

Advertising Expenditure Volatility and Firm Value: The Moderating Role of ESG Performance*

차상권(주저자) · 이영우(공저자) · 이인남(교신저자)

Sangkwon Cha(First Author) · Young Woo Lee(Co-author) · Yinnan Li(Corresponding Author)

남서울대학교 글로벌상경대학 세무학과 Assistant Professor in the Department of Taxation, College of Global Business and Economics, Namseoul University (sangkwon@nsu.ac.kr)

칼빈대 글로벌경영학과 조교수 Assistant Professor of Global Management at Calvin University(cp198@calvin.ac.kr)

광운대 경영대학 경영학부 부교수 Associate Professor of College of Business at KwangWoon University(ynl@kw.ac.kr)

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This study examines how advertising expenditure volatility affects firm value and whether ESG performance moderates this relationship. Unlike prior marketing-finance research emphasizing advertising levels as investments in brand capital, it considers volatility as market-facing investment uncertainty that may signal a firm's strategic commitment and managerial discipline. Using KOSPI and KOSDAQ firms from 2012 to 2023, advertising volatility is measured as the rolling standard deviation of advertising intensity, while next-period Tobin's Q proxies for firm value. ESG ratings and pillar scores are obtained from the Korea Corporate Governance Service. Results indicate that the unconditional relationship between advertising volatility and firm value is not consistently significant, implying that volatility is not inherently value-destroying. However, its valuation effect depends on ESG performance. Advertising volatility is negatively associated with future firm value among low-ESG firms, but this association is significantly weaker among high-ESG firms. Thus, ESG performance may provide credibility and reputational capital, encouraging investors to interpret volatile advertising as adaptive flexibility rather than strategic inconsistency or short-termism. Additional analyses show that this moderating effect is driven mainly by the Social and Governance dimensions and remains robust across alternative volatility windows. The study highlights advertising stability and ESG's role as a credibility-based interpretive mechanism.

Keyword: Advertising Expenditure Volatility, Firm Value, ESG, Tobin's Q, Stakeholder Theory

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I. Introduction

Advertising represents a substantial and

strategic investment in a firm's intangible assets and constitutes a core component of long-term value creation (Joshi and Hanssens, 2010). A large body of marketing literature

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emphasizes that advertising contributes not only to short-term sales growth but also to the accumulation of firm-specific brand equity, which can persist over time and shape investor perceptions (Keller, 1993; Barth et al., 1998; Belo et al., 2014). From this perspective, advertising expenditures can be interpreted as investments in long-lived “brand capital” that are largely unrecognized in conventional financial statements, yet nonetheless account for a sizable portion of firms’ market valuation (Vitorino, 2014). Recent marketing-finance research further suggests that advertising has a direct valuation effect because it increases public information flows about the firm and functions as a signal of competitiveness, financial strength, and future earnings potential (Du and Osmonbekov, 2020). As a result, the way firms manage advertising expenditures has important implications for capital market outcomes.

Despite this accumulated evidence, prior studies have focused primarily on the level, intensity, or persistence of advertising expenditures, while paying relatively limited attention to the valuation implications of instability in advertising spending. This omission is important because the capital market may evaluate not only how much a firm spends on advertising, but also how consistently the firm commits resources to its brand-building strategy over time. Advertising expenditures differ from many other corpo-

rate investments, such as capital expenditures or R&D (McAlister et al., 2007), in that they are highly visible to multiple external audiences, including consumers, competitors, analysts, and investors. Whereas capital expenditures are often embedded in internal production capacity and R&D investments are frequently opaque until innovation outcomes materialize, advertising is repeatedly observed in product markets and therefore conveys public signals about the firm’s strategic commitment, brand positioning, and market confidence.

The strategic importance of advertising investment becomes particularly salient under conditions of uncertainty (Srinivasan et al., 2005; Bloom, 2009). Firms must determine their advertising budgets each period despite uncertainty surrounding macroeconomic conditions, competitive dynamics, technological change, and consumer demand (Deleersnyder et al., 2009; Lamey et al., 2012). In practice, managers often attempt to smooth advertising expenditures over time to stabilize demand and reinforce brand equity (Dekimpe and Hanssens, 1995). Such smoothing behavior is consistent with the notion that stable advertising signals strategic commitment and long-term orientation. However, firms are frequently exposed to external shocks such as economic cycles, digital transformation, regulatory changes, or unexpected financial constraints, all of which may induce substantial

volatility in advertising budgets (Leary et al., 2005; Bharadwaj et al., 2013). Recent evidence on crisis-period marketing responses also indicates that firms often adjust marketing strategies under external shocks, making the stability and flexibility of marketing investment an increasingly relevant issue for understanding firm value (Wang et al., 2020).

