# “ESG initiatives and financial stability in the Korean financial industry: The moderating role of ownership concentration”

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| **AUTHORS** | Kevin Troy Chua<br>Hae-Young Byun |

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**Kevin Troy Chua** (Philippines), **Hae-Young Byun** (South Korea)

# ESG INITIATIVES AND FINANCIAL STABILITY IN THE KOREAN FINANCIAL INDUSTRY: THE MODERATING ROLE OF OWNERSHIP CONCENTRATION[1]

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Kevin Troy Chua, Ph.D., Faculty Member, College of Accountancy and Finance, Polytechnic University of the Philippines, Philippines.

Hae-Young Byun, Ph.D., Professor of Accounting, Department of Accounting, College of Business Administration, Kangwon National University, South Korea. (Corresponding author)

## Abstract

Financial firms are emerging as key drivers of sustainable business, shaping development through the entities they choose to finance. The ownership structures and governance mechanisms of these firms can shape sustainability efforts, potentially affecting financial stability through risks and costs of implementation. This study aims to examine the impact of ESG initiatives on the financial stability of Korean financial firms and understand how ownership concentration moderates this relationship. Utilizing a fixed-effects regression model, the study investigates 537 firm-year observations across 53 Korean financial sector firms, including banks, insurance companies, securities firms, and diversified financial services firms, from 2012 to 2023. The analysis reveals that for banks, environmental sustainability initiatives are positively associated with financial stability (coefficient = 0.0017; t = 1.84), while social responsibility initiatives have a negative association (coefficient = –0.0018; t = –2.00). For insurance firms, overall sustainability efforts show a negative relationship with financial stability (coefficient = –0.0061; t = –1.72), driven mainly by the governance dimension (coefficient = –0.0074; t = –2.06). Additionally, in the case of banks, higher ownership concentration diminishes the positive impact of environmental sustainability on financial stability (coefficient = –0.0056; t = –1.90). Moreover, ownership concentration acts as a double-edged sword where its moderating impact varies depending on whether the financial firm is a high or low ESG performer. These findings highlight the importance of firm-specific dynamics in aligning with institutional and societal expectations of ESG while navigating the complexities of ownership concentration as a pathway for financial firms to maintain financial stability.

**Keywords** ESG, sustainability, accounting, financial stability, banks, insurance, financial services, industry-level analysis

**JEL Classification** G2, G21, G32, M41, Q56

## INTRODUCTION

Across various sectors, companies have increasingly adopted more responsible and sustainable business practices, with financial firms emerging as one of the most active industry players over the past decade (D'Amato et al., 2024). Given their systemic influence on economic development and their ability to direct capital flows, financial firms are uniquely positioned to drive environmentally and socially responsible change (Weber et al., 2014). This relevance is amplified by increasing stakeholder and regulatory scrutiny, which has led financial firms to integrate ESG initiatives into their strategic and risk man-



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Author(s) reported no conflict of interest

1 This study constitutes the third component of the author's Ph.D. dissertation, entitled "Three Accounting Essays on Industry-Level Analyses of the Valuation Implications of Environmental, Social, and Governance (ESG) Sustainability Initiatives," which was developed and completed under the close scholarly collaboration, expert mentorship, and direct supervision of Professor Hae-Young Byun, Professor of Accounting at Kangwon National University, South Korea. The version presented herein has been substantially abridged and refined from its original dissertation form for clarity and conciseness.

agement frameworks (Miralles-Quiros et al., 2019; Crespi & Migliavacca, 2020; Gholami et al., 2022; Mandas et al., 2023). At the same time, the growing market for sustainable financial products continues to shape ESG priorities within the industry (Migliorelli, 2021).

However, despite these developments, significant questions remain about how internal organizational factors, particularly ownership structure, shape ESG engagement and its implications for firm-level outcomes. Concentrated ownership may influence decision-making and long-term orientations toward ESG, particularly in governance-sensitive environments such as financial services (Choi et al., 2024; Wen et al., 2023). This is especially critical in the context of strict regulatory frameworks, where ownership-driven ESG decisions may intersect with institutional constraints affecting financial stability (Dell'Atti et al., 2017; Chiaramonte et al., 2022).

This study addresses a critical gap in the literature by investigating how ESG initiatives influence the financial stability of financial firms, with particular attention to the moderating role of ownership concentration. The scientific problem lies in the limited empirical understanding of how internal structures, especially ownership concentration, shape the outcomes of ESG engagement and their implications for financial stability in the financial sector. While ESG has gained strategic importance in the financial sector, the institutional mechanisms through which sustainability efforts interact with firm structure and performance remain underexplored, particularly in the context of highly regulated environments such as Korean financial institutions. Grounded in institutional theory, this study seeks to provide empirical insights into these dynamics, contributing to a deeper understanding of sustainability practices within the financial sector.

## 1. LITERATURE REVIEW AND HYPOTHESES

Anecdotal evidence suggests that Korean financial institutions are actively integrating ESG principles into their operations, with a strong emphasis on environmental initiatives. Major financial groups such as Shinhan and Hana Financial have accelerated ESG bond issuance to fund environmentally and socially beneficial projects. Many institutions are also restructuring portfolios to support carbon reduction and are adopting sustainable policies, including biodiversity conservation and coal divestment. In addition, the Bank of Korea and the Financial Supervisory Service (FSS) have conducted climate stress tests to evaluate the sector's resilience to climate-related risks, aiming to safeguard financial stability amid global transitions to a low-carbon economy. Financial holding companies have also pledged to ease interest burdens on small business owners and the self-employed, addressing key social concerns while supporting economic stability. Similarly, institutions like the Korea Securities Depository have launched programs to tackle socioeconomic challenges such as youth unemployment, rural depopulation, and elderly poverty, alongside environmental efforts like reducing greenhouse gas emissions (Kim, 2020; Park, 2020; 2022; Von Oldenskioeld, 2022; Lee, 2023; Park, 2023; Yi, 2023; Lee, 2024a; 2024b; Yi, 2024).

The growing recognition of environmental, social, and governance issues has highlighted the financial sector's pivotal role in promoting sustainable development (Lupu et al., 2022). This shift reflects efforts to meet evolving societal expectations by integrating sustainability and social responsibility into business strategies for long-term resilience. Institutional Theory offers a useful framework for understanding this trend, explaining the motivations behind financial firms embedding sustainability into their core operations (Iarossi et al., 2013).

Organizational decision-making is shaped by external pressures and the need to adapt to interconnected environments to ensure survival. Aligning with external expectations enhances long-term viability by fostering stability and legitimacy (Oliver, 1991). According to DiMaggio and Powell (1983), institutional environments promote homogeneity, where firms adopt similar behaviors to secure survival, political power, and legitimacy. Firms' adop-


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tion of sustainability initiatives is influenced by three institutional pressures: coercive (from governments, regulators, and stakeholders), normative (from societal values and professional norms), and mimetic (imitating successful peers). As leading financial firms adopt sustainability practices, others tend to follow to maintain competitive relevance, as supported by anecdotal evidence (Lee, 2023; Yi, 2023).

Stricter environmental regulations, such as emissions caps, compel firms to adopt green technologies to comply with legal requirements and avoid penalties or reputational harm (Wang et al., 2014). Growing stakeholder demands for ethical sourcing and carbon neutrality further push financial firms toward sustainability (Wiek & Weber, 2014). Consequently, sustainability is increasingly seen as a way to fulfill social responsibilities, build legitimacy, and strengthen stakeholder trust.

The financial sector faces mounting pressure from diverse stakeholders, such as investors, employees, customers, academia, rating agencies, and NGOs, to enhance sustainability performance and transparency (Dong et al., 2020; Latif et al., 2020). In response, firms are increasingly integrating social and environmental considerations into decision-making. Operating within strict regulatory frameworks that emphasize risk management and governance, financial institutions often adopt conservative, risk-averse approaches to ESG performance and reporting (Erben Yavuz et al., 2024). As a result, sustainability efforts are often reactive, driven by business incentives, regulations, leadership values, and client expectations (Wiek & Weber, 2014). Environmental disclosures, in particular, reflect responses to two main external forces: government regulation and public pressure (Wang et al., 2014). Evidence suggests that financial firms demonstrate the most dynamic ESG changes due to regulatory pressure, as reflected in sustainability ratings (D'Amato et al., 2024). However, these institutionally driven initiatives require resource allocation that may affect firms' financial stability.

The financial sector holds significant economic influence and plays a critical role in advancing sustainable development. Driven by both risk management and stakeholder expectations, the industry is increasingly aligning with sustainability goals (Weber et al., 2014). Despite this, sustainability research has largely focused on non-financial firms, leaving the financial sector relatively underexplored (Crespi & Migliavacca, 2020; Di Tommaso & Thornton, 2020; Chiaramonte et al., 2022; Choi et al., 2024). Existing ESG studies within finance have primarily centered on banks (e.g., Brogi & Lagasio, 2019; Buallay, 2019; Saïdane & Abdallah, 2020; Toth et al., 2021; Chiaramonte et al., 2022; Dragomir et al., 2022; Lupu et al., 2022), while comprehensive examinations across the broader financial industry remain limited (Dong et al., 2020).

An exploration of ESG and financial stability using the Altman Z-score (Altman, 1968, 1983; Altman et al., 2017) was conducted by Choi et al. (2024) among 15 major Korean financial institutions, finding that ESG, especially the environmental pillar, positively affects stability. Korea's regulatory environment has encouraged compliance, particularly among export-oriented industries, with financial firms supporting sustainability through green finance. This highlights the environmental pillar's critical role in enhancing stability within the Korean financial system. Meanwhile, beyond basic materials and industrial sectors, financial firms are moving toward more responsible practices. D'Amato et al. (2024) identify the financial sector as one of the most dynamic sectors in ESG adoption, as reflected in rising ESG scores. The study also finds a significant link between ESG ratings and profitability (measured via EBIT), reinforcing the sector's role in aligning financial stability with broader sustainability goals.

Similarly, it was also found that environmentally sustainable practices are associated with higher profitability, not only through direct operations but also through indirect impacts via lending and investment decisions (Taddeo et al., 2024). The study emphasizes the financial sector's responsibility to assess the environmental behavior of financed firms and to prioritize the environmental component of ESG. Moreover, Gholami et al. (2022) show that all three ESG components of environmental, social, and governance positively correlate with profitability in the financial sector. Their findings suggest that responsible practices and strong governance enhance performance and reduce misconduct risk, with further potential through ESG-focused investment and product innovation.

In banking, numerous studies confirm that ESG initiatives contribute positively to performance, profitability, and stability, while also reducing risk and non-performing loans (Brogi & Lagasio, 2019; Buallay, 2019; Saïdane & Abdallah, 2020; Toth et al., 2021; Chiaramonte et al., 2022; Dragomir et al., 2022; Lupu et al., 2022). While effects vary across ESG dimensions, these findings collectively highlight the value of sustainability in strengthening institutional reputation and financial resilience.

Meanwhile, concentrated ownership allows shareholders to exert greater influence over corporate decisions, often engaging with management to prioritize ESG initiatives and promote sustainability. Higher ownership concentration can enhance a firm's capacity to fulfill its social responsibilities (Aboud & Yang, 2022; Wen et al., 2023). While ownership structure has been widely studied in non-financial firms across contexts such as performance (Claessens & Djankov, 1999; Hu & Izumida, 2008; Li et al., 2015), firm valuation (Wruck, 1989; Selarka, 2005; Vintila & Ghergina, 2014), and corporate social responsibility (Crifo et al., 2016; Dam & Scholtens, 2013), research on its influence on ESG activities remains limited (Agnese et al., 2022). Findings on the moderating effect of ownership concentration on ESG-performance relationships remain mixed and context-specific (Wang & Shailer, 2015). Some studies show a weakening effect (Rastogi et al., 2024; Truong, 2024), while others report no significant impact (Wu et al., 2022).

In financial firms, ownership concentration is linked to information asymmetry and investor protection concerns, given the sector's sensitivity to externalities (Mudambi & Nicosia, 1998). Erben Yabuz et al. (2024) found that while concentrated institutional ownership may improve transparency, it is generally associated with lower ESG ratings, potentially due to disruptions caused by shifts in control. In banking, large shareholders may distort lending practices and undermine minority shareholder interests due to the opaque nature of bank assets (Busta et al., 2014). Despite regulatory oversight, concentrated control can still lead to excessive risk-taking or insider lending.

Further empirical evidence suggests a negative relationship between ownership concentration and bank performance, with higher control linked to reduced efficiency, greater risk, and lower valuation (Haw et al., 2010). Similar trends are seen in the insurance sector, where concentrated ownership is associated with lower financial stability (Rubio-Misas, 2020), likely due to tighter alignment of owner-manager incentives. In Korea, high ownership concentration among owner-managers and ties to conglomerates pose unique governance challenges (Choi et al., 2024). Despite ongoing reforms since 2000, governance and ESG-related issues remain prominent, underscoring the need to understand how governance structures influence ESG outcomes and financial stability in Korea's financial sector.

The reviewed literature underscores the complex and multifaceted relationship between ownership concentration, ESG performance, and financial stability, particularly within financial firms where balancing sustainability initiatives with firm outcomes presents unique challenges. Ownership concentration plays a pivotal role in shaping ESG initiatives and financial performance, highlighting the necessity for approaches tailored to the financial sector's institutional context.

Building on this foundation, the primary goal of this study is to empirically examine how ESG initiatives affect the financial stability of Korean financial firms, with ownership concentration as a moderating factor. With the above discussions, the following hypotheses are developed:

*H1: In whichever direction, ESG initiatives significantly impact the financial stability of firms in the financial sector.*

*H2: Ownership concentration moderates the impact of ESG initiatives on the financial stability of firms in the financial sector.*

## 2. METHODOLOGY

To test the research hypotheses, this study employs the following research model to analyze the relationship between the environmental, social, and governance initiatives of Korean financial firms, as measured by their ESG ratings (*ESG*), and their financial stability, as proxied by the Z-score (*Zscore*). Furthermore, the model exam-


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ines the moderating role of ownership concentration (*OWNCON*) in this relationship for financial firm *i* at year *t*.

$$\begin{aligned}
&Zscore_{i,t} = \alpha_{i,t} + \beta_1 ESG(E,S,G)_{i,t} \\
&+\beta_2 OWNCON_{i,t} \\
&+\beta_3 \left[ ESG(E,S,G) \cdot OWNCON \right]_{i,t} \\
&+\beta_4 LEV_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 EMP_{i,t} \\
&+\beta_7 AGE_{i,t} + \beta_8 OPER_1_{i,t} + \beta_9 OPER_2_{i,t} \\
&+\beta_{10} O_EFF_{i,t} + \beta_{11} M_EFF_{i,t} \\
&+\beta_{12} B_SIZE_{i,t} + \beta_{13} B_IND_{i,t} \\
&+\beta_{14} BETA_{i,t} + \delta_1 SIDUM \\
&+\delta_2 YDUM + \varepsilon_{i,t}.
\end{aligned} \tag{1}$$

In the proposed model, the dependent variable, Altman's Z-score (*Zscore*), represents the financial stability of financial firms. This metric integrates multiple financial ratios to provide a comprehensive assessment of a firm's financial health and its likelihood of financial distress or insolvency. The independent variable in this study is the ESG ratings of Korean financial firms (*ESG*), while ownership concentration (*OWNCON*) is included as the moderating variable. To enhance the robustness of the analysis, this study incorporates a range of control variables to account for firm-specific characteristics that may influence financial stability. Consistent with prior research, including Byun (2017), Di Tommaso and Thornton (2020), Ersoy et al. (2020), Di Tommaso and Mazzuca (2023), and Choi et al. (2024), the regression model controls for leverage (*LEV*), firm size (*SIZE*), number of employees (*EMP*), firm age since establishment (*AGE*), operating profit margin (*OPER_1*), pre-tax return on equity (*OPER_2*), operational efficiency (*O_EFF*), management efficiency (*M_EFF*), board size (*B_SIZE*), board independence (*B_IND*), and the firm's beta coefficient based on the capital asset pricing model (*BETA*). Additionally, the model accounts for sub-industry-specific variations among banks, insurance firms, securities, and diversified financial services firms, as well as temporal dynamics across different years. To address these factors, dummy variables are included to capture sub-industry classifications and year-specific effects. A detailed description of all variables, including their definitions and computations, is provided in Appendix A.

This study employs Altman's Z-score as a comprehensive measure of financial stability. The Z-score integrates various financial ratios, spanning liquidity, profitability, leverage, solvency, and activity, into a single, composite metric that captures the overall financial health and stability of firms. Consistent with Choi et al. (2024), based on the foundational work of Altman (1968), Altman (1983), and Altman et al. (2017), the Z-score for financial stability is computed using the following formula:

$$\begin{aligned}
&Zscore = 0.717 \cdot x_1 + 0.847 \cdot x_2 + 3.107 \cdot x_3 \\
&+0.420 \cdot x_4 + 0.998 \cdot x_5,
\end{aligned} \tag{2}$$

where $x_1$ represents the ratio of cash and cash equivalents to total assets, serving as an indicator of liquidity. $x_2$ measures retained earnings relative to total assets, reflecting the firm's cumulative profitability and ability to reinvest earnings. $x_3$ captures earnings before interest and taxes (EBIT) as a proportion of total assets, indicating operational profitability. $x_4$ is the ratio of the total book value of equity to the total book value of liabilities, providing insights into solvency. Finally, $x_5$ measures the ratio of total revenue to total assets, reflecting asset efficiency in generating revenue. These variables are multiplied by their respective coefficients, and their weighted sum constitutes the Z-score, which serves as an aggregate measure of financial stability. The Z-score provides a predictive framework for assessing a firm's likelihood of financial distress. It evaluates critical aspects of a firm's financial performance, including its ability to meet short-term obligations, generate profits, manage debt, and sustain long-term solvency. Higher Z-scores indicate greater financial stability, suggesting that the firm is less likely to experience insolvency or financial distress. Such firms typically exhibit strong operational performance, efficient use of assets, and prudent financial management. Meanwhile, lower Z-scores signal weaker financial stability and a higher risk of financial distress or bankruptcy. These firms may struggle with liquidity, overleverage, or poor profitability, necessitating corrective measures to improve financial health.

The Korea Institute of Corporate Governance and Sustainability (KCGS), formerly known as the Korea Corporate Governance Service, publishes annual ESG ratings for both financial and non-financial firms in Korea. These ratings include comprehensive assessments of overall ESG performance as well as individual ratings for environmental, social, and governance factors. While the corporate governance of Korean firms has been evaluated by KCGS since 2003, the assessment framework was expanded in 2011 to incorporate environmental and social responsibility dimensions. KCGS categorizes ESG ratings into seven distinct levels: S, A+, A, B+, B, C, and D, based on the scores assigned to each category. These ratings provide a comprehensive evaluation of firms' performance in environmental, social, and governance dimensions. In this study, the ESG ratings issued by KCGS serve as proxies for firms' ESG sustainability initiatives. Consistent with prior methodologies employed by Kim et al. (2022) and Kwon and Choi (2024), this study adopts a point-based scoring system to quantify these ratings. Specifically, one point is assigned to the lowest rating (D), two points to C, three points to B, and so forth, culminating in seven points for the highest rating (S). This scoring approach is applied not only to the overall ESG rating but also to the individual dimensions. A detailed description of the scoring levels, their corresponding qualitative assessments, and the numerical proxies utilized in this study is presented in Appendix B.

