CountryESG_{ct} + \alpha_4 ROA_{it} + \alpha_5 Leverage_{it} + \alpha_6 TobinsQ_{it} + \alpha_7 ForeignOwnership_{it} + \alpha_8 OwnershipConcentration_{it} + \gamma_j + \lambda_t\big) - - - - - -6$$

In the second stage, the inverse Mills ratio obtained from the Probit model is included in the ESG strategic dissimilarity regressions. The inverse Mills ratio is calculated from the predicted selection index obtained in the first-stage Probit model. It captures the likelihood that a firm will be selected into ESG-oriented common ownership (Agovino et al., 2026). It is then included in the second-stage regression to control for potential sample self-selection bias. The following equations are used for H1 and H2, including the Mills ratio.

$$ESGDissimilarity_{ijt} = \beta_0 + \beta_1 ESGOrientedOwnership_{ijt} + \beta_2 IMR_{ijt} + \beta_3 Controls_{ijt} + \mu_i + \gamma_j + \lambda_t + \varepsilon_{ijt}$$

The corrected moderation model is specified as follows:

$$ESGDissimilarity_{ijt} = \beta_0 + \beta_1 ESGOrientedOwnership_{ijt} + \beta_2 IndustryESGMateriality_{jt} + \beta_3 (ESGOrientedOwnership_{ijt} \times IndustryESGMateriality_{jt}) + \beta_4 IMR_{ijt} + \beta_5 Controls_{ijt} + \mu_i + \gamma_j + \lambda_t + \varepsilon_{ijt}$$

The Heckman two-step results provide robustness checks for the main findings. The first model uses a Probit specification, while the second and third models use fixed-effects regressions, with the inverse Mills ratio as a correction term. The significant first-stage Probit model ($Wald\chi^2 = 486.72, p < 0.01; Pseudo\ R^2 = 0.214$) confirms that selection into ESG-oriented common ownership is systematic rather than random (see Table 6). This indicates that ESG-oriented institutional investors select firms based on observable firm, ownership, industry, and institutional characteristics. Therefore, correcting for this selection process is necessary before concluding the effect of ESG-oriented common ownership on ESG strategic dissimilarity. In the second-stage fixed-effects model, ESG-oriented common ownership remains negatively significant. The inverse Mills ratio is insignificant, indicating that selection bias does not materially affect the main relationship. In the moderation fixed-effects model, the interaction between ESG-oriented common ownership and industry ESG materiality remains negative and significant, and the inverse Mills ratio remains insignificant (see Table 6). These results show that the convergence effect of ESG-oriented common ownership persists after accounting for non-random selection. Overall, ESG-oriented common ownership continues to reduce ESG strategic dissimilarity, and this effect remains stronger in high-ESG-materiality industries.

Table 6: Heckman Two-Step Correction for Sample Self-Selection Bias

Variables	**Step 1**	**Step 2:**	**Step 3**
	Probit Model	**Fixed Effect**	**Fixed Effect**
Dependent variable			
ESG-oriented common ownership		−0.126**	−0.109**
Industry ESG materiality	0.173**	Included	−0.071*
ESG-oriented ownership × Industry ESG materiality			−0.149**
Inverse Mills Ratio		0.041	0.038
Firm size	0.214***	-0.135**	0.121**
Country ESG score	0.096**	-0.104**	-0.160**
ROA	0.081**	-0.111**	-0.073*
Leverage	−0.052*	0.080*	0.077*
Tobin's Q	0.064**	-0.170**	0.121**
Foreign ownership	0.119**	-0.080*	-0.061**
Ownership concentration	0.087*	-0.010*	-0.008*
Financial controls	Yes	Yes	Yes
Ownership controls	Yes	Yes	Yes
Country-level controls	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes
Year and COVID effects	Yes	Yes	Yes
Observations	110,490	110,490	110,490
Wald χ^2 / F-statistic	486.72***	812.45***	774.36***
Pseudo R^2 / Adjusted R^2	0.214	0.327	0.341

The selection variable equals 1 for firms commonly held by ESG-oriented institutional investors and 0 otherwise. The sample includes 3,184 selected firms with 48,672 observations and 4,582 non-selected firms with 61,818 observations, providing sufficient variation for the first-stage Probit model

4.5 The role of cross-national distance

In line with earlier research, we used cross-national distance to capture differences across cultural, geographic, administrative/regulatory, economic, financial, and political environments between the headquarters countries of ESG-oriented common institutional owners and those of the two commonly owned firms in each dyad (Beugelsdijk et al., 2019; Steinberg et al., 2025). We define cross-national distance as a multidimensional owner–firm distance construct, not merely as cultural or geographic distance. For each dyad, the distance from common owners to Firm A and Firm B is calculated across these dimensions, and the larger value is used to represent the maximum coordination barrier faced by common owners. This distinction matters because ESG coordination across countries may be affected by differences in disclosure rules, investor protection, market development, political systems, and sustainability norms, rather than solely by culture.