Volatility in advertising expenditures introduces uncertainty regarding the continuity and effectiveness of a firm's marketing strategy (Assmus et al., 1984). From an investor's perspective, large fluctuations in advertising may signal inconsistent strategic priorities, short-termism, or difficulties in forecasting future cash flows (Stein, 1989). These concerns can undermine investor confidence and potentially reduce firm value (Wu et al., 1996). Importantly, advertising expenditure volatility should not be viewed merely as another form of investment volatility. Because advertising is a market-facing and reputation-sensitive investment, volatility in advertising may be interpreted as instability in brand commitment rather than as a purely internal resource-allocation adjustment. In this sense, advertising volatility captures a distinct dimension of marketing investment risk: the risk that a firm's brand-building effort appears inconsistent, opportunistic, or insufficiently committed to long-term value creation.

This distinction provides the central theoretical motivation for the present study. If advertising expenditures serve as a public signal of strategic commitment, then unstable advertising patterns may weaken the credibility of that signal. Investors may interpret sharp year-to-year fluctuations in advertising intensity as evidence that the firm lacks a coherent long-term marketing strategy, faces financing constraints, or responds myopically to short-term performance pressure. Consequently, even if the average level of advertising spending is value-enhancing, greater volatility in advertising expenditure may be negatively associated with firm value.

At the same time, Environmental, Social, and Governance (ESG) performance has emerged as a central dimension of corporate strategy, risk management, and firm valuation. ESG metrics capture a firm's commitment to environmental sustainability, social responsibility, and sound governance practices, and they are widely regarded as indicators of long-term managerial quality (Van Beurden and Gössling, 2008; Choi et al. 2010; Kim et al. 2012; Oh et al. 2013; Eccles et al., 2014; Friede et al., 2015; Khan et al. 2016). A growing empirical literature documents that firms with stronger ESG performance tend to exhibit higher firm value, improved operating performance, and lower risk (Waddock and Graves, 1997; Lins et al., 2017). Recent studies further show that

ESG and CSR activities can function as resilience-enhancing mechanisms during periods of heightened uncertainty. For example, firms with stronger ESG performance experienced more favorable market outcomes during the COVID-19 crisis, suggesting that investors may interpret ESG as a signal of risk mitigation and organizational resilience (Broadstock et al., 2021; Ding et al., 2021).

From a theoretical standpoint, stakeholder theory provides a useful framework for understanding these findings. ESG engagement may reduce information asymmetry between managers and investors, mitigate agency conflicts, and build relational capital with key stakeholders (Donaldson and Preston, 1995; Dhaliwal et al., 2011). Moreover, strong ESG performance can lower exposure to reputational, regulatory, and litigation risks, thereby contributing to greater stability in expected cash flows (Godfrey et al., 2009). Recent evidence also suggests that CSR can enhance product-market perceptions and create firm value through reputation-related channels (Bardos et al., 2020), while CSR may create social trust capital that supports firm performance under adverse conditions (Lins et al., 2017). These studies imply that ESG performance is not merely a direct determinant of firm value, but may also shape how investors interpret other uncertain or ambiguous corporate decisions.

This argument is particularly relevant in

the context of advertising expenditure volatility. Advertising volatility is inherently ambiguous. On the one hand, it may reflect strategic inconsistency, financial pressure, or short-term managerial behavior. On the other hand, it may also reflect adaptive marketing responses to changes in consumer demand, competitive actions, or digital market conditions. Whether investors interpret advertising volatility negatively may therefore depend on the broader credibility and reputation of the firm. ESG performance can provide such a credibility context. Firms with strong ESG performance are more likely to be perceived as transparent, stakeholder-oriented, and long-term oriented. As a result, investors may be less likely to interpret advertising volatility in high-ESG firms as evidence of opportunism or strategic inconsistency.

This study brings together these two strands of literature—marketing investment behavior and sustainability performance—to examine how they interact in shaping firm value. Specifically, we focus on advertising expenditure volatility as a proxy for uncertainty in marketing investment and on ESG ratings, along with their environmental, social, and governance subcomponents, as indicators of responsible corporate conduct. The central premise of this study is that firms with strong ESG performance may be perceived by investors as more credible, resilient, and long-term oriented. Consequently,

volatility in advertising expenditures may be viewed as less detrimental for high-ESG firms than for firms with weak ESG performance. Put differently, ESG performance may alter the interpretation of advertising volatility: the same fluctuation in advertising spending may be penalized as strategic instability in low-ESG firms, but interpreted more benignly as adaptive strategic flexibility in high-ESG firms.

In this sense, ESG performance may play a moderating role by attenuating the negative market impact of advertising uncertainty (El Ghoul et al., 2011). While prior marketing-finance research has largely treated advertising budgets as static inputs or context-specific strategic choices, this study emphasizes the importance of year-to-year fluctuations in advertising expenditures and their implications for valuation risk. At the same time, existing ESG research has rarely incorporated firms' marketing decisions, despite the growing recognition of ESG as a determinant of investment efficiency, firm risk, and stakeholder trust. By integrating these perