

Do All ESG Dimensions Matter Equally? Evidence from Taiwanese Financial Holding Companies

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Abstract

This study examines the relationship between ESG performance and firm value using a sample of 13 Taiwanese financial holding companies over the period 2016–2025. Firm value is measured by Tobin's Q, while ESG performance is measured using the Taiwan ESG (TESG) rating. A series of pooled ordinary least squares (OLS) regression models is employed to examine the effects of overall ESG performance and its individual Environmental (E), Social (S), and Governance (G) dimensions. The results indicate that overall ESG performance is positively associated with firm value. Among the individual ESG dimensions, the Social dimension exhibits the most robust positive association with firm value and remains statistically significant after accounting for within-firm correlation. These findings highlight the importance of evaluating ESG as a multidimensional construct rather than relying solely on an aggregate ESG score.

JEL classification numbers: G32.

Keywords: ESG performance, Environmental, Social, Governance, Financial holding companies.

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1. Introduction

The financial sector plays a pivotal role in promoting economic growth, facilitating capital allocation, and maintaining financial stability. As financial intermediaries, financial institutions provide a wide range of services, including lending, investment, asset management, and risk management, thereby contributing substantially to economic development and social welfare. Given their central role in the economy, financial institutions are expected not only to achieve superior financial performance but also to fulfill broader responsibilities toward sustainable development. Consequently, environmental, social, and governance (ESG) issues have become increasingly important for the financial services industry, attracting growing attention from regulators, investors, and other stakeholders (Friede et al., 2015; Gillan et al., 2021; Velte, 2022).

The growing importance of ESG has become particularly evident following the global financial crisis and the increasing awareness of climate change and sustainable development. The financial crisis of 2007–2009 exposed significant weaknesses in corporate governance, risk management, and ethical standards within financial institutions, highlighting the importance of responsible corporate management and sustainable business practices (Acharya & Richardson, 2009; Kirkpatrick, 2009). More recently, climate change, carbon neutrality, and sustainable finance have become major policy priorities worldwide. Governments and regulatory authorities have actively promoted ESG-related regulations and sustainability disclosure standards to encourage firms to integrate ESG considerations into corporate strategies and investment decisions (UNEP FI, 2023; ISSB, 2023). As a result, ESG has gradually evolved from a voluntary corporate initiative into an important criterion for evaluating corporate sustainability, investment decisions, and long-term competitiveness (Fatemi et al., 2018; Broadstock et al., 2021).

In Taiwan, the Financial Supervisory Commission (FSC) has actively promoted sustainable finance through a series of policy initiatives, including the Sustainable Finance Action Plans and enhanced ESG disclosure requirements for listed companies (Financial Supervisory Commission, 2022; Taiwan Stock Exchange, 2023). Financial holding companies, as key participants in Taiwan's financial system, are expected to incorporate ESG principles into their corporate governance, investment decisions, lending practices, and risk management processes. Compared with firms in many other industries, financial institutions may exert relatively limited direct environmental impacts; however, they play an indispensable role in promoting sustainable development through capital allocation and financial intermediation. Consequently, ESG performance has become an increasingly important indicator of the competitiveness, sustainability, and long-term value creation of Taiwanese financial holding companies.

Although previous studies have extensively examined the relationship between ESG performance and firm value, the empirical evidence remains inconclusive (Friede et al., 2015; Fatemi et al., 2018; Gillan et al., 2021; Velte, 2022). While

many studies suggest that superior ESG performance enhances firm value through improved corporate governance, stronger stakeholder relationships, enhanced corporate reputation, and reduced corporate risk, other studies argue that ESG initiatives may increase operating costs or produce heterogeneous effects across industries and institutional environments (Cavaco & Crifo, 2014). Furthermore, most existing studies primarily focus on the overall ESG score and pay relatively limited attention to whether the Environmental, Social, and Governance dimensions exert different effects on firm value. Since each ESG dimension reflects different aspects of corporate sustainability and managerial practices, their economic implications may differ substantially. In addition, empirical evidence from Taiwanese financial holding companies remains relatively limited despite the industry's important role in promoting sustainable finance.

This study makes three contributions to the existing literature. First, it provides updated empirical evidence from Taiwanese financial holding companies, an industry that plays a pivotal role in sustainable finance but has received relatively limited attention in the ESG literature. Second, this study extends prior research by moving beyond the use of an aggregate ESG score to examine the heterogeneous effects of the Environmental, Social, and Governance dimensions on firm value, thereby providing a more comprehensive understanding of the relative importance of different ESG dimensions. Third, by focusing on the financial holding industry, this study provides industry-specific evidence on how different ESG dimensions are reflected in firm value, offering further insights into the role of ESG in a highly regulated and stakeholder-oriented financial environment.

The remainder of this paper is organized as follows. Section 2 reviews the relevant literature and develops the research hypotheses. Section 3 describes the research methodology, including the sample, variables, empirical models, and estimation methods. Section 4 presents the empirical results and robustness analyses. Finally, Section 5 concludes the study and discusses the theoretical and practical implications of the findings.

2. Literature Review and Research Hypotheses

2.1 ESG Performance and Firm Value

Environmental, Social, and Governance (ESG) performance has become an increasingly important determinant of firm value as investors, regulators, and other stakeholders place greater emphasis on corporate sustainability. Rather than focusing solely on short-term financial performance, ESG reflects a firm's ability to create long-term value by effectively managing environmental risks, stakeholder relationships, and corporate governance practices. As ESG information has become more transparent and widely incorporated into investment decision-making, firms with superior ESG performance are generally expected to enjoy stronger market valuation and long-term competitiveness.

Stakeholder Theory provides one of the primary theoretical foundations for explaining the positive relationship between ESG performance and firm value.

According to Freeman (1984), firms that effectively address the interests of multiple stakeholders—including customers, employees, suppliers, regulators, and local communities—are more likely to strengthen stakeholder relationships, enhance corporate reputation, and achieve sustainable competitive advantages. Similarly, the *Resource-Based View* argues that ESG-related capabilities constitute valuable intangible resources that improve organizational resilience, reduce business risk, and enhance firms' long-term competitiveness (Barney, 1991).

Consistent with these theoretical perspectives, a growing body of empirical research documents a positive relationship between ESG performance and firm value. Friede et al. (2015), through a meta-analysis of more than 2,000 empirical studies, conclude that the majority of existing evidence supports a positive association between ESG performance and corporate financial performance. Likewise, Fatemi et al. (2018) show that superior ESG performance enhances firm value by improving corporate transparency and reducing information asymmetry, while Gillan et al. (2021) argue that ESG provides investors with important non-financial information for evaluating firms' long-term competitiveness and sustainability. Nevertheless, previous studies have reported inconsistent findings regarding the ESG–firm value relationship (e.g., Velte, 2022; Atan et al., 2018), suggesting that the economic value of ESG may depend on industry characteristics, institutional environments, and the specific ESG dimensions examined.

Although the literature generally supports a positive relationship between ESG performance and firm value, most existing studies focus primarily on the overall ESG score and implicitly assume that the Environmental (E), Social (S), and Governance (G) dimensions contribute equally to firm value. However, relatively limited empirical evidence compares the relative importance of these three ESG dimensions, particularly within Taiwan's financial holding industry, where sustainable finance policies, stakeholder-oriented business models, and regulatory requirements may influence how different ESG dimensions create corporate value. Accordingly, this study first examines whether overall ESG performance is positively associated with firm value and further investigates the individual contributions of the Environmental, Social, and Governance dimensions, thereby addressing an important gap in the existing ESG literature.

H1: ESG performance is positively associated with firm value.

2.2 Environmental Dimension and Firm Value

The environmental dimension reflects a firm's ability to manage environmental risks and integrate sustainability considerations into its business operations. From the perspective of *Stakeholder Theory*, firms that actively engage in environmental protection are more likely to strengthen relationships with regulators, investors, customers, and local communities, thereby enhancing corporate reputation and long-term value creation (Freeman, 1984). Similarly, the *Resource-Based View* (RBV) suggests that effective environmental management can create valuable

organizational capabilities, including improved resource efficiency, innovation, and risk management, which contribute to sustainable competitive advantage (Barney, 1991).

Consistent with these theoretical arguments, previous empirical studies generally report a positive relationship between environmental performance and firm value. Firms with stronger environmental performance are more likely to benefit from improved corporate reputation, lower environmental risk, and greater investor confidence, resulting in higher market valuation (Eccles et al., 2014; Fatemi et al., 2018).

Nevertheless, the existing evidence is not entirely consistent. Cavaco and Crifo (2014) argue that environmental initiatives often require substantial investments, whereas their financial benefits may only materialize over a relatively long time horizon. Consequently, improvements in environmental performance do not necessarily translate into immediate increases in firm value, and the strength of this relationship may vary across industries and institutional environments.

This issue is particularly relevant in the financial services industry. Unlike manufacturing firms, financial institutions generate relatively limited direct environmental impacts because they do not engage in large-scale production activities. Instead, their environmental performance is primarily reflected in green lending, sustainable investment, climate-related risk management, and responsible financing decisions. Consequently, whether environmental performance contributes to firm value remains an important empirical question for financial holding companies.

Based on the above theoretical arguments and empirical evidence, firms with superior environmental performance are expected to exhibit higher firm value.