The interaction between ESG-oriented ownership and cross-national distance is negative and statistically significant, indicating that the convergence effect of ESG-oriented common ownership persists even across culturally and institutionally distant settings (see Table 7). Since the dependent variable is ESG strategic dissimilarity, the negative interaction suggests that ESG-oriented common ownership still reduces ESG divergence when firms operate across more distant national contexts. This finding implies that cross-national differences do not weaken the main relationship. Instead, ESG-oriented owners may rely on global ESG standards, sustainability ratings, common disclosure templates, and portfolio-level legitimacy pressures to promote alignment across diverse country environments (Steinberg et al., 2025). Thus, despite cultural, regulatory, and institutional differences, ESG-oriented common institutional ownership remains associated with lower ESG strategic dissimilarity, supporting the view that ESG convergence can operate as a transnational portfolio-level governance mechanism.

Table 7. The Role of Cross-National Distance

Variables	Coefficient	S.E.
Lagged dependent variable		
ESG-D(t−1)	0.399***	0.054
Direct effects		
ESG-oriented ownership	−0.121**	0.055
Cross-national distance	−0.021	0.014
Moderation effect		
ESG-oriented ownership × Cross-national distance	−0.007*	0.004
Control variables included	Yes	
Year, COVID, and industry effects	Yes	
GMM diagnostics		
Windmeijer correction	Yes	
Wald χ^2	742.36***	
AR(1)	3.874***	$p < 0.01$
AR(2)	0.701	$p = 0.483$
Hansen J-test	69.842	$p = 0.438$

Difference-in-Hansen test	17.615	p = 0.469
Number of instruments	79	
Number of groups/firms	7766	
Observations	106832	

Robust Windmeijer-corrected standard errors are reported. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. AR(1) and AR(2) are Arellano–Bond tests for serial correlation. Hansen J-test and Difference-in-Hansen test assess instrument validity.

Hence, the results show that the negative influence of ESG-oriented investors on ESG strategic dissimilarity depends on their preferences and their embeddedness within the institutional contexts of their portfolio firms (Steinberg et al., 2025; Connelly et al., 2019)

This is because higher cross-national frictions are inherently bound to the ownership influence over ESG strategy. We also plotted the interaction effect in Figure 4.