This study employs a measure of ownership concentration based on the collective distribution percentage of a financial firm's largest shareholder and special related parties to reflect the prevalence of dominant shareholders who can significantly influence corporate decision-making (Choi et al., 2024). This ownership structure is associated with both enhanced control and potential risks, such as entrenchment or conflicts of interest. The data utilized for the level of ownership concentration were collected from Korean financial databases and cross-checked with the Korean repository of corporate filings.

This study utilizes financial data and other corporate information collected from the following databases: FNDataGuide, TS2000, and the repository of Korea's corporate filings, Data Analysis, Retrieval and Transfer System (DART). To ensure consistency in the samples used in this study, financial firms with fiscal years not ending in December, as well as firm-year observations with insufficient data for the dependent, moderating, and control variables, were excluded from this study. After applying these selection criteria, the study arrived at a final sample size of 537 firm-year observations across 53 financial firms. Table 1 summarizes the selection process conducted, as well as the different distributions of the samples into high and low overall ESG ratings, market listing, sub-industry classification, and year distribution.

**Table 1.** Sample selection and other distributions

| | | |
|---|---|---|
| **Panel A. Selection Process** | | |
| Total number of financial companies from KCGS company listing of ESG ratings | | 674 |
| Less: Firms with fiscal years not ending in December | | (55) |
| Less: Firm-years with missing variables | | (82) |
| Final sample, firm-years | | 537 |
| **Panel B. Financial Firms with High and Low ESG Ratings** | | |
| High ESG Ratings (A+, A, B+) | (53.82%) | 289 |
| Low ESG Ratings (B, C, D) | (46.18%) | 248 |
| Final sample, firm-years | | 537 |
| **Panel C. Market Listing** | | |
| Korea Composite Stock Price Index (KOSPI) | (91.81%) | 493 |
| Korean Securities Dealers Automated Quotations (KOSDAQ) | (8.19%) | 44 |
| Final sample, firm-years | | 537 |
| **Panel D. Sub-industry Distribution** | | |
| Banks | (19.74%) | 106 |
| Insurance Companies | (25.70%) | 138 |
| Securities and Diversified Financial Services | (54.56%) | 293 |
| Final sample, firm-years | | 537 |
| **Panel E. Firm-Year Distribution** | | |
| 2012 | | 11 |
| 2013 | | 45 |
| 2014 | | 47 |
| 2015 | | 55 |
| 2016 | | 48 |
| 2017 | | 48 |
| 2018 | | 43 |
| 2019 | | 45 |
| 2020 | | 48 |
| 2021 | | 49 |
| 2022 | | 49 |
| 2023 | | 49 |
| Final sample, firm-years | | 537 |

The multivariate regression analyses in this study were performed using a fixed-effects regression model (Hill et al., 2012). To examine potential



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multicollinearity concerns, the variance inflation factor (VIF) was calculated for each variable. Excluding dummy variables, the average VIF was 2.20, indicating that multicollinearity is unlikely to significantly affect the validity of the results. Before conducting the regression analysis, the data underwent winsorization at the 1st and 99th percentiles for continuous and financial variables. This procedure effectively mitigated the influence of outliers, ensuring the robustness of the analysis.

All datasets used in the analysis, along with the full set of regression output tables, are made publicly available through an open-access repository to ensure transparency, replicability, and academic integrity (Chua & Byun, 2025).

# 3. RESULTS

This section presents the empirical results on the relationship between ESG initiatives and financial stability in financial firms, as well as the moderating effect of ownership concentration. Table 2 reports descriptive statistics for all variables. The mean Z-score is 0.4333, indicating that, on average, sampled firms fall within the financial distress zone, suggesting elevated solvency risk. Moreover, the average ESG score is 3.6276, corresponding roughly to a "B" to "B+" rating, implying that sustainability performance across financial firms remains modest and in need of improvement. Disaggregated scores show notable variation: environmental ratings average 2.5028 ("B" to "C" rating), indicating weak environmental practices; social scores average 3.8156 ("B" to "B+" rating), suggesting moderate social responsibility; and governance scores average 4.1266 ("B+" to "A" rating), reflecting comparatively stronger governance systems.

Ownership concentration averages 41.02%, with a minimum of 6.09% and a maximum of 85.22%, highlighting considerable variation in dominant shareholder control. Among control variables, the average leverage ratio is high at 83.49%, posing an operating profit margin of 25.24%, and a pre-tax return on equity of 9.06%. These figures point to financial fragility, consistent with low Z-scores. Additionally, the average board size is five members, with 42.18% board independence, suggesting room for stronger governance practices.

To assess how financial firms respond to institutional pressures for sustainability, the sample was divided into two groups based on overall ESG ratings: high ESG score firms (scores of 4-6: B+ to A+) and low ESG score firms (scores of 1-3: D to B). Table 3 presents a univariate analysis using t-tests to compare key variables across these groups.

Results show statistically significant differences between high- and low-performing ESG firms

**Table 2.** Descriptive statistics

| Variables | N | Mean | SD | Min | 25%Q | Med | 75%Q | Max |
|---|---|---|---|---|---|---|---|---|
| Zscore | 537 | 0.4333 | 1.0308 | –1.5310 | 0.1427 | 0.1895 | 0.4019 | 15.7424 |
| ESG_Total | 537 | 3.6276 | 1.1951 | 1.0000 | 3.0000 | 4.0000 | 4.0000 | 6.0000 |
| E_Score | 537 | 2.5028 | 1.6607 | 1.0000 | 1.0000 | 2.0000 | 4.0000 | 6.0000 |
| S_Score | 537 | 3.8156 | 1.4094 | 1.0000 | 3.0000 | 4.0000 | 5.0000 | 6.0000 |
| G_Score | 537 | 4.1266 | 1.2454 | 1.0000 | 3.0000 | 4.0000 | 5.0000 | 7.0000 |
| OWNCON | 537 | 0.4102 | 0.2198 | 0.0609 | 0.2235 | 0.4300 | 0.5631 | 0.8522 |
| LEV | 537 | 0.8349 | 0.1774 | 0.0273 | 0.8599 | 0.8938 | 0.9192 | 0.9609 |
| SIZE | 537 | 23.5361 | 1.9660 | 17.3180 | 22.5467 | 23.6221 | 24.7616 | 27.2966 |
| EMP | 537 | 1,665.0840 | 2,516.2600 | 7.0000 | 161.0000 | 807.0000 | 2,082.0000 | 15,850.0000 |
| AGE | 537 | 3.5527 | 0.8019 | 0.4886 | 3.1801 | 3.8710 | 4.1250 | 4.7791 |
| OPER_1 | 537 | 0.2524 | 1.1332 | –2.5099 | 0.0622 | 0.2016 | 0.3430 | 25.5861 |
| OPER_2 | 537 | 0.0906 | 0.1060 | –1.0799 | 0.0580 | 0.0933 | 0.1232 | 1.0889 |
| O_EFF | 537 | 11.1388 | 281.2277 | –5,396.3160 | 5.9667 | 11.9335 | 26.3427 | 2,469.7650 |
| M_EFF | 537 | 0.1852 | 0.1637 | 0.0178 | 0.0806 | 0.1327 | 0.2290 | 0.9910 |
| B_SIZE | 537 | 5.1304 | 2.6056 | 1.0000 | 3.0000 | 5.0000 | 7.0000 | 19.0000 |
| B_IND | 537 | 0.4218 | 0.2764 | 0.0000 | 0.2500 | 0.4444 | 0.6667 | 1.0000 |
| BETA | 537 | 0.8659 | 0.4598 | –0.2900 | 0.5500 | 0.7900 | 1.1600 | 2.4900 |

*Notes:* All financial variables are winsorized at 1% and 99% levels. Full variable definitions are provided in Appendix A.

**Table 3.** Univariate analysis

| Variables | Low Overall ESG Rating | High Overall ESG Rating | Difference | t-value | p-value |
|---|---|---|---|---|---|
| Zscore | 0.649 | 0.248 | 0.400 | 4.569*** | 0.000 |
| ESG_Total | 2.548 | 4.554 | –2.005 | –35.422*** | 0.000 |
| E_Score | 1.262 | 3.567 | –2.305 | –22.216*** | 0.000 |
| S_Score | 2.730 | 4.747 | –2.018 | –23.609*** | 0.000 |
| G_Score | 3.266 | 4.865 | –1.599 | –19.298*** | 0.000 |
| OWNCON | 0.475 | 0.355 | 0.120 | 6.558*** | 0.000 |
| LEV | 0.763 | 0.897 | –0.134 | –9.427*** | 0.000 |
| SIZE | 22.198 | 24.684 | –2.486 | –18.814*** | 0.000 |
| EMP | 788.210 | 2417.557 | –1,629.347 | –7.897*** | 0.000 |
| AGE | 3.626 | 3.490 | 0.136 | 1.967** | 0.050 |
| OPER_1 | 0.199 | 0.299 | –0.100 | –1.017 | 0.310 |
| OPER_2 | 0.077 | 0.102 | –0.025 | –2.790*** | 0.006 |
| O_EFF | 9.200 | 12.802 | –3.602 | –0.148 | 0.883 |
| M_EFF | 0.190 | 0.181 | 0.009 | 0.620 | 0.535 |
| B_SIZE | 4.956 | 5.280 | –0.325 | –1.441 | 0.150 |
| B_IND | 0.396 | 0.444 | –0.048 | –2.018** | 0.044 |
| BETA | 0.865 | 0.866 | –0.001 | –0.033 | 0.974 |

*Note:* ***, **, and * represent significance at the 1, 5, and 10% levels, respectively. All financial variables are winsorized at 1% and 99% levels. Full variable definitions are provided in Appendix A.

across the Z-score, ESG dimensions, and ownership concentration. Notably, high-performing ESG firms exhibit lower financial stability (Z-score) and lower ownership concentration. They are also characterized by higher leverage, larger firm size, more employees, younger firm age, greater board independence, and higher pre-tax return on equity. These findings suggest that firms with stronger ESG performance tend to operate on a larger scale, adopt more transparent governance structures, and face greater financial risk.

Table 4 reports Pearson correlation coefficients among the study variables. A significant negative correlation is observed between overall ESG ratings and financial stability, as well as between each ESG dimension and financial stability. These findings suggest that responding to institutional pressures for ESG engagement may strain firm resources, potentially weakening financial stability. Meanwhile, ownership concentration shows no significant correlation with financial stability but is negatively correlated with ESG ratings.

Among control variables, leverage is negatively correlated with financial stability, while pre-tax return on equity is positively correlated, indicating that higher debt levels reduce stability, whereas stronger profitability enhances it.

While these correlations offer preliminary insights, they do not imply causality. Therefore, the subsequent regression analyses provide a more robust examination of the relationships among ESG performance, financial stability, and the moderating role of ownership concentration in Korean financial firms.

Table 5 presents regression results analyzing the relationship between ESG initiatives and financial stability, measured by the Altman Z-score, across the full sample and sub-industries within the financial sector. Panel A, which includes all financial firms, shows no significant association between ESG performance and financial stability. However, disaggregated analysis in Panels B, C, and D reveals industry-specific effects.

Panel B for the banking sector indicates that environmental initiatives are positively associated with financial stability (*coefficient* = 0.0017; $p < 0.10$), suggesting that environmentally focused strategies may support long-term financial resilience. Conversely, social responsibility efforts are negatively associated with stability (*coefficient* = –0.0018; $p < 0.10$), likely reflecting short-term resource burdens linked to stakeholder engagement and compliance.

Panel C for insurance firms finds a significant negative relationship between overall ESG initia-



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**Table 4.** Pearson correlation

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) Zscore | 1.0000 | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| | | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| (2) ESG_Total | −0.2620 | 1.0000 | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| | 0.0000 | | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| (3) E_Score | −0.1616 | 0.7977 | 1.0000 | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| | 0.0002 | 0.0000 | | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| (4) S_Score | −0.2040 | 0.8276 | 0.7674 | 1.0000 | – | – | – | – | – | – | – | – | – | – | – | – | – |
| | 0.0000 | 0.0000 | 0.0000 | | – | – | – | – | – | – | – | – | – | – | – | – | – |
| (5) G_Score | −0.2878 | 0.8077 | 0.4716 | 0.4682 | 1.0000 | – | – | – | – | – | – | – | – | – | – | – | – |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | – | – | – | – | – | – | – | – | – | – | – | – |
| (6) OWNCON | 0.0241 | −0.3892 | −0.4121 | −0.3074 | −0.3265 | 1.0000 | – | – | – | – | – | – | – | – | – | – | – |
| | 0.5771 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | – | – | – | – | – | – | – | – | – | – | – |
| (7) LEV | −0.7033 | 0.4883 | 0.3000 | 0.3895 | 0.5149 | −0.0693 | 1.0000 | – | – | – | – | – | – | – | – | – | – |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.1086 | | – | – | – | – | – | – | – | – | – | – |
| (8) SIZE | −0.4400 | 0.7709 | 0.6849 | 0.6665 | 0.6671 | −0.3240 | 0.6876 | 1.0000 | – | – | – | – | – | – | – | – | – |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | – | – | – | – | – | – | – | – | – |
| (9) EMP | −0.1040 | 0.2445 | 0.3113 | 0.2550 | 0.1828 | 0.0649 | 0.2047 | 0.4110 | 1.0000 | – | – | – | – | – | – | – | – |
| | 0.0159 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.1330 | 0.0000 | 0.0000 | | – | – | – | – | – | – | – | – |
| (10) AGE | 0.0325 | −0.2133 | −0.1658 | −0.0636 | −0.2728 | 0.2692 | −0.0871 | −0.2681 | 0.3734 | 1.0000 | – | – | – | – | – | – | – |
| | 0.4528 | 0.0000 | 0.0001 | 0.1411 | 0.0000 | 0.0000 | 0.0437 | 0.0000 | 0.0000 | | – | – | – | – | – | – | – |
| (11) OPER_1 | −0.0024 | 0.0288 | −0.0208 | 0.0246 | 0.0461 | 0.0108 | 0.0159 | 0.0167 | −0.0345 | −0.0371 | 1.0000 | – | – | – | – | – | – |
| | 0.9553 | 0.5061 | 0.6306 | 0.5699 | 0.2860 | 0.8022 | 0.7131 | 0.7000 | 0.4244 | 0.3908 | | – | – | – | – | – | – |
| (12) OPER_2 | 0.1172 | 0.1791 | 0.0529 | 0.1798 | 0.1715 | 0.0201 | 0.1638 | 0.2097 | 0.0185 | −0.1156 | 0.0156 | 1.0000 | – | – | – | – | – |
| | 0.0066 | 0.0000 | 0.2208 | 0.0000 | 0.0001 | 0.6413 | 0.0001 | 0.0000 | 0.6684 | 0.0073 | 0.7185 | | – | – | – | – | – |
| (13) O_EFF | −0.0027 | 0.0076 | −0.0086 | 0.0034 | 0.0034 | 0.0250 | 0.0195 | 0.0240 | 0.0094 | 0.0229 | −0.0002 | 0.0237 | 1.0000 | – | – | – | – |
| | 0.9504 | 0.8613 | 0.8424 | 0.9369 | 0.9378 | 0.5638 | 0.6513 | 0.5786 | 0.8276 | 0.5970 | 0.9957 | 0.5843 | | – | – | – | – |
| (14) M_EFF | 0.0513 | −0.0917 | −0.1404 | −0.1009 | −0.0294 | −0.0014 | −0.0504 | −0.1230 | −0.0013 | 0.3027 | −0.0154 | −0.0600 | 0.0304 | 1.0000 | – | – | – |
| | 0.2356 | 0.0337 | 0.0011 | 0.0193 | 0.4966 | 0.9748 | 0.2438 | 0.0043 | 0.9754 | 0.0000 | 0.7222 | 0.1647 | 0.4817 | | – | – | – |
| (15) B_SIZE | −0.0650 | 0.1301 | 0.1163 | −0.0087 | 0.2410 | −0.2101 | 0.0503 | 0.1990 | 0.1272 | −0.2165 | −0.0514 | −0.1504 | −0.0755 | −0.1510 | 1.0000 | – | – |
| | 0.1324 | 0.0025 | 0.0070 | 0.8409 | 0.0000 | 0.0000 | 0.2445 | 0.0000 | 0.0031 | 0.0000 | 0.2344 | 0.0005 | 0.0805 | 0.0004 | | – | – |
| (16) B_IND | −0.0268 | 0.1672 | 0.2111 | 0.0422 | 0.2346 | −0.2794 | 0.0662 | 0.1970 | 0.0854 | −0.2667 | −0.0526 | −0.1238 | −0.0564 | −0.2560 | 0.6915 | 1.0000 | – |
| | 0.5361 | 0.0001 | 0.0000 | 0.3295 | 0.0000 | 0.0000 | 0.1252 | 0.0000 | 0.0479 | 0.0000 | 0.2238 | 0.0041 | 0.1917 | 0.0000 | 0.0000 | | – |
| (17) BETA | −0.0213 | −0.0006 | −0.1082 | 0.0035 | 0.0459 | −0.2419 | 0.0639 | 0.0628 | −0.0262 | −0.0133 | 0.0914 | −0.0433 | 0.0418 | −0.1716 | 0.0222 | 0.0278 | 1.0000 |
| | 0.6220 | 0.9896 | 0.0121 | 0.9352 | 0.2886 | 0.0000 | 0.1394 | 0.1464 | 0.5451 | 0.7579 | 0.0343 | 0.3163 | 0.3334 | 0.0001 | 0.6081 | 0.5205 | |

*Notes:* All financial variables are winsorized at 1% and 99% levels. The numbers below the coefficients indicate the p-values. Full variable definitions are provided in Appendix A.

tives and financial stability (*coefficient* = –0.0061; $p < 0.10$), with corporate governance showing a particularly strong negative effect (*coefficient* = –0.0074; $p < 0.05$). These results suggest that ESG efforts, especially governance reforms, may impose operational and compliance costs that reduce stability in this sector.

Panel D for securities and diversified financial services firms reveal no significant relationship between ESG variables and financial stability. In summary, ESG impacts on financial stability vary by sub-sector. Environmental initiatives enhance the financial stability of banks, while social and governance efforts may reduce stability in banks and insurance firms, respectively. These findings provide empirical support for *Hypothesis 1*.

Table 6 presents panel regression results assessing the moderating effect of ownership concentration

**Table 5.** Panel regression results: Main effect of ESG initiatives on the stability of financial firms

| Variables | (A) All Financial Firms | | (B) Banks | | (C) Insurance | | (D) SDFS | |
|---|---|---|---|---|---|---|---|---|
| | **Dependent Variable: Altman Z-Score of Financial Stability** | | | | | | | |
| | (1) ESG | (2) Full | (1) ESG | (2) Full | (1) ESG | (2) Full | (1) ESG | (2) Full |
| ESG_Total | 0.0095 | – | 0.0010 | – | –0.0061* | – | 0.0098 | – |
| | (0.41) | – | (0.97) | – | (–1.72) | – | (0.24) | – |
| E_Score | – | 0.0161 | – | 0.0017* | – | –0.0003 | – | 0.0333 |
| | – | (0.73) | – | (1.84) | – | (–0.08) | – | (0.79) |
| S_Score | – | 0.0168 | – | –0.0018* | – | 0.0023 | – | –0.0019 |
| | – | (0.80) | – | (–2.00) | – | (0.66) | – | (–0.05) |
| G_Score | – | 0.0055 | – | 0.0008 | – | –0.0074** | – | 0.0062 |
| | – | (0.24) | – | (0.75) | – | (–2.06) | – | (0.14) |
| OWNCON | –0.0931 | –0.0864 | –0.0194 | –0.0138 | –0.0765 | –0.0572 | –0.4516 | –0.4738 |
| | (–0.34) | (–0.32) | (–1.19) | (–0.84) | (–1.63) | (–1.14) | (–0.95) | (–0.98) |
| LEV | –4.9083*** | –4.9099*** | –0.8106*** | –0.8864*** | –1.3728*** | –1.3951*** | –6.5482*** | –6.5686*** |
| | (–10.07) | (–10.06) | (–5.21) | (–5.82) | (–11.64) | (–11.60) | (–8.72) | (–8.68) |
| SIZE | 0.0621 | 0.0619 | –0.0454*** | –0.0466*** | –0.0251 | –0.0197 | 0.1982 | 0.1896 |
| | (0.79) | (0.79) | (–5.00) | (–5.00) | (–0.70) | (–0.54) | (1.55) | (1.48) |
| EMP | 0.0001 | 0.0001 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 |
| | (1.05) | (1.06) | (0.44) | (0.19) | (1.05) | (1.43) | (0.27) | (0.34) |
| AGE | 0.0188 | 0.0045 | 0.0192*** | 0.0192*** | –0.0194 | –0.0217 | –0.8306 | –0.7770 |
| | (0.18) | (0.04) | (5.28) | (5.30) | (–0.68) | (–0.76) | (–1.27) | (–1.18) |
| OPER_1 | 0.0117 | 0.0118 | –0.0096 | –0.0156 | 0.0105 | 0.0173 | 0.0134 | 0.0140 |
| | (0.96) | (0.96) | (–0.30) | (–0.49) | (0.21) | (0.35) | (0.85) | (0.89) |
| OPER_2 | 2.1264*** | 2.1414*** | 0.3018*** | 0.3187*** | 0.3609*** | 0.3605*** | 2.1970*** | 2.2275*** |
| | (12.32) | (12.31) | (3.61) | (3.89) | (8.25) | (8.16) | (8.56) | (8.55) |
| O_EFF | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| | (0.43) | (0.40) | (–0.44) | (–0.51) | (0.93) | (0.67) | (0.33) | (0.35) |
| M_EFF | –0.5700*** | –0.5472*** | 0.0004 | 0.0281 | 0.8106*** | 0.8259*** | –1.1968*** | –1.1548*** |
| | (–2.75) | (–2.63) | (0.01) | (0.39) | (16.25) | (16.66) | (–3.72) | (–3.54) |
| B_SIZE | –0.0269** | –0.0266** | –0.0005 | –0.0002 | 0.0019 | 0.0015 | –0.0632*** | –0.0607*** |
| | (–2.35) | (–2.31) | (–1.25) | (–0.60) | (1.05) | (0.83) | (–2.78) | (–2.63) |
| B_IND | 0.1644 | 0.1621 | 0.0060 | 0.0069 | 0.0317* | 0.0269 | 0.3026* | 0.2947* |
| | (1.63) | (1.60) | (1.19) | (1.30) | (1.76) | (1.45) | (1.76) | (1.71) |
| BETA | –0.1246** | –0.1185** | 0.0063 | 0.0086** | –0.0075 | –0.0112 | –0.2172** | –0.2063** |
| | (–2.21) | (–2.08) | (1.57) | (2.13) | (–0.66) | (–0.95) | (–2.31) | (–2.17) |
| Intercept | 2.8375* | 2.7653* | 1.9818*** | 2.0784*** | 2.0649** | 1.9396** | 4.8230* | 4.7319* |
| | (1.73) | (1.69) | (10.30) | (10.14) | (2.53) | (2.32) | (1.77) | (1.72) |
| Sub-Industry/Year | Included | Included | Included | Included | Included | Included | Included | Included |
| Observations | 537 | 537 | 106 | 106 | 138 | 138 | 293 | 293 |
| R-sq. (within) | 0.4743 | 0.4769 | 0.9234 | 0.9290 | 0.8820 | 0.8837 | 0.5683 | 0.5698 |

*Notes:* Numbers in parentheses represent t-values. ***, **, and * represent significance at the 1, 5, and 10% levels, respectively. All financial variables are winsorized at 1% and 99% levels. Full variable definitions are provided in Appendix A. SDFS pertains to Securities and Diversified Financial Services Firms.



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**Table 6.** Panel regression results: Moderating effect of ownership concentration in the ESG-stability relationship

| Variables | (A) All Financial Firms (1) ESG | (A) All Financial Firms (2) Full | (B) Banks (1) ESG | (B) Banks (2) Full | (C) Insurance (1) ESG | (C) Insurance (2) Full | (D) SDFS (1) ESG | (D) SDFS (2) Full |
|---|---|---|---|---|---|---|---|---|
| | Dependent Variable: Altman Z-Score of Financial Stability | | | | | | | |
| ESG_Total | 0.0561 | – | 0.0021 | | −0.0037 | – | 0.0766 | – |
| | (1.17) | – | (1.36) | | (−0.40) | – | (0.79) | – |
| E_Score | – | 0.0040 | – | 0.0036*** | – | 0.0048 | – | 0.0644 |
| | – | (0.09) | – | (2.76) | – | (0.59) | – | (0.71) |
| S_Score | – | 0.0321 | – | −0.0019 | – | 0.0006 | – | 0.0294 |
| | – | (0.79) | – | (−1.53) | – | (0.06) | – | (0.37) |
| G_Score | – | 0.0637 | – | 0.0010 | – | −0.0169** | – | 0.0981 |
| | – | (1.48) | – | (0.74) | – | (−2.14) | – | (1.18) |
| OWNCON | 0.2540 | 0.4466 | 0.0010 | 0.0141 | −0.0548 | −0.1202 | −0.0498 | 0.4585 |
| | (0.61) | (0.94) | (0.04) | (0.48) | (−0.63) | (−1.11) | (−0.07) | (0.55) |
| ESG * OWNCON | −0.1094 | – | −0.0050 | – | −0.0052 | – | −0.1426 | – |
| | (−1.12) | – | (−0.96) | – | (−0.30) | – | (−0.76) | – |
| E * OWNCON | – | 0.0308 | – | −0.0056* | – | −0.0114 | – | −0.0384 |
| | – | (0.38) | – | (−1.90) | – | (−0.71) | – | (−0.24) |
| S * OWNCON | – | −0.0315 | – | 0.0011 | – | 0.0024 | – | −0.0691 |
| | – | (−0.37) | – | (0.27) | – | (0.14) | – | (−0.41) |
| G * OWNCON | – | −0.1358 | – | −0.0022 | – | 0.0201 | – | −0.2002 |
| | – | (−1.57) | – | (−0.52) | – | (1.39) | – | (−1.26) |
| LEV | −4.9393*** | −4.9036*** | −0.8352*** | −0.8797*** | −1.3839*** | −1.3834*** | −6.5658*** | −6.5778*** |
| | (−10.12) | (−9.99) | (−5.30) | (−5.80) | (−11.14) | (−11.15) | (−8.73) | (−8.64) |
| SIZE | 0.0653 | 0.0584 | −0.0436*** | −0.0446*** | −0.0248 | −0.0147 | 0.1959 | 0.1799 |
| | (0.83) | (0.74) | (−4.70) | (−4.53) | (−0.69) | (−0.40) | (1.53) | (1.39) |
| EMP | 0.0001 | 0.0001 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| | (1.06) | (1.04) | (0.73) | (0.70) | (1.02) | (1.17) | (0.18) | (0.11) |
| AGE | −0.0086 | 0.0180 | 0.0175*** | 0.0165*** | −0.0188 | −0.0294 | −0.8325 | −0.7118 |
| | (−0.08) | (0.16) | (4.35) | (3.56) | (−0.66) | (−0.98) | (−1.27) | (−1.07) |
| OPER_1 | 0.0110 | 0.0107 | −0.0160 | −0.0114 | 0.0107 | 0.0158 | 0.0122 | 0.0115 |
| | (0.90) | (0.87) | (−0.48) | (−0.34) | (0.22) | (0.32) | (0.77) | (0.72) |
| OPER_2 | 2.1117*** | 2.1382*** | 0.3095*** | 0.2920*** | 0.3631*** | 0.3676*** | 2.1786*** | 2.2223*** |
| | (12.20) | (12.16) | (3.69) | (3.44) | (8.14) | (8.01) | (8.44) | (8.46) |
| O_EFF | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| | (0.43) | (0.35) | (−0.59) | (−0.38) | (0.92) | (0.73) | (0.32) | (0.32) |
| M_EFF | −0.5744*** | −0.5382** | 0.0134 | 0.0418 | 0.8128*** | 0.8343*** | −1.1821*** | −1.0956*** |
| | (−2.78) | (−2.58) | (0.18) | (0.58) | (16.04) | (15.96) | (−3.66) | (−3.33) |
| B_SIZE | −0.0272** | −0.0273** | −0.0005 | −0.0002 | 0.0019 | 0.0017 | −0.0640*** | −0.0614*** |
| | (−2.37) | (−2.36) | (−1.30) | (−0.43) | (1.03) | (0.92) | (−2.81) | (−2.65) |
| B_IND | 0.1619 | 0.1458 | 0.0061 | 0.0073 | 0.0306 | 0.0380* | 0.3141* | 0.3135* |
| | (1.60) | (1.43) | (1.21) | (1.37) | (1.65) | (1.91) | (1.82) | (1.80) |
| BETA | −0.1279** | −0.1324** | 0.0059 | 0.0083** | −0.0075 | −0.0073 | −0.2260** | −0.2251** |
| | (−2.26) | (−2.29) | (1.46) | (2.04) | (−0.66) | (−0.60) | (−2.39) | (−2.30) |
| Intercept | 2.7238* | 2.5682 | 1.9558*** | 2.0173*** | 2.0537** | 1.8687** | 4.7175* | 4.2766 |
| | (1.66) | (1.56) | (10.06) | (9.39) | (2.50) | (2.23) | (1.73) | (1.54) |
| Sub-Industry/Year | Included | Included | Included | Included | Included | Included | Included | Included |
| Observations | 537 | 537 | 106 | 106 | 138 | 138 | 293 | 293 |
| R-sq. (within) | 0.4758 | 0.4801 | 0.9245 | 0.9337 | 0.8821 | 0.8866 | 0.5694 | 0.5737 |

*Notes:* Numbers in parentheses represent t-values. ***, **, and * represent significance at the 1, 5, and 10% levels, respectively. All financial variables are winsorized at 1% and 99% levels. Full variable definitions are provided in Appendix A. CMDFS pertains to Securities and Diversified Financial Services Firms.

on the ESG-financial stability relationship across financial firms. Panel A for the full sample reveals no significant direct or moderated effects of ESG on financial stability. However, industry-level analyses yield more significant insights.

In Panel B for the banking sector, environmental sustainability is positively associated with financial stability (*coefficient* = 0.0036; $p < 0.01$). When ownership concentration is introduced as a moderator, the positive effect weakens significantly (*interaction coefficient* = –0.0056; $p < 0.10$), suggesting that concentrated ownership may reduce the effectiveness of environmental initiatives in enhancing bank stability. This may reflect a shift in managerial priorities under dominant shareholders, potentially misaligning with long-term ESG goals.

Panel C for insurance firms confirms a negative relationship between corporate governance and financial stability (*coefficient* = –0.0169; $p < 0.05$), but no significant moderating effect of ownership concentration is found. In Panel D for securities and diversified financial services, ESG and interaction terms remain insignificant.

Overall, the results provide empirical support for *Hypothesis 2* in the banking sector, highlighting ownership concentration as a key moderating factor that conditions the ESG–stability relationship.

To further examine the interplay between ESG performance, ownership concentration, and financial stability, firms were categorized into high (A+, A, B+) and low (B, C, D) ESG performers based on overall ratings. Table 7 presents panel regression results for each group.

For low ESG performers in Panel B, overall ESG initiatives are negatively associated with financial stability (*coefficient* = –0.1314; $p < 0.10$), suggesting inefficient implementation that increases costs without immediate financial benefit. Within this group, social responsibility has a stabilizing effect (*coefficient* = 0.2135; $p < 0.10$), but this is significantly weakened by concentrated ownership (*interaction coefficient* = –0.4666; $p < 0.05$). This implies that while social responsibility initiatives may build stakeholder trust, dominant shareholders in poorly rated firms may deprioritize ESG strategies.

In contrast, for high ESG performers, overall ESG effects are not significant. However, corporate governance negatively impacts financial stability (*coefficient* = –0.0101; $p < 0.05$), likely due to increased compliance burdens. This negative effect is mitigated by ownership concentration (*interaction coefficient* = 0.0239; $p < 0.05$), indicating that in well-rated firms, concentrated ownership may support governance efficiency and strategic coherence.

These findings underscore the role of ownership concentration as a double-edged sword as a constraint in low-ESG firms and a potential stabilizer in high-ESG firms. They reinforce the importance of aligning ownership structures with ESG strategies to optimize financial outcomes.

In summary, the findings indicate that, within the banking sector, environmental sustainability initiatives enhance financial stability, whereas social responsibility initiatives are associated with reduced financial stability. In contrast, for insurance firms, overall ESG initiatives, particularly governance-related efforts, exert a negative influence on financial stability. Moreover, in banks, the positive effect of environmental initiatives on financial stability is moderated by the presence of concentrated ownership. Taken together, these results highlight that ESG initiatives, whether positively or negatively, exert a significant influence on the financial stability of financial institutions. They further highlight the moderating role of ownership concentration, particularly in the banking sector. Ownership concentration also functions as a double-edged sword, with its moderating effect differing according to whether the financial firm exhibits high or low ESG performance. Overall, the findings provide strong empirical support for *Hypotheses 1* and *2*.

# 4. DISCUSSION

This study investigates the impact of ESG sustainability initiatives on the financial stability of firms within the financial sector, while also examining the moderating role of ownership concentration in this relationship. Centering on Korean financial institutions, including banks, insurance companies, securities firms, and diversified financial services, the study contributes to the relatively


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**Table 7.** ESG, ownership concentration, and stability of financial firms based on high and low ESG ratings

| Variables | Dependent Variable: Altman Z-Score of Financial Stability | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Main Effect | | | | With Moderating Effect | | | |
| | (A) High ESG Ratings | | (B) Low ESG Ratings | | (C) High ESG Ratings | | (D) Low ESG Ratings | |
| | (1) ESG | (2) Full | (1) ESG | (2) Full | (1) ESG | (2) Full | (1) ESG | (2) Full |
| ESG_Total | −0.0032 | – | −0.1314* | – | −0.0026 | – | 0.1491 | – |
| | (−0.82) | – | (−1.70) | – | (−0.40) | – | (0.72) | – |
| E_Score | – | 0.0013 | – | 0.0897 | – | −0.0030 | – | 0.2766 |
| | – | (0.52) | – | (0.95) | – | (−0.66) | – | (1.39) |
| S_Score | – | 0.0019 | – | −0.0214 | – | 0.0048 | – | 0.2135* |
| | – | (0.66) | – | (−0.43) | – | (0.99) | – | (1.86) |
| G_Score | – | −0.0023 | – | −0.0217 | – | −0.0101** | – | 0.1956 |
| | – | (−0.78) | – | (−0.36) | – | (−2.05) | – | (1.53) |
| OWNCON | −0.1010*** | −0.0924** | −0.6055 | −0.5373 | −0.0926 | −0.1966** | 0.6572 | 2.3101* |
| | (−2.89) | (−2.60) | (−0.99) | (−0.86) | (−1.14) | (−2.47) | (0.62) | (1.81) |
| ESG • OWNCON | – | – | – | – | −0.0021 | – | −0.5196 | – |
| | – | – | – | – | (−0.11) | – | (−1.45) | – |
| E • OWNCON | – | – | – | – | – | 0.0108 | – | −0.3878 |
| | – | – | – | – | – | (1.17) | – | (−1.00) |
| S • OWNCON | – | – | – | – | – | −0.0087 | – | −0.4666** |
| | – | – | – | – | – | (−0.76) | – | (−2.14) |
| G • OWNCON | – | – | – | – | – | 0.0239** | – | −0.4021* |
| | – | – | – | – | – | (2.02) | – | (−1.78) |
| LEV | −0.9061*** | −0.9345*** | −7.8999*** | −7.5514*** | −0.9045*** | −0.9414*** | −7.8668*** | −7.6146*** |
| | (−8.94) | (−9.12) | (−8.58) | (−8.15) | (−8.83) | (−9.15) | (−8.57) | (−8.14) |
| SIZE | −0.0543*** | −0.0553*** | 0.1601 | 0.1016 | −0.0544*** | −0.0518*** | 0.1619 | 0.0998 |
| | (−4.02) | (−4.07) | (0.99) | (0.62) | (−4.00) | (−3.80) | (1.01) | (0.61) |
| EMP | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0000 | 0.0000 | 0.0001 | 0.0000 |
| | (−0.02) | (0.16) | (0.56) | (0.54) | (−0.01) | (−0.10) | (0.39) | (0.12) |
| AGE | 0.0228* | 0.0231* | −0.3499 | −0.2653 | 0.0226* | 0.0198 | −0.4298 | −0.3689 |
| | (1.88) | (1.89) | (−0.65) | (−0.49) | (1.83) | (1.50) | (−0.80) | (−0.67) |
| OPER_1 | −0.0043*** | −0.0042*** | −0.2268 | −0.2009 | −0.0043*** | −0.0042*** | −0.2413 | −0.2245 |
| | (−3.78) | (−3.70) | (−1.41) | (−1.23) | (−3.77) | (−3.70) | (−1.50) | (−1.38) |
| OPER_2 | 0.3484*** | 0.3498*** | 2.1860*** | 2.2140*** | 0.3485*** | 0.3434*** | 2.1145*** | 2.1259*** |
| | (9.88) | (9.84) | (7.15) | (7.12) | (9.86) | (9.64) | (6.85) | (6.80) |
| O_EFF | 0.0000** | 0.0000* | 0.0010 | 0.0009 | 0.0000* | 0.0000* | 0.0010 | 0.0008 |
| | (1.98) | (1.94) | (1.26) | (1.06) | (1.97) | (1.91) | (1.19) | (0.94) |
| M_EFF | 0.2297*** | 0.2313*** | −1.5255*** | −1.4286*** | 0.2296*** | 0.2329*** | −1.5410*** | −1.4261*** |
| | (7.31) | (7.32) | (−3.59) | (−3.28) | (7.28) | (7.38) | (−3.63) | (−3.29) |
| B_SIZE | −0.0003 | −0.0003 | −0.0680** | −0.0690** | −0.0003 | −0.0004 | −0.0740*** | −0.0758*** |
| | (−0.23) | (−0.22) | (−2.48) | (−2.49) | (−0.23) | (−0.27) | (−2.68) | (−2.72) |
| B_IND | 0.0303** | 0.0306** | 0.2354 | 0.2883 | 0.0301** | 0.0361** | 0.3112 | 0.4157* |
| | (2.21) | (2.23) | (1.12) | (1.37) | (2.18) | (2.58) | (1.45) | (1.91) |
| BETA | −0.0152** | −0.0136* | −0.2707** | −0.2504* | −0.0152** | −0.0109 | −0.2547** | −0.1987 |
| | (−1.99) | (−1.75) | (−2.14) | (−1.93) | (−1.98) | (−1.36) | (−2.01) | (−1.51) |
| Intercept | 2.3175*** | 2.3381*** | 4.4093 | 4.9365 | 2.3174*** | 2.3091*** | 3.9111 | 3.8831 |
| | (7.60) | (7.60) | (1.42) | (1.57) | (7.58) | (7.52) | (1.26) | (1.24) |
| Sub-Industry/Year | Included | Included | Included | Included | Included | Included | Included | Included |
| Observations | 289 | 289 | 248 | 248 | 289 | 289 | 248 | 248 |
| R-sq. (within) | 0.6493 | 0.6509 | 0.6234 | 0.6199 | 0.6493 | 0.6586 | 0.6280 | 0.6348 |

*Notes:* Numbers in parentheses represent t-values. ***, **, and * represent significance at the 1, 5, and 10% levels, respectively. All financial variables are winsorized at 1% and 99% levels. Full variable definitions are provided in Appendix A.

underexplored intersection of sustainability and financial performance in this sector. By addressing this gap, the research offers detailed insights into how ESG practices and ownership structures interact to shape financial stability within a strategically vital industry.

The results reveal that within the banking sector, environmental sustainability initiatives are positively associated with financial stability. This suggests that banks engaging in robust environmental practices tend to exhibit stronger financial resilience. One interpretation is that environmental initiatives such as investments in green finance or proactive climate risk management enhance a bank's long-term risk profile and align with emerging regulatory and market expectations, ultimately contributing to financial stability. This finding aligns with prior studies by Brogi and Lagasio (2019) and Taddeo et al. (2024), which also reported a positive relationship between environmental ESG efforts and financial performance in banks. These results reinforce the idea that environmental commitment may signal strategic foresight that contributes to financial stability. However, the analysis also uncovers a significant negative relationship between banks' social responsibility initiatives and their financial stability. This may reflect the resource-intensive nature of social activities, which, while beneficial for reputation and stakeholder engagement, can place pressure on short-term financial performance. This finding contrasts with Chiaramonte et al. (2022), who found that ESG practices generally contribute positively to bank stability. The discrepancy may be attributable to differences in regional contexts, regulatory environments, or the scope and efficiency of social programs. In the Korean context, it is possible that such initiatives have not yet matured to the point of generating measurable returns, or that they are perceived as compliance-driven rather than strategically integrated.

The insurance industry, while not a direct polluter or a policymaker for climate change mitigation, plays a pivotal role in fostering resilience and protecting societies against financial losses from unexpected events such as premature death, injury, property loss, or legal liabilities. The results indicate that sustainability initiatives within the insurance sector are negatively associated with financial stability. This suggests that ESG efforts may impose additional financial burdens on insurance firms, likely due to the reactive nature of their business model, which incurs costs primarily in response to adverse events such as claims for death, injury, or property loss. Consequently, unlike proactive sectors, the immediate financial benefits of sustainability practices in insurance are less tangible, while costs tend to be more immediate and pronounced. This finding aligns with the discussions of Weber et al. (2014), who noted the challenges financial firms face when integrating sustainability, given their cost structures and risk exposures. Additionally, the study finds that stronger corporate governance frameworks correspond with a decline in financial stability within insurance firms. While governance mechanisms typically aim to improve oversight and decision-making quality, they may inadvertently lead to operational inefficiencies or increased compliance costs in this sector. These inefficiencies can detract from the firms' focus on financial resilience, potentially undermining governance benefits. This result diverges somewhat from the general consensus that effective governance enhances firm performance (e.g., Gholami et al., 2022) but resonates with evidence that governance complexity may impose short-term costs, especially in highly regulated and risk-sensitive industries such as insurance.

The analysis further reveals that the positive relationship between sustainability initiatives and financial stability in the financial sector, particularly within banks, is significantly moderated by ownership concentration. Specifically, higher levels of ownership concentration weaken the beneficial effects of environmental sustainability efforts on financial stability. This suggests that when ownership is concentrated, controlling shareholders may reduce management commitment to comprehensive ESG implementation, possibly prioritizing short-term financial returns over long-term sustainability goals and strategies. Such influence can dilute the overall effectiveness of sustainability initiatives. This finding aligns with the discussions of Erben Yabuz et al. (2024), who argue that excessive ownership concentration can disrupt established governance policies, thereby undermining ESG performance, ultimately hindering ESG



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outcomes. The results contribute to the broader debate by demonstrating how concentrated ownership may inadvertently hinder the positive impact of sustainability on financial stability, echoing concerns raised in previous studies about potential conflicts between shareholder interests and ESG objectives.

Remarkably, ownership concentration emerges as a double-edged sword in shaping how ESG initiatives impact the financial stability of firms, depending critically on whether a firm is a high or low ESG performer. For high ESG-rated firms, concentrated ownership actually softens the blow of stringent governance mechanisms by fostering more agile and efficient decision-making. While traditional governance structures aim to boost transparency and accountability, excessive rigidity can stifle flexibility, yet dominant shareholders break this deadlock, actively streamlining decisions and offsetting inefficiencies caused by overly formal governance frameworks.

Meanwhile, for firms with low ESG ratings, concentrated ownership powerfully dampens the positive effects of social responsibility initiatives. These firms undertake social efforts to appease stakeholders and societal demands, but controlling shareholders often view these actions as costly distractions from short-term profits. This leads to a laser-focused pursuit of shareholder interests at the expense of broader social goals.

In essence, ownership concentration acts as a powerful fulcrum that simultaneously curbs investment in social initiatives while alleviating the burdens of overbearing governance. This unprecedented insight challenges prevailing assumptions and promises to shake up current thinking in the financial ESG arena, opening exciting new avenues for governance and sustainability research in ESG decision-making, implementation, and its broader implications for financial stability and valuation.

Overall, the results highlight the complex interplay between the institutional calls to pursue ESG initiatives and the presence of concentrated ownership in shaping the financial stability of firms in the financial sector. While these sustainability initiatives hold the potential to impact financial stability in any direction, concentrated ownership moderates this direct effect. The findings highlight the need for balanced governance structures that align shareholder priority with ESG objectives to ensure that financial firms achieve both sustainability goals and maintain financial stability. As the financial industry continues to evolve, this interplay is crucial in maximizing ESG initiatives to answer the call for a "greener" financial industry as a tool for a more stable financial firm.

## CONCLUSION

This study set out to examine the impact of ESG sustainability initiatives on the financial stability of firms in the financial sector, with a particular focus on how ownership concentration moderates this relationship. By analyzing data from Korean financial firms, including banks, insurance companies, securities, and diversified financial services entities, the study responds to growing institutional calls for sustainability in finance and addresses a critical gap in the ESG literature specific to the financial industry context.

The empirical findings show that the effects of ESG initiatives on financial stability are not uniform across financial sub-sectors. For banks, environmental sustainability efforts were positively associated with financial stability, aligning with international regulatory trends and anecdotal observations of increased ESG engagement in the banking sector. Conversely, for insurance firms, ESG initiatives, particularly in governance, tend to exert a negative effect on financial stability, likely due to the reactive nature of their business models and the short-term cost burdens imposed by sustainability programs. Furthermore, the study found that ownership concentration significantly moderates the beneficial impact of environmental sustainability in banks. Furthermore, in high-performing ESG firms, concentrated ownership alleviated the negative effects of rigid governance, while in low ESG-rated firms, it diluted the stabilizing benefits of social responsibility efforts.

From these findings, several key conclusions can be drawn. First, ESG initiatives can serve as a strategic response to institutional pressures, supporting the theoretical lens of institutional theory. Financial firms undertake ESG practices not only for ethical or compliance reasons but also to secure legitimacy within a rapidly evolving institutional environment. Second, the moderating role of ownership concentration underscores a structural tension within firms between shareholder priorities and external institutional demands. This interaction between internal governance and external pressure must be carefully managed to avoid undermining ESG effectiveness. Third, ESG impacts are not monolithic but vary based on firm-specific characteristics and sub-sector contexts. Thus, a one-size-fits-all policy for ESG may be ineffective where ESG integration poses unique operational challenges.

Beyond theoretical contributions, the study also offers practical implications for stakeholders. For financial firm managers and owners, especially those operating within concentrated ownership structures, there is a pressing need to strike a balance between ESG investments and financial outcomes. Firms should tailor governance practices to ensure that ESG adoption is not hindered by excessive control or inflexible board oversight. For policymakers, this research suggests that regulatory and fiscal incentives could encourage ESG adoption without compromising firm stability. Furthermore, regulators should pay closer attention to ownership structures in financial firms, as these significantly shape how ESG initiatives translate into financial performance.

While the study provides meaningful insights, it also acknowledges certain limitations. Chief among them is the exclusive focus on ownership concentration as the primary moderating variable. Governance is multifaceted, and other elements such as institutional ownership, family control, and cross-holdings deserve further exploration. Additionally, this study relies on ESG ratings as a proxy for sustainability performance, which, while practical, may overlook qualitative aspects such as leadership commitment, internal culture, or stakeholder engagement. Future research should consider mixed-method approaches, including interviews, surveys, or textual analysis of ESG disclosures, to capture a fuller picture of ESG practice. Scholars might also examine how changes in regulatory environments, such as green taxonomy systems or climate risk disclosure rules, affect ESG-stability dynamics. Lastly, as ESG reporting becomes increasingly data-driven, emerging tools such as artificial intelligence-based sustainability analytics, green bonds, and sustainability-linked loans offer promising areas for future inquiry.

In summary, this study confirms that ESG initiatives, when strategically aligned with firm-specific structures and institutional contexts, can contribute to financial stability in the financial sector. However, ownership concentration introduces a layer of complexity that requires deliberate governance design and supportive policy environments. The findings not only advance ESG research but also provide a roadmap for financial firms striving to reconcile profitability, sustainability, and accountability in an era of growing institutional and societal expectations.

## AUTHOR CONTRIBUTIONS

Conceptualization: Kevin Troy Chua, Hae-Young Byun.
Data curation: Kevin Troy Chua.
Formal analysis: Kevin Troy Chua, Hae-Young Byun.
Funding acquisition: Hae-Young Byun.
Investigation: Kevin Troy Chua, Hae-Young Byun.
Methodology: Kevin Troy Chua, Hae-Young Byun.
Project administration: Kevin Troy Chua, Hae-Young Byun.
Resources: Kevin Troy Chua.
Software: Kevin Troy Chua, Hae-Young Byun.
Supervision: Hae-Young Byun.


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Validation: Kevin Troy Chua, Hae-Young Byun.
Visualization: Kevin Troy Chua.
Writing – original draft: Kevin Troy Chua, Hae-Young Byun.
Writing – reviewing & editing: Kevin Troy Chua, Hae-Young Byun.

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# APPENDIX A

**Table A1.** Study variables

| | |
|---|---|
| **Dependent Variable** | |
| Zscore | *Altman's Z-Score of Financial Stability.* A measurement of a financial firm's financial stability following Choi et al. (2024) based on Altman (1968), Altman (1983), and Altman et al. (2017) |
| **Independent and Moderating Variables** | |
| ESG_Total | *Overall ESG Rating.* The overall ESG rating of the financial firm, as provided by KCGS |
| E_Score | *Environmental Rating.* The "E" dimension of ESG and its rating for a financial firm, as provided by KCGS |
| S_Score | *Social Rating.* The "S" dimension of ESG and its rating for a financial firm, as provided by KCGS |
| G_Score | *Governance Rating.* The "G" dimension of ESG and its rating for a financial firm, as provided by KCGS |
| OWNCON | *Ownership Concentration.* Collective distribution percentage of a financial firm's largest shareholder and special related parties |
| ESG • OWNCON | An interaction term representing the overall ESG rating and ownership concentration |
| E • OWNCON | An interaction term representing the environmental rating and ownership concentration |
| S • OWNCON | An interaction term representing the social rating and ownership concentration. |
| G • OWNCON | An interaction term representing the governance rating and ownership concentration |
| **Control Variables** | |
| LEV | *Leverage.* Ratio of a financial firm's total liabilities to total assets |
| SIZE | *Firm Size.* Natural logarithm of the total assets of the financial firm |
| EMP | *Employees.* Number of employees in the financial firm |
| AGE | *Firm Age.* Natural logarithm of the firm's age from the date of establishment. |
| OPER_1 | *Operating Profit Margin.* Reported operating profit of a financial firm over total revenue |
| OPER_2 | *Pre-tax Return on Equity.* Reported profit before tax in the statement of comprehensive income of the financial firm over total equity |
| O_EFF | *Operational Efficiency.* Reported operating costs over operating profit. |
| M_EFF | *Management Efficiency.* Reported operating costs, excluding interest expense, over the total assets of the financial firm |
| B_SIZE | *Board Size.* Number of total directors on the board |
| B_IND | *Board Independence.* Ratio of the number of outside directors to the total number of directors on the board |
| BETA | *Beta.* A financial firm's beta coefficient under the Capital Asset Pricing Model (CAPM) |
| SIDUM | *Sub-Industry Dummy.* Control variable for industry categorization to account for variations between banks, insurance firms, securities, and diversified financial services firms |
| YDUM | *Year Dummy.* Control variable for year representation to account for temporal changes in between years of the study |

# APPENDIX B

**Table B1.** Descriptions of ESG ratings and numerical proxies

| Ratings | Descriptions (translated from original Korean) | Numerical Proxies |
|---|---|---|
| S (Excellent) | Establishing an excellent sustainable management system, serving as a role model for other companies in all aspects of sustainable management | 7 |
| A+ (Very Satisfactory) | Building a very satisfactory, sustainable management system and consistently demonstrating excellent performance | 6 |
| A (Satisfactory) | Building a relatively satisfactory sustainable management system, with efforts needed for system enhancement | 5 |
| B+ (Fair) | Having a fair, sustainable management system, with continuous efforts required for system improvement | 4 |
| B (Average) | Having a somewhat weak sustainable management system, with continuous efforts needed for improvement | 3 |
| C (Weak) | Having a weak sustainable management system, requiring considerable effort for improvement | 2 |
| D (Very Weak) | Having a very weak sustainable management system, requiring significant effort for improvement | 1 |

*Note:* The above numerical proxies are not provided by the Korea Institute of Corporate Governance and Sustainability (KCGS). Rather, these are quantitative proxies following Kim et al. (2022) and Kwon and Choi (2024) for utilization in all regression analyses.


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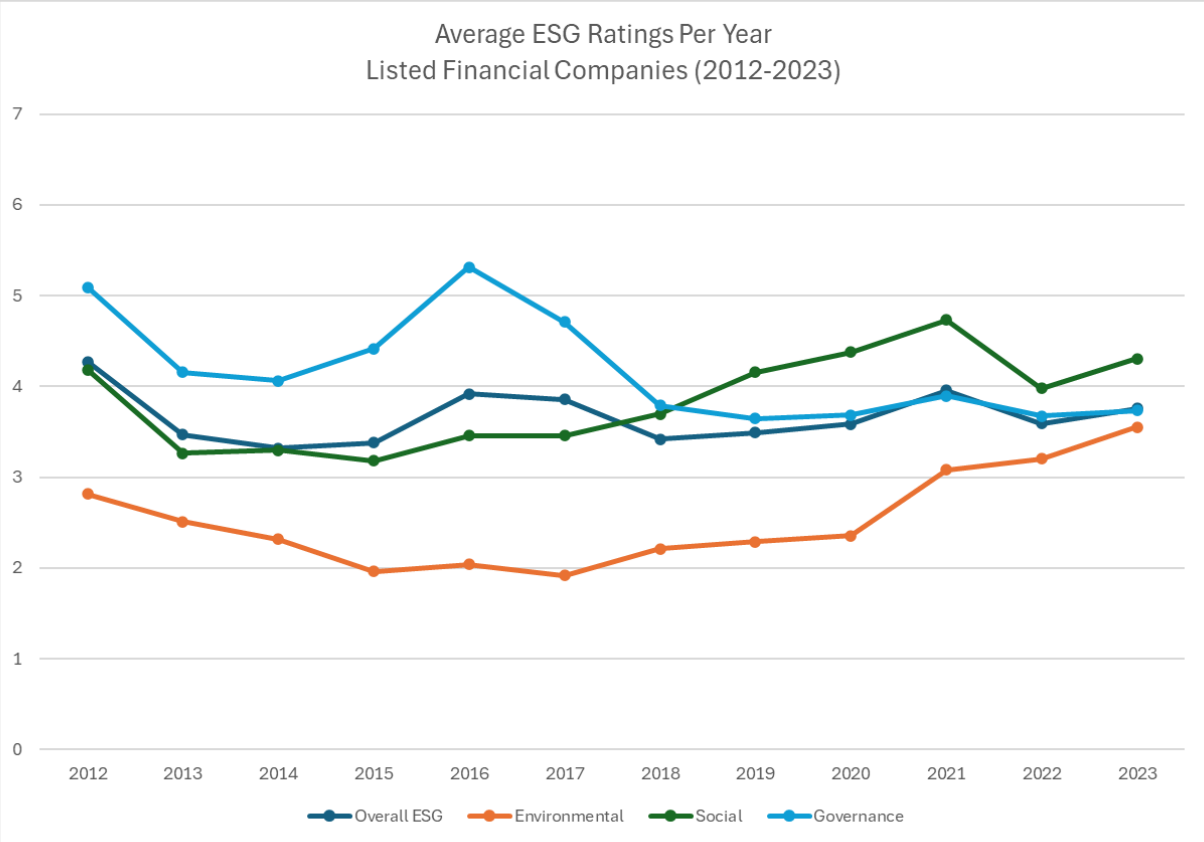
# APPENDIX C




*Note:* The seven-point system on the left side of the figure represents the ESG ratings of firms as provided in Appendix B.

**Figure C1.** Average ESG ratings of listed financial companies in Korea