H2a: Environmental performance is positively associated with firm value.

2.3 Social Dimension and Firm Value

The social dimension reflects a firm's ability to establish and maintain positive relationships with its stakeholders, including customers, employees, suppliers, and local communities. According to *Stakeholder Theory*, firms that effectively address stakeholder expectations are more likely to strengthen stakeholder trust, improve corporate reputation, and create long-term value (Freeman, 1984). From the perspective of the *Resource-Based View*, superior social performance contributes to valuable intangible resources, such as customer loyalty, employee commitment, organizational culture, and corporate reputation, all of which are difficult for competitors to imitate and therefore enhance sustainable competitive advantage (Barney, 1991).

Consistent with these theoretical perspectives, prior empirical studies generally support a positive relationship between social performance and firm value. Firms with superior social performance are more likely to improve customer satisfaction, attract and retain talented employees, strengthen stakeholder relationships, and

reduce information asymmetry, thereby enhancing market valuation and long-term corporate performance (Eccles et al., 2014; Fatemi et al., 2018; Gillan et al., 2021). Nevertheless, previous studies also suggest that the economic benefits of social performance may vary across industries because firms differ in their dependence on stakeholder relationships, customer interaction, and service characteristics (Gillan et al., 2021; Velte, 2022). Accordingly, the value relevance of the social dimension may be particularly context-dependent.

This issue is especially important for the financial services industry, where competitive advantage depends heavily on customer trust, service quality, corporate reputation, and long-term stakeholder relationships rather than the production of tangible goods. Financial institutions with stronger social performance may therefore be better positioned to enhance customer loyalty, attract investors, strengthen market confidence, and ultimately increase firm value. However, empirical evidence regarding the value relevance of the social dimension within Taiwan's financial holding industry remains relatively limited.

Based on the above theoretical arguments and empirical evidence, firms with superior social performance are expected to exhibit higher firm value.

H2b: Social performance is positively associated with firm value.

2.4 Governance Dimension and Firm Value

The governance dimension reflects the quality of a firm's governance practices, including board oversight, transparency, accountability, risk management, and the protection of shareholder interests. *Agency Theory* argues that conflicts of interest between managers and shareholders give rise to agency costs that may reduce firm value (Jensen & Meckling, 1976). Effective corporate governance mechanisms help mitigate these agency conflicts by strengthening monitoring, improving managerial accountability, and reducing opportunistic behavior. In contrast, *Stewardship Theory* suggests that managers are capable of acting as responsible stewards of organizational resources when supported by effective governance structures. Under this perspective, sound governance facilitates strategic decision-making, organizational cooperation, and long-term value creation rather than merely serving as a monitoring mechanism (Davis et al., 1997).

Consistent with these theoretical perspectives, previous empirical studies generally report a positive relationship between governance performance and firm value. Firms with stronger governance practices are more likely to improve financial transparency, strengthen investor confidence, reduce information asymmetry, and enhance decision-making quality, thereby contributing to higher market valuation (Gompers et al., 2003; Bebcuk et al., 2009; Gillan et al., 2021).

Nevertheless, previous studies have reported heterogeneous findings regarding the governance–firm value relationship. The effectiveness of governance mechanisms may vary across institutional environments, ownership structures, and regulatory frameworks (Gillan et al., 2021). Furthermore, Velte (2022) suggests that

differences in governance indicators, ESG measurement approaches, and research settings may contribute to inconsistent empirical evidence concerning the value relevance of the governance dimension.

This issue is particularly important in the financial services industry, where financial institutions operate under stringent regulatory requirements and rely heavily on stakeholder confidence and prudent risk management. Strong governance practices facilitate regulatory compliance, enhance risk control, improve strategic decision-making, and strengthen organizational stability. However, relatively limited empirical evidence has examined whether governance contributes to firm value within Taiwan's financial holding companies.

Based on the above theoretical arguments and empirical evidence, firms with superior governance performance are expected to exhibit higher firm value.

H2c: Governance performance is positively associated with firm value.

3. Methodology

3.1 Sample Selection and Data Sources

The research sample consists of 13 financial holding companies listed on the Taiwan Stock Exchange (TWSE). Quarterly observations covering the period from the first quarter of 2016 to the fourth quarter of 2025 are collected. Financial data and ESG information are obtained from the Taiwan Economic Journal (TEJ) database. Firms with incomplete financial or ESG information are excluded from the final sample, resulting in 520 firm-quarter observations. Table 1 summarizes the sample selection and data sources.

Table 1: Sample Description

Item	Description
Sample	13 Taiwanese financial holding companies
Market	Taiwan Stock Exchange (TWSE)
Sample period	2016Q1–2025Q4
Frequency	Quarterly
Total observations	520 firm-quarter observations
Financial data	Taiwan Economic Journal (TEJ)

3.2 Variable Measurement

Firm value is measured by Tobin's Q, while ESG performance is measured using the Taiwan ESG (TESG) ratings provided by the Taiwan Economic Journal (TEJ). In addition to the overall TESG score, the Environmental (E), Social (S), and Governance (G) dimension scores are examined separately to assess their individual effects on firm value. Firm size (SIZE) and financial leverage (DR) are included as control variables. Table 2 presents the definitions and measurements of all variables.

Table 2: Variable Definitions

Variable	Definition	Measurement
Tobin's Q	Firm value	(Market value of equity + Total liabilities) / Total assets
TESG	Overall ESG performance	Taiwan ESG (TESG) score provided by TEJ
E	Environmental performance	Environmental dimension score
S	Social performance	Social dimension score
G	Governance performance	Governance dimension score
SIZE	Firm size	Natural logarithm of total assets
DR	Financial leverage	(Total liabilities / Total assets)×100

3.3 Regression Models

To examine the relationship between ESG performance and firm value, this study estimates a series of pooled ordinary least squares (OLS) regression models. Models (1)–(6) are specified as follows.

Model (1) serves as the baseline model and includes only the control variables, namely firm size (SIZE) and financial leverage (DR).

$$\text{Tobin's } Q_{i,t} = \beta_0 + \beta_1 \text{SIZE}_{i,t} + \beta_2 \text{DR}_{i,t} + \varepsilon_{i,t} \quad (1)$$

Model (2) extends the baseline model by incorporating the overall Taiwan ESG (TESG) score. This model examines whether firms with superior overall ESG performance exhibit higher firm value, thereby testing **Hypothesis 1**.

$$\text{Tobin's } Q_{i,t} = \beta_0 + \beta_1 \text{TESG}_{i,t} + \beta_2 \text{SIZE}_{i,t} + \beta_3 \text{DR}_{i,t} + \varepsilon_{i,t} \quad (2)$$

To further investigate whether the three ESG dimensions exert different effects on firm value, the overall TSEG score is replaced with each individual ESG dimension.

Model (3) estimates the effect of the **Environmental (E)** dimension on firm value and is used to test **Hypothesis 2a**.

$$\text{Tobin's } Q_{i,t} = \beta_0 + \beta_1 E_{i,t} + \beta_2 \text{SIZE}_{i,t} + \beta_3 \text{DR}_{i,t} + \varepsilon_{i,t} \quad (3)$$

Model (4) estimates the effect of the **Social (S)** dimension on firm value and is used to test **Hypothesis 2b**.

$$\text{Tobin's } Q_{i,t} = \beta_0 + \beta_1 S_{i,t} + \beta_2 \text{SIZE}_{i,t} + \beta_3 \text{DR}_{i,t} + \varepsilon_{i,t} \quad (4)$$

Model (5) estimates the effect of the **Governance (G)** dimension on firm value and is used to test **Hypothesis 2c**.

$$\text{Tobin's } Q_{i,t} = \beta_0 + \beta_1 G_{i,t} + \beta_2 \text{SIZE}_{i,t} + \beta_3 \text{DR}_{i,t} + \varepsilon_{i,t} \quad (5)$$

Although Models (3)–(5) provide evidence on the individual effects of each ESG dimension, they do not allow direct comparison among the three dimensions because each model is estimated separately. Therefore, Model (6) simultaneously includes the Environmental, Social, and Governance dimensions, allowing the association of each ESG dimension with firm value to be estimated while controlling for the other two dimensions. The aggregate TESG score is not included in Model (6) because it is constructed from the underlying ESG dimensions and its simultaneous inclusion would introduce substantial multicollinearity.

$$\text{Tobin's } Q_{i,t} = \beta_0 + \beta_1 E_{i,t} + \beta_2 S_{i,t} + \beta_3 G_{i,t} + \beta_4 \text{SIZE}_{i,t} + \beta_5 \text{DR}_{i,t} + \varepsilon_{i,t} \quad (6)$$

where *Tobin's* $Q_{i,t}$ denotes firm value; TESG represents the overall ESG score; E, S, and G denote the Environmental, Social, and Governance dimension scores, respectively; $\text{SIZE}_{i,t}$ represents firm size; $\text{DR}_{i,t}$ denotes financial leverage; i denotes the firm; t denotes the quarter; β represents the estimated coefficients; and $\varepsilon_{i,t}$ is the random error term.

The regression models are estimated using pooled ordinary least squares (OLS). To assess the robustness of the empirical findings, all models are further re-estimated using firm-clustered standard errors to account for potential heteroskedasticity and within-firm serial correlation arising from repeated quarterly observations. Prior to the regression analysis, potential multicollinearity is assessed using the variance inflation factor (VIF) and tolerance values to ensure that the explanatory variables do not exhibit serious multicollinearity.

4. Empirical Results

4.1 Descriptive Statistics

Table 3 presents the descriptive statistics of the variables used in this study. The mean value of Tobin's Q is 1.0065, with a standard deviation of 0.0243, indicating that the sampled financial holding companies are, on average, valued slightly above the replacement value of their assets. The average TESG score is 63.8717, ranging from 45.890 to 76.940, suggesting substantial variation in ESG performance across firms.

Among the three ESG dimensions, the Social (S) dimension records the highest mean score (70.0431), followed by the Environmental (E) dimension (69.7693) and the Governance (G) dimension (58.6272). In addition, the Environmental dimension exhibits the largest standard deviation, indicating greater variation in environmental

performance across the sampled firms than in the Social and Governance dimensions. Overall, the three ESG dimensions exhibit sufficient cross-sectional variation, suggesting that the sample provides adequate heterogeneity for the subsequent regression analyses.

The mean debt ratio (DR) is 92.3187%, which is substantially higher than that typically observed in non-financial firms. This reflects the operational characteristics of financial holding companies, whose primary funding sources include deposits, insurance reserves, and other financial liabilities. Accordingly, relatively high debt ratios are a common characteristic of financial holding companies.

Table 3: Descriptive Statistics of Research Variables

Variable	N	Mean	SD	Min	Max
Firm value					
Tobin Q	520	1.0065	0.0243	0.9426	1.0744
Environmental, Social, and Governance (ESG)					
TESG	520	63.8717	7.1149	45.8900	76.9400
E	520	69.7693	14.3597	31.7400	90.2600
S	520	70.0431	10.0309	41.9900	91.1100
G	520	58.6272	7.9587	34.8200	71.1900
Control Variable					
SIZE	520	21.8958	0.8644	19.3178	23.3864
DR (%)	520	92.3187	2.3973	80.8200	97.4200

Note: Tobin's Q = Firm value; TESG = Taiwan ESG score; E= Environmental; S = Social; G = Governance; SIZE = Firm size; DR = Debt ratio.

4.2 Multicollinearity Diagnostics

To assess potential multicollinearity among the explanatory variables, the variance inflation factor (VIF) and tolerance values are examined. Table 4 presents the multicollinearity diagnostics for the benchmark TESG model and the joint ESG dimension model. Following Hair et al. (2019), VIF values below 5 and tolerance values above 0.10 indicate that multicollinearity is unlikely to pose a serious concern.

As shown in Table 4, the VIF values range from 1.195 to 2.684, while the corresponding tolerance values range from 0.373 to 0.837. All VIF values are substantially below the threshold of 5, and all tolerance values exceed 0.10. These results indicate that the explanatory variables do not exhibit serious multicollinearity. These results suggest that multicollinearity is unlikely to affect the reliability of the regression estimates.

Table 4: Multicollinearity Diagnostics

Panel A. Benchmark Model (TESG)		
Variable	Tolerance	VIF
TESG	0.686	1.458
SIZE	0.436	2.295
DR	0.441	2.270
Panel B. ESG Dimension Comparison Model		
Variable	Tolerance	VIF
E	0.678	1.474
S	0.837	1.195
G	0.776	1.289
SIZE	0.373	2.684
DR	0.410	2.440

Note: Tolerance is calculated as the reciprocal of the variance inflation factor (Tolerance = $1/\text{VIF}$). Following Hair et al. (2019), VIF values below 5 and tolerance values above 0.10 indicate that multicollinearity is not a serious concern.

4.3 Regression Results

This section presents the regression results examining the relationship between ESG performance and firm value. The analysis is conducted in two stages. First, the benchmark regression model examines the effect of the overall Taiwan ESG (TESG) score on firm value. Second, the Environmental (E), Social (S), and Governance (G) dimensions are examined both individually and jointly to evaluate their respective effects on firm value. The regression results are reported in Tables 5 and 6.

4.3.1 Benchmark Regression: Overall ESG Performance

Table 5 presents the benchmark regression results for the relationship between overall ESG performance and firm value. Model (1) serves as the baseline specification including only the control variables, whereas Model (2) additionally incorporates the Taiwan ESG (TESG) score to examine the effect of overall ESG performance on firm value.

Regarding the control variables, SIZE is negatively and significantly associated with Tobin's Q in both models, whereas DR exhibits a positive and statistically significant relationship with firm value. The consistent signs and statistical significance of the control variables indicate that the estimated relationships remain stable after the inclusion of ESG performance.

After the inclusion of the TESG score in Model (2), the coefficient of TESG is positive and statistically significant ($\beta = 0.0013$, $p < 0.01$), indicating that firms with superior ESG performance tend to exhibit higher firm value. This finding supports Hypothesis H1 and is consistent with *Stakeholder Theory* (Freeman, 1984), which

argues that firms creating value for multiple stakeholders are more likely to enhance long-term corporate value. The result also supports the *Resource-Based View* (Barney, 1991), suggesting that ESG-related capabilities constitute valuable intangible resources that strengthen firms' competitiveness and market valuation. The inclusion of the TESG score also improves the explanatory power of the regression model. The adjusted R^2 increases from 0.3552 in Model (1) to 0.4502 in Model (2), indicating that overall ESG performance provides substantial explanatory power beyond the control variables. Overall, the benchmark regression results provide **strong empirical support for Hypothesis H1**, suggesting that firms with superior ESG performance tend to receive higher market valuations.

Table 5: Benchmark Regression: Overall ESG Performance and Tobin's Q

Variable	Model (1)	Model (2)
Constant	0.4493** (0.0332)	0.5407** (0.0322)
TESG		0.0013** (0.0001)
SIZE	-0.0064** (0.0015)	-0.0097** (0.0014)
DR	0.0076** (0.0005)	0.0065** (0.0005)
N	520	520
R^2	0.3576	0.4534
Adjusted R^2	0.3552	0.4502
F-statistic	143.9253	142.6648
Prob > F	2.041E-50	2.568E-67

Notes: Unstandardized coefficients are reported, with standard errors in parentheses. ** $p < 0.01$; * $p < 0.05$.

4.3.2 Regression Results for ESG Dimensions

Table 6 presents the regression results examining the individual and joint effects of the Environmental (E), Social (S), and Governance (G) dimensions on firm value. Models (3)–(5) estimate each ESG dimension separately, whereas Model (6) simultaneously incorporates the three dimensions to evaluate their joint effects.

Regarding the control variables, SIZE remains negatively and significantly associated with Tobin's Q across all model specifications, whereas DR continues to exhibit a positive and statistically significant relationship with firm value. The consistent coefficients of the control variables suggest that the estimated relationships remain stable across different model specifications.

The regression results indicate that the Environmental (E), Social (S), and Governance (G) dimensions are all positively and significantly associated with

Tobin's Q when estimated individually. Compared with the baseline model, the inclusion of each ESG dimension increases the explanatory power of the regression models. The adjusted R^2 rises from 0.3552 in the baseline model to 0.3882, 0.3977, and 0.3923 for the Environmental, Social, and Governance models, respectively. Among the three dimensions, the Social model exhibits the highest explanatory power, suggesting that social-related activities may be more strongly associated with firm value when each ESG dimension is considered individually.

When all three ESG dimensions are simultaneously included in Model (6), the coefficients of the Environmental ($\beta = 0.00027$, $p < 0.01$), Social ($\beta = 0.00050$, $p < 0.01$), and Governance ($\beta = 0.00047$, $p < 0.01$) dimensions remain positive and statistically significant. These results indicate that each ESG dimension is positively associated with firm value when the other two ESG dimensions are simultaneously controlled for.

Accordingly, **Hypotheses H2a, H2b, and H2c are supported**. Although all three ESG dimensions are positively associated with firm value, their relative importance cannot be directly inferred from the unstandardized coefficients because the three dimensions are measured on different scales. Therefore, the following section compares their relative effects using standardized regression coefficients and coefficient equality tests.

Table 6: Regression Results for Individual and Joint ESG Dimensions

Variable	Model (1)	Model (3)	Model (4)	Model (5)	Model (6)
Constant	0.4493** (0.0332)	0.4752** (0.0327)	0.4905** (0.0328)	0.4875** (0.0323)	0.5335** (0.0321)
E		0.0004** (0.0001)			0.00027** (0.0001)
S			0.0006** (0.0001)		0.00050** (0.0001)
G				0.0007** (0.0001)	0.00047** (0.0001)
SIZE	-0.0063** (0.0015)	-0.0101** (0.0015)	-0.0073** (0.0014)	-0.0069** (0.0014)	-0.0103** (0.0015)
DR	0.0076** (0.0005)	0.0079** (0.0005)	0.0069** (0.0005)	0.0068** (0.0005)	0.0067** (0.0005)
N	520	520	520	520	520
R^2	0.3576	0.3917	0.4011	0.3958	0.4498
Adjusted R^2	0.3552	0.3882	0.3977	0.3923	0.4444
F-statistic	143.9253	110.7571	115.2142	112.6576	84.0404
Prob > F	2.041E-50	2.282E-55	4.083E-57	4.073E-56	1.956E-64

Notes: Model (1) is the baseline model reported for comparison, whereas Model (2) is presented separately in Table 5. Unstandardized coefficients are reported, with standard errors in parentheses.

** $p < 0.01$; * $p < 0.05$.

4.3.3 Comparison of the Relative Effects of ESG Dimensions

To further compare the relative importance of the Environmental (E), Social (S), and Governance (G) dimensions, standardized regression coefficients and pairwise coefficient equality tests are conducted based on Model (6). The results are reported in Table 7.

The standardized regression coefficients indicate that the Social dimension exhibits the strongest association with firm value ($\beta = 0.2063$), followed by the Environmental ($\beta = 0.1569$) and Governance ($\beta = 0.1550$) dimensions. These results suggest that improvements in social performance are more strongly reflected in firm value than improvements in the other ESG dimensions.

To determine whether these differences are statistically significant, pairwise coefficient equality tests are performed. The results show that the coefficient of the Social dimension is significantly larger than that of the Environmental dimension ($t = -2.1015$, $p = 0.0361$), whereas the differences between the Environmental and Governance dimensions ($p = 0.1576$) and between the Social and Governance dimensions ($p = 0.8576$) are not statistically significant. These findings indicate that the Social dimension exerts a significantly stronger effect than the Environmental dimension, while the Governance dimension does not differ significantly from either of the other two dimensions.

Overall, the results suggest that all three ESG dimensions contribute positively to firm value, but their contributions are not identical. In particular, the Social dimension exhibits the strongest relative association with firm value, providing additional evidence that ESG should be regarded as a multidimensional construct rather than a single composite indicator.

This finding is consistent with the characteristics of Taiwan's financial holding industry, where stakeholder trust, customer relationships, service quality, and corporate reputation constitute important intangible assets. Compared with environmental initiatives, investments in customer protection, employee welfare, financial inclusion, and stakeholder engagement are more likely to be recognized by investors and reflected in market valuation. Consequently, the Social dimension appears to create greater value for Taiwanese financial holding companies, whereas the Environmental and Governance dimensions remain important but exhibit relatively similar effects.

Table 7: Relative Importance of ESG Dimensions

Panel A. Standardized Regression Coefficients (Model (6))				
ESG Dimension		Standardized Beta		
Environmental (E)		0.1569		
Social (S)		0.2063		
Governance (G)		0.1550		
Panel B. Pairwise Coefficient Equality Tests				
Null Hypothesis		Difference	t-statistic	p-value
$H_0 : \beta_E = \beta_S$		E – S	-2.1015	0.0361*
$H_0 : \beta_E = \beta_G$		E – G	-1.4153	0.1576
$H_0 : \beta_S = \beta_G$		S – G	0.1795	0.8576

Notes: Panel A reports standardized regression coefficients (Beta) from Model 6. Panel B reports pairwise tests of coefficient equality. * indicates statistical significance at the 5% level.

4.3.4 Robustness Test Using Firm-Clustered Standard Errors

To examine the robustness of the empirical findings, all regression models are re-estimated using firm-clustered standard errors, which account for potential heteroskedasticity and within-firm serial correlation arising from repeated quarterly observations. The robustness results are reported in Table 8.

Overall, the robustness analysis produces results that are highly consistent with the benchmark regressions. The coefficients of the overall ESG score as well as the Environmental (E), Social (S), and Governance (G) dimensions remain positive across all model specifications, indicating that the estimated relationships are robust to the alternative estimation approach.

After adopting firm-clustered standard errors, the statistical significance of the Environmental and Governance dimensions changes in the joint specification. In Model (6), the coefficients of E and G remain positive but are no longer statistically significant, whereas the Social dimension remains positive and statistically significant. Thus, when accounting for within-firm correlation and simultaneously controlling for the other two ESG dimensions, only the Social dimension exhibits a statistically robust association with firm value.

Regarding the control variables, SIZE continues to exhibit a negative relationship with firm value, whereas DR remains positively and statistically significant across all model specifications. The consistency of the estimated coefficients and their signs indicates that the main empirical findings are not sensitive to the use of firm-clustered standard errors. Overall, the robustness analysis provides additional support for the reliability and stability of the regression results.