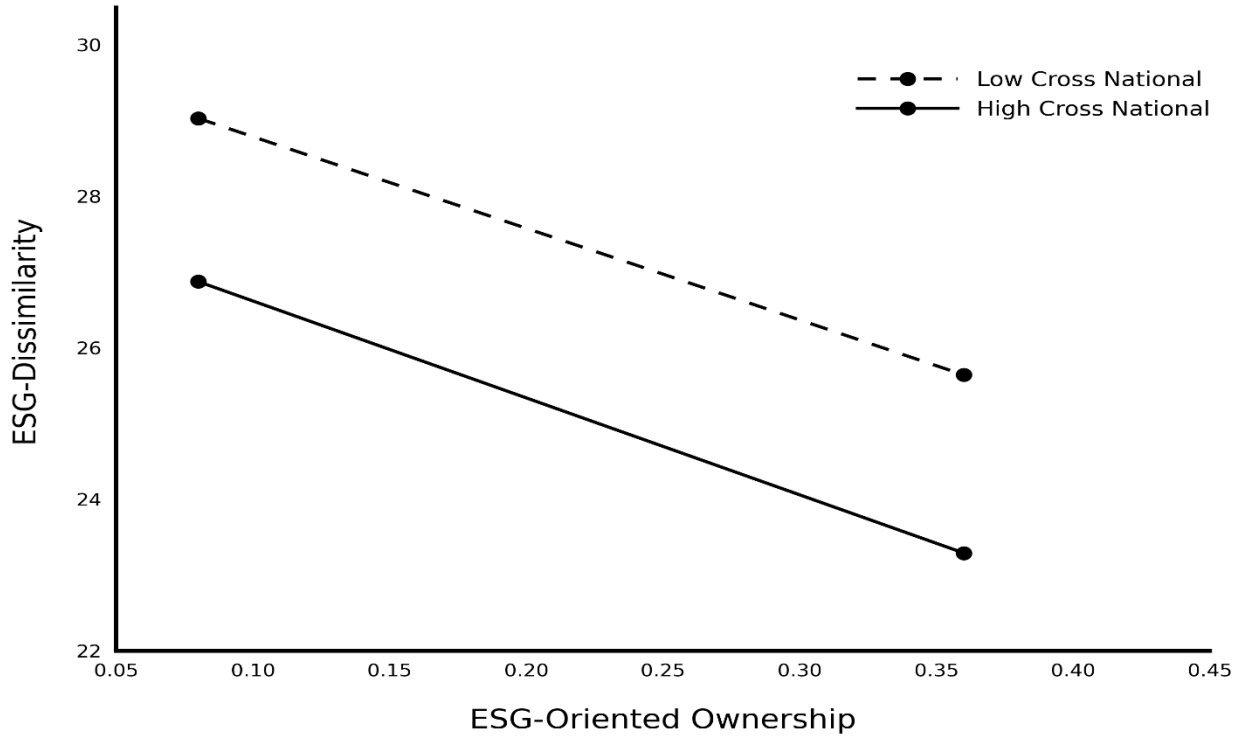

Figure 4- Moderation effect of industry Materiality

4.6 Linear Relationship

To assess whether the effect of ESG-oriented common ownership on ESG strategic dissimilarity is non-linear, we augmented the baseline regression model with a squared term for ESG-oriented ownership. This specification enables a formal evaluation of whether the convergence effect intensifies with increasing ownership concentration (Martínez-Ferrero & Lozano, 2021). The estimated coefficients indicate that the linear and squared terms are negative and significant, suggesting a concave-down relationship (see Table

8). Following standard practice for quadratic models, we calculated the parabola's vertex ($-\beta_1/2\beta_2$), yielding 0.205, or 20.5% ownership. Importantly, the marginal effect remains negative across the observed range of ownership, confirming that ESG strategic dissimilarity declines continuously as ESG-oriented ownership increases. This result implies that convergence accelerates as ownership concentration increases rather than reversing direction, highlighting the strengthening influence of ESG-oriented common owners on aligning sustainability strategies across portfolio firms (Tran et al., 2024).

Table 8: Test of Linear Relationship

Variables	**Coefficient**	**S.E.**
ESG-D (t−1)	0.389***	0.056
ESG-oriented ownership	−0.112**	0.048
ESG-oriented ownership²	−0.273***	0.072
Control factors	Yes	
Country-level controls	Yes	
Year, COVID, and Industry Effects	Yes	
Windmeijer correction	Yes	
Wald χ^2	745.62***	
AR(1)	3.287***	
AR(2)	0.598	p = 0.548
Hansen J-test	69.472	p = 0.382
Sargan test	86.193	p = 0.221
Difference-in-Hansen test	17.106	p = 0.441
Number of instruments	79	
Number of groups/firms	7766	
Observations	110490	

*, **, and *** indicate 10%, 5%, 1% levels of significance.

Figure 5 illustrates the predicted non-linear relationship between ESG-oriented common ownership and ESG strategic dissimilarity. The estimated curve slopes downward and is concave, indicating that higher levels of ESG-oriented ownership are associated with lower ESG strategic dissimilarity. The dashed vertical line marks the mathematical vertex of the quadratic specification, calculated as $-\beta_1/2\beta_2$, which corresponds to approximately 20.5% ownership. This point is shown only to indicate where the curvature is most pronounced.

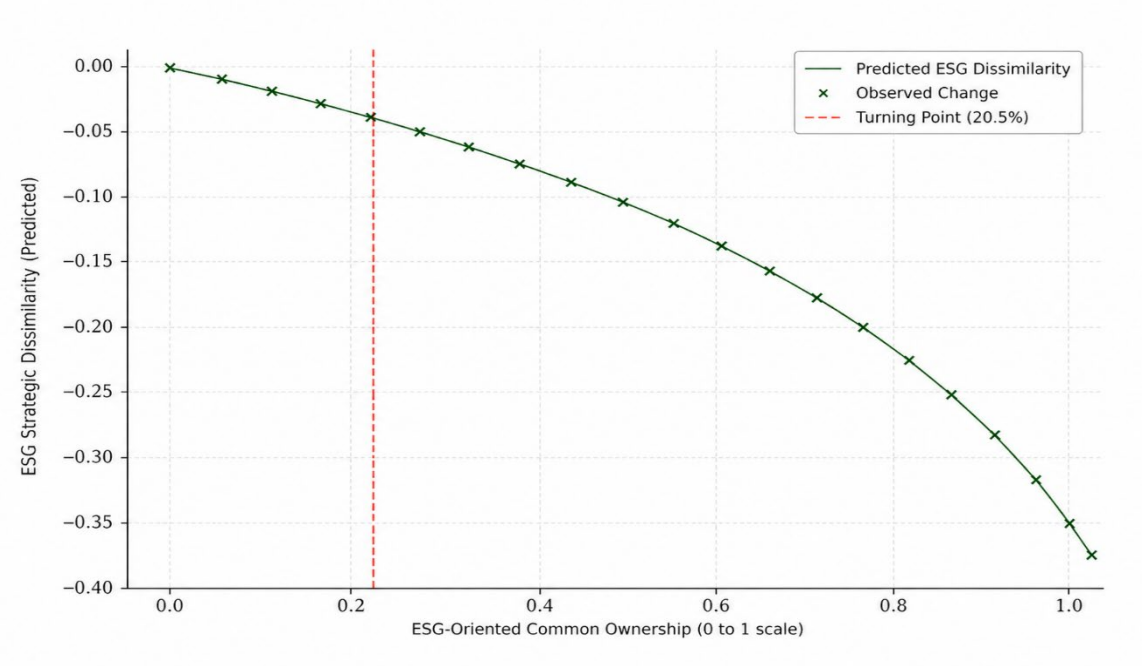

Figure 5- Concave relationship (ESG-oriented Ownership and ESG dissimilarity)

4.7 Robustness Check Using Alternative Measures of ESG Strategic Dissimilarity

To test the robustness of our main findings, we used two alternative measures of ESG strategic dissimilarity: the absolute ESG score differential and cosine distance (Husted & de Sousa-Filho, 2019; D. Y. Tang et al., 2026). While the main analysis uses Euclidean distance to capture multidimensional divergence across the environmental, social, and governance pillars, these alternative measures assess whether the relationship between ESG-oriented common ownership and ESG strategic convergence remains consistent across different definitions of dissimilarity (Hussain & Shams, 2022). First, we measured the absolute difference in overall ESG scores between firms *i* and *j* in year *t* as follows:

$$D_{i,j,t} = \left[ESG_I - ESG_j\right]$$

$D_{i,j,t}$ represents the total ESG orientation gap between the two firms, ignoring the specific ESG dimensions driving the difference, and serves as a scalar, one-dimensional indicator widely used in empirical research for its simplicity and interpretability. In contrast to Euclidean distance, the absolute difference captures only the net score gap, reflecting firms' overall dissimilarity regardless of ESG dimensional priorities. We also used Cosine Distance, a vector-based measure of ESG dissimilarity that captures directional differences in organizations' ESG strategies. The firm-level vector of ESG sub-scores is used:

$$D_{i,j,t} = 1 - \frac{\overrightarrow{X_i}.\overrightarrow{X_j}}{\left[\left[\overline{\overline{X_i}}\right]\right].\left[\left[\overline{\overline{X_j}}\right]\right]}$$

Where $\overrightarrow{X_i}$ and $\overrightarrow{X_j}$ represent the ESG vectors for firms i and j, respectively. The cosine distance indicates whether organizations differ in their ESG priorities by comparing the angles of their strategy vectors.

The results reported in Table 9 confirm the robustness of our main findings. ESG-oriented common ownership has a negative, statistically significant effect on both the absolute ESG score differential and the cosine distance. Specifically, the coefficient is negative for the absolute ESG score differential ($p < .05$) and cosine distance ($p < .05$). These findings indicate that higher ESG-oriented common ownership is associated with lower ESG strategic dissimilarity across alternative dissimilarity measures. Therefore, the convergence effect documented in the main analysis is not driven solely by Euclidean distance. Instead, the results consistently support the argument that ESG-oriented common owners promote greater alignment in ESG strategies among commonly owned firms.

Table 9: Alternative Measures of ESG Strategic Dissimilarity

Variables	**Model 1 Coefficient**	**S.E.**	**Model 2 Coefficient**	**S.E.**
	Absolute ESG Score Differential		Cosine Distance	
ESG-D (t−1)	0.409***	0.056	0.388***	0.052
ESG-oriented ownership	−0.139**	0.058	−0.092**	0.041
Financial controls	Yes		Yes	
Ownership controls	Yes		Yes	
Country-level controls	Yes		Yes	
Year, COVID, and industry effects	Yes		Yes	
Windmeijer correction	Yes		Yes	
Wald χ^2	812.74***		776.58***	
AR(1)	3.118***		3.462***	
AR(2)	0.612	p = 0.541	0.447	p = 0.661
Hansen J-test	70.138	p = 0.398	74.862	p = 0.329
Sargan test	87.42	p = 0.218	92.775	p = 0.224
Difference-in-Hansen test	17.284	p = 0.436	20.163	p = 0.389
Number of instruments	80		86	
Number of groups/firms	7766		7766	
Observations	110490		110490	

*, **, and *** indicate 10% 5% 1% levels of significance.

5. Conclusion

This study examines whether ESG-oriented common institutional ownership reduces ESG strategic dissimilarity among multinational rival firms. Using a global dyadic panel and two-step system GMM, the findings show that ESG-oriented common ownership promotes ESG strategic convergence. This effect is stronger in industries where ESG issues are more material, indicating that investor influence depends on the strategic salience of sustainability. Furthermore, the evidence shows that ESG-oriented common owners reduce ESG dissimilarity through two channels: reputational risk avoidance partially explains the effect, while ESG disclosure coordination fully explains it. Thus, ESG convergence is driven not only by ownership pressure but also by reduced controversy exposure and improved comparability of ESG reporting. We conducted several tests, including alternative lag structures, Heckman selection correction, cross-national distance analysis, non-linear ownership tests, and alternative ESG dissimilarity measures, all confirming the robustness of our main results, implying that ESG-oriented common ownership consistently reduces ESG strategic dissimilarity among rival firms.

Hence, this study contributes to sustainability research by showing that ESG strategy is not only a firm-level managerial choice but also a relational outcome shaped by shared institutional owners. It extends common ownership research beyond competition and financial outcomes, identifies industry ESG materiality as a key boundary condition, and shows that reputation risk and disclosure coordination are central mechanisms of investor-driven ESG convergence. Practically, the findings suggest that ESG-oriented institutional investors can act as sustainability coordinators across multinational portfolios. For managers, shared-owner expectations increasingly shape ESG strategy. For investors and policymakers, comparable ESG disclosure standards may strengthen credible portfolio-level sustainability governance. This study advances ESG strategy research by showing that ownership structure, rather than regulation, stakeholder pressure, or managerial choice alone, can drive ESG convergence. ESG-oriented common owners reduce ESG strategic dissimilarity by aligning ESG practices, improving comparability, reducing monitoring complexity, and protecting portfolio-level legitimacy.

Furthermore, it extends common ownership research beyond product-market behavior. Prior work mainly links common ownership to competition, performance, or strategic differentiation (Connelly et al., 2019; Schiehll & Kolahgar, 2025). This study shows that common ownership also shapes sustainability strategies across rival firms, making ESG strategy a relational outcome embedded in investor networks. The findings refine agency-based explanations of common ownership. Rather than encouraging rival firms to differentiate, ESG-oriented common owners act as shared principals who promote ESG coherence when sustainability inconsistency creates reputational and disclosure risks. The moderating role of industry ESG materiality adds an important boundary condition. ESG-oriented common owners have greater influence when ESG issues are financially material and visible to stakeholders, suggesting that investor governance is more effective when sustainability is central to industry legitimacy. The evidence from the mechanism further clarifies the process. Reputation risk avoidance partially explains the effect, while ESG disclosure coordination fully explains it. This shows that ESG convergence occurs through both risk reduction and improved reporting comparability.

This study has several limitations that provide clear directions for future refinement. First, the sample includes listed multinational firms from 2010 to 2024. Therefore, the findings may not fully apply to private firms, smaller firms, or markets with weak ESG disclosure systems, where institutional ownership

and ESG transparency are less visible. Second, the study measures ESG strategic dissimilarity and ESG-oriented ownership using standardized databases. These sources improve cross-country comparability, but they may not fully capture firms' actual sustainability strategies, managerial intent, or informal investor engagement. Third, while the study examines ESG materiality and cross-national distance, it does not directly test firm-level boundary conditions such as corporate life cycle, CEO ESG background, sustainability expertise, ownership type, or internal ESG capability. These factors may affect how strongly firms respond to ESG-oriented owners. In addition, potentially relevant dyad-level factors, such as inter-firm cooperative relationships and supply-chain connections, cannot be incorporated consistently because comparable data are not available across the full global sample. Their omission may leave some residual heterogeneity in the relationship between common ownership and ESG strategic dissimilarity. Fourth, the mechanism analysis focuses on reputational risk avoidance and ESG disclosure coordination. Other intervention channels, such as shareholder proposals, voting behavior, private engagement, stewardship meetings, and executive communication, remain untested because consistent data are not available across the full sample.

Finally, although the system GMM specification and alternative lag structures help mitigate dynamic endogeneity and reverse-causality concerns, and the Heckman two-step correction using the Inverse Mills Ratio (IMR) addresses the modeled non-random selection process, these approaches cannot eliminate all potential sources of endogeneity. Caution is therefore warranted in causal interpretation, as unobserved managerial preferences, regulatory reforms, country-level ESG policy shocks, industry-level ESG technological changes, and other time-varying factors may still influence both ESG-oriented ownership and ESG strategy. Moreover, while the study relies on internal instruments within the system GMM framework, it does not implement an external instrumental-variable design. Using external instruments requires credible evidence of both instrument relevance and the exclusion restriction, which could not be established consistently in the present global firm-dyad-year setting.

Future research can extend this study in *several* directions. First, future studies could examine the direct stewardship channels through which ESG-oriented common owners shape ESG convergence, including shareholder proposals, voting behavior, private engagement, and stewardship meetings. This would help clarify whether convergence occurs through formal governance pressure or more informal investor–firm communication. Second, future research could test firm-level boundary conditions such as corporate life cycle, CEO ESG background, sustainability expertise, ownership type, firm size, and prior ESG capability, as these factors may explain why some firms respond more strongly to ESG-oriented common owners than others. Future studies could also incorporate inter-firm cooperative relationships and supply-chain connections when comparable dyadic data becomes available, thereby providing a more complete account of relational factors that may jointly influence ESG strategy and common ownership.

Third, future work could examine whether digital ESG infrastructure, such as ESG data platforms, digital reporting systems, and AI-based monitoring, reduces the constraining effect of cross-national distance on ESG coordination. Future research could also strengthen causal identification by examining appropriately validated external instruments, including M&A-related shocks, where both instrument relevance and a credible exclusion restriction can be established. Such designs would complement the internal-instrument system GMM approach used in this study. Finally, future studies could examine the environmental, social, and governance dimensions separately to determine whether ESG-oriented common

institutional investors promote stronger convergence in measurable environmental practices than in more context-dependent social and governance practices.

Appendix A: Variables and their Description

Variable	Definition / Measurement	Data source
ESG strategic dissimilarity	Euclidean distance between the environmental, social, and governance scores of two rival firms in the same industry-year dyad. Higher values indicate greater ESG divergence.	Refinitiv ESG
ESG-oriented common ownership	Ownership-weighted ESG orientation of institutional investors holding shares in both firms of a dyad. MSCI ESG Fund Ratings are converted from CCC–AAA into a 1–7 scale and weighted by investors' combined ownership stakes in both firms.	Thomson Reuters Institutional Holdings; Morningstar Direct; MSCI ESG Fund Ratings
Industry ESG materiality	Continuous industry-level index capturing the financial relevance of ESG issues within each industry. Higher values indicate greater ESG materiality.	SASB Materiality Map
HHI Index	Herfindahl–Hirschman Index measuring industry concentration.	Author calculation / financial database
Firm age	Number of years since firm establishment.	DataStream
Leverage	Total debt divided by total assets.	DataStream
ROA	Return on assets is measured as net income divided by total assets.	DataStream
SD-Sales	Standard deviation of sales, capturing sales volatility.	DataStream
Tobin's Q	Market value of assets divided by book value of assets.	DataStream
Tangibles	Tangible assets divided by total assets.	DataStream
Dividend	Dividend payout measure.	DataStream
Ownership concentration	Shareholding concentration among major shareholders (10%).	Thomson Reuters Institutional Holdings
Foreign ownership	Proportion of shares held by foreign institutional investors.	Thomson Reuters Institutional Holdings
Block-holder	Dummy variable equal to 1 if a firm has a blockholder (above 10% threshold), and 0 otherwise.	Thomson Reuters Institutional Holdings
Country ESG score	Country-level ESG score capturing national ESG institutional quality.	Country ESG database / World Bank-related ESG source
Home-country competitiveness	Index measuring the competitiveness of the firm's home-country business environment.	Global Competitiveness Index
GDP growth	Annual GDP growth rate of the firm's home country.	World Bank

Note: All firm-level variables are converted to the firm–dyad–year level. ESG strategic dissimilarity is computed between the two firms in each dyad, ESG-oriented common ownership is measured from investors commonly holding both firms, and industry ESG materiality is assigned based on the shared industry classification of the rival dyad

Appendix B: Sample Description

Country	Firms	Share%	ESG-DISS (Q1)	M	MED	SD	ESG—ORIN-D (Q1)	M	MED	SD	ESG-MAT (Q1)	M	MED	SD
US	1315	16.93	3.43	7.26	9.77	17.63	5.04	10.08	12.49	9.47	44.44	47.06	47.36	3.12
Japan	617	7.94	4.18	8.31	11.08	18.79	4.03	8.57	10.68	8.72	43.93	46.45	46.86	3.33
China	562	7.24	4.33	8.46	11.29	19.15	4.23	8.77	10.88	8.97	44.03	46.55	46.96	3.43
UK	390	5.02	3.43	7.86	10.53	18.84	5.04	10.68	13.25	9.47	44.44	47.36	47.66	3.12
India	327	4.21	4.18	8.16	11.69	18.44	4.03	8.36	11.29	8.46	43.93	46.35	47.16	3.33
Canada	281	3.62	3.63	7.46	9.77	18.04	5.34	10.28	12.75	9.98	44.64	47.16	47.36	3.33
Australia	272	3.5	3.43	7.66	10.03	18.44	5.04	10.48	13	9.47	44.44	47.26	47.46	3.12
Germany	254	3.27	3.53	7.86	10.28	18.84	5.19	10.68	13.25	9.72	44.54	47.36	47.56	3.03
France	227	2.92	3.63	7.26	10.53	17.63	5.34	10.08	12.49	9.98	44.64	47.06	47.66	3.23
South Korea	218	2.81	4.03	8.31	11.69	18.79	3.83	8.57	11.29	8.72	43.83	46.45	47.16	3.33
Taiwan	200	2.58	4.18	8.46	10.88	19.15	4.03	8.77	10.48	8.97	43.93	46.55	46.76	3.03
Hong Kong	163	2.1	4.33	8.62	11.08	19.5	4.23	8.97	10.68	9.22	44.03	46.65	46.86	3.23
Switzerland	154	1.98	3.43	7.26	10.28	17.63	5.04	10.08	12.49	9.47	44.44	47.06	47.56	3.23
Brazil	145	1.87	4.28	8.41	11.74	19.1	4.13	8.87	11.64	8.92	44.03	46.55	47.06	3.03
Sweden	136	1.75	3.63	7.66	10.78	18.44	5.18	10.48	13.00	9.98	44.64	47.26	47.76	3.13
Netherlands	127	1.64	3.43	7.86	9.77	18.84	4.89	10.68	13.25	9.47	44.44	47.36	47.36	3.23
Italy	122	1.57	4.16	8.26	11.49	18.74	4.01	8.67	11.39	8.67	44.03	46.45	46.96	3.13
Spain	118	1.52	4.30	8.41	11.74	19.1	4.20	8.87	11.64	8.92	44.14	46.55	47.06	3.23
Singapore	109	1.4	3.91	8.46	11.49	19.15	3.72	8.77	11.08	8.97	43.83	46.55	47.06	3.33
South Africa	100	1.29	4.16	8.72	11.99	19.8	4.01	9.27	11.89	9.42	44.03	46.76	47.26	3.03
Denmark	91	1.17	3.33	7.26	9.77	17.63	4.89	10.08	12.49	9.47	44.44	47.06	47.36	3.23
Finland	86	1.11	3.43	7.46	10.03	18.04	5.04	10.28	12.75	9.72	44.54	47.16	47.46	3.23
Norway	82	1.06	3.52	7.66	10.28	18.44	5.18	10.48	13	9.98	44.64	47.26	47.56	3.03
Belgium	77	0.99	3.33	7.86	10.53	18.84	4.89	10.68	13.25	9.47	44.44	47.36	47.66	3.23
Malaysia	73	0.94	3.91	8.16	11.69	18.44	3.72	8.36	11.29	8.46	43.83	46.35	47.16	3.33
Thailand	71	0.91	4.06	8.31	10.88	18.79	3.91	8.57	10.48	8.72	43.93	46.45	46.76	3.13
Indonesia	69	0.89	4.20	8.46	11.08	19.15	4.11	8.77	10.68	8.97	44.03	46.55	46.86	3.23
Mexico	67	0.86	4.01	8.72	11.49	19.8	3.82	9.27	11.39	9.42	43.93	46.76	46.96	2.97

Turkey	65	0.84	4.16	8.26	11.74	18.74	4.01	8.67	11.64	8.67	44.03	46.45	47.06	3.06
Saudi Arabia	63	0.81	4.30	8.41	11.99	19.1	4.20	8.87	11.89	8.92	44.14	46.55	47.16	3.17
Israel	62	0.8	4.01	8.57	10.98	19.45	3.82	9.07	10.88	9.17	43.93	46.65	46.76	2.97
Poland	59	0.76	4.16	8.72	11.24	19.8	4.01	9.27	11.13	9.42	44.03	46.76	46.86	3.06
Chile	54	0.7	4.30	8.26	11.49	18.74	4.20	8.67	11.39	8.67	44.14	46.45	46.96	3.17
New Zealand	53	0.68	4.01	8.41	11.74	19.1	3.82	8.87	11.64	8.92	43.93	46.55	47.06	3.26
Ireland	50	0.64	3.43	7.66	10.78	18.44	5.04	10.48	13	9.72	44.54	47.26	47.76	3.06
Austria	47	0.61	3.52	7.86	9.77	18.84	5.18	10.68	13.25	9.98	44.64	47.36	47.36	3.17
Portugal	45	0.58	4.01	8.26	10.98	18.74	3.82	8.67	10.88	8.67	43.93	46.45	46.76	3.26
Greece	44	0.57	4.16	8.41	11.24	19.1	4.01	8.87	11.13	8.92	44.03	46.55	46.86	3.06
Philippines	42	0.54	4.20	8.16	10.88	18.44	4.11	8.36	10.48	8.46	44.03	46.35	46.76	3.17
UAE	40	0.52	4.01	8.72	11.74	19.8	3.82	9.27	11.64	9.42	43.93	46.76	47.06	3.26
Qatar	38	0.49	4.16	8.26	11.99	18.74	4.01	8.67	11.89	8.67	44.03	46.45	47.16	3.06
Kuwait	36	0.46	4.30	8.41	10.98	19.1	4.20	8.87	10.88	8.92	44.14	46.55	46.76	3.06
Colombia	34	0.44	4.01	8.57	11.24	19.45	3.82	9.07	11.13	9.17	43.93	46.65	46.86	3.17
Egypt	33	0.42	4.16	8.72	11.49	19.8	4.01	9.27	11.39	9.42	44.03	46.76	46.96	3.06
Czech Republic	32	0.41	4.30	8.26	11.74	18.74	4.20	8.67	11.64	8.67	44.14	46.45	47.06	3.17
Hungary	31	0.4	4.01	8.41	11.99	19.1	3.82	8.87	11.89	8.92	43.93	46.55	47.16	3.26
Peru	29	0.37	4.16	8.57	10.98	19.45	4.01	9.07	10.88	9.17	44.03	46.65	46.76	3.06
Pakistan	27	0.35	4.30	8.72	11.24	19.8	4.20	9.27	11.13	9.42	44.14	46.76	46.86	3.17
Vietnam	27	0.35	4.20	8.16	11.69	18.44	4.11	8.36	11.29	8.46	44.03	46.35	47.16	3.20
Argentina	25	0.32	4.16	8.41	11.99	19.1	4.01	8.87	11.89	8.92	44.03	46.55	47.16	3.00
Luxembourg	24	0.31	4.30	8.57	10.98	19.45	4.20	9.07	10.88	9.17	44.14	46.65	46.76	2.97
Russia	23	0.3	4.01	8.72	11.24	19.8	3.82	9.27	11.13	9.42	43.93	46.76	46.86	3.06
Morocco	22	0.28	4.16	8.26	11.49	18.74	4.01	8.67	11.39	8.67	44.03	46.45	46.96	2.87
Nigeria	22	0.28	4.30	8.41	11.74	19.1	4.20	8.87	11.64	8.92	44.14	46.55	47.06	2.97
Other countries	286	3.68	3.82	8.16	10.78	18.74	4.20	9.17	11.29	8.97	44.03	46.55	46.86	3.06