Table 8: Robustness Test: Tobin's Q with Firm-Clustered Standard Errors

Variable	Model (1)	Model (3)	Model (4)	Model (5)	Model (6)
Constant	0.4493** (0.062)	0.4752** (0.0735)	0.4905** (0.0591)	0.4875** (0.0763)	0.5335** (0.0721)
E		0.000365* (0.000139)			0.000266 (0.000170)
S			0.000651* (0.000209)		0.000501* (0.000174)
G				0.00065* (0.000353)	0.000474 (0.000379)
SIZE	-0.0064 (0.0042)	-0.0101* (0.0035)	-0.00723 (0.0041)	-0.0069* (0.0039)	-0.0103** (0.0030)
DR	0.0076** (0.0015)	0.0079** (0.001)	0.0069** (0.0014)	0.0069** (0.0017)	0.0067** (0.0016)
N	520	520	520	520	520
R ²	0.3576	0.3917	0.4011	0.3958	0.4498
Adjusted R ²	0.3552	0.3882	0.3977	0.3923	0.4444
F-statistic (clustered)	41.5687	24.0670	35.2476	33.7324	30.0740
Prob > F	4.027E-06	2.302E-05	3.140E-06	3.969E-06	2.166E-06

Notes: The regression models are re-estimated using firm-clustered standard errors to account for within-firm correlation and heteroskedasticity. Unstandardized coefficients are reported, with firm-clustered standard errors in parentheses. **, and * denote significance at the 1% and 5% levels, respectively.

5. Discussion and Conclusion

This study investigates the relationship between ESG performance and firm value using Taiwanese financial holding companies as the research sample. By examining both the overall Taiwan ESG (TESG) score and the individual Environmental (E), Social (S), and Governance (G) dimensions, this study provides updated empirical evidence on the value relevance of ESG performance in Taiwan's financial industry. More importantly, by comparing the relative effects of the three ESG dimensions, this study extends the existing ESG literature beyond the use of an aggregate ESG score and demonstrates that ESG should be viewed as a multidimensional construct rather than a homogeneous indicator.

The empirical results indicate that overall ESG performance is positively associated with firm value, suggesting that firms with superior ESG performance tend to receive higher market valuations. This finding is consistent with *Stakeholder Theory* (Freeman, 1984), which argues that firms creating value for multiple stakeholders are more likely to strengthen stakeholder relationships and enhance

long-term corporate value. It also supports the *Resource-Based View* (Barney, 1991), which considers ESG-related capabilities as valuable intangible resources that improve firms' competitiveness and sustainable advantage. In the context of Taiwan's financial industry, the positive ESG–firm value relationship further reflects the growing importance of sustainable finance policies and ESG disclosure requirements promoted by regulators, making ESG performance an increasingly important consideration in investment decisions.

The results further reveal that the Environmental, Social, and Governance dimensions are positively associated with firm value in the benchmark regressions; however, their associations are not equally robust. Among the three dimensions, the Social dimension exhibits the strongest standardized association with firm value and is significantly stronger than the Environmental dimension. Importantly, after accounting for within-firm correlation using firm-clustered standard errors, only the Social dimension remains statistically significant in the joint specification, indicating that its positive association with firm value is comparatively more robust than those of the Environmental and Governance dimensions. These findings highlight the importance of evaluating the ESG dimensions separately rather than treating ESG solely as a single composite indicator.

The prominent role of the Social dimension is particularly meaningful in the context of Taiwan's financial holding industry. Unlike manufacturing firms, financial institutions rely heavily on customer trust, employee professionalism, corporate reputation, and long-term stakeholder relationships rather than on tangible production assets. Consequently, investments in employee development, customer protection, financial inclusion, responsible finance, and stakeholder engagement are more likely to enhance investor confidence and be reflected in market valuation. These findings suggest that social-related initiatives represent an important source of competitive advantage for Taiwanese financial holding companies and provide a plausible explanation for why the Social dimension demonstrates the strongest value relevance in this study.

From a practical perspective, the findings provide useful implications for managers, investors, and policymakers. For managers, ESG strategies should extend beyond regulatory compliance and emphasize those ESG activities that generate long-term corporate value. In particular, firms should strategically allocate resources across different ESG dimensions rather than relying solely on improvements in their overall ESG ratings. For investors, evaluating the Environmental, Social, and Governance dimensions separately may provide more informative signals regarding firms' long-term competitiveness than relying exclusively on aggregate ESG scores. For policymakers, the results support continued efforts to enhance ESG disclosure standards and sustainable finance policies while encouraging more transparent reporting of individual ESG dimensions to improve the quality of investment decisions.

In conclusion, this study demonstrates that ESG performance is positively associated with firm value among Taiwanese financial holding companies and that the Environmental, Social, and Governance dimensions exhibit different patterns of

association with firm value. In particular, the Social dimension exhibits the most robust positive association, highlighting the importance of evaluating ESG as a multidimensional construct rather than relying solely on an aggregate ESG score. Although this study focuses on Taiwanese financial holding companies and employs the Taiwan ESG (TESG) rating as the measure of ESG performance, the findings provide useful evidence for understanding how different ESG dimensions contribute to firm value and offer a valuable reference for future research on sustainable finance and corporate sustainability.

6. References

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