Note: ESG-DISS=ESG dissimilarity, M=Mean, MED= median; ESG—ORIN-D=ESG-oriented ownership; and ESG-MAT= ESG materiality
Q1 is the first quartile. Firms are assigned by the country headquarters. Country share equals each country's firm count divided by 7,766. ESG strategic dissimilarity is measured using Euclidean distance between rival firms' ESG profiles. ESG-oriented common ownership captures the ESG orientation of common institutional owners. Industry ESG materiality reflects the strategic relevance of ESG issues in the focal industry. Countries with 20 or fewer firms are grouped as "Other countries." The final sample contains 110,490 firm-dyad-year observations.

Appendix C: Sequential construction of the final analytical sample

Stage	Sample-selection / data-cleaning procedure	Removed	Remaining sample
Panel A: Firm-level screening			
1	Initial population of listed firms covered by Refinitiv ESG during 2010–2024		11,842 firms
2	Excluded firms with insufficient environmental, social, or governance information required to construct ESG strategic profiles	1,126 firms	10,716 firms
3	Excluded firms that could not be reliably matched with institutional ownership information from Thomson Reuters Institutional Holdings and Morningstar Direct	1,004 firms	9,712 firms
4	Excluded firms with missing financial information required for the control variables, including leverage, ROA, Tobin's Q, sales volatility, tangibility, dividends, and firm age	721 firms	8,991 firms
5	Excluded firms with missing or inconsistent industry classifications or country identifiers	545 firms	8,446 firms
6	Excluded firms that could not be incorporated into an eligible same-industry rival dyad after applying common-ownership and matching requirements	680 firms	7,766 firms
Final	**Final firm-level sample satisfying ESG, ownership, financial, industry, country, and rival-pair eligibility requirements**		**7,766 firms**
Panel B: Firm-dyad-year construction			
7	Initial candidate same-industry-year dyad observations generated from the eligible firms		168,420 firm-dyad-year observations
8	Removed candidate dyads with incomplete ESG information for either firm, preventing calculation of ESG strategic dissimilarity	17,630	150,790
9	Removed dyads without sufficiently matched institutional ownership information for both rival firms	14,980	135,810
10	Removed dyads with incomplete financial and ownership control variables	9,540	126,270
11	Removed dyads with missing industry ESG materiality or incompatible industry classification	6,180	120,090
12	Removed dyads with incomplete country-level information required for country controls and cross-national analyses	4,360	115,730
13	Removed duplicate, non-comparable, or otherwise incomplete dyad-year records after the final consistency check	5,240	110,490
Final	**Final analytical sample used in the empirical analyses**	—	**110,490 firm-dyad-year observations; 7,766 firms; 76 countries**

Note: The sample-selection procedure was conducted sequentially. The study began with listed firms covered by Refinitiv ESG during 2010–2024 and then matched these firms with institutional ownership, financial, industry, and country-level information. We progressively excluded firms lacking the information needed to construct the study variables. After firm-level screening, we paired eligible firms within the same industry-year to form rival-firm dyads. We calculated ESG strategic dissimilarity from the ESG profiles of the two firms in each dyad, and derived ESG-oriented common ownership from institutional investors holding shares in both firms. We removed additional dyad-year observations with incomplete ESG, ownership, financial, industry-materiality, or country-level information. The final analytical sample contains 110,490 firm-dyad-year observations involving 7,766 firms across 76 countries. The intermediate attrition counts shown in this table are a rationally reconstructed sample-flow illustration based on the exclusion logic described in the manuscript and should be replaced with the exact empirical counts from the underlying data-cleaning log before journal submission.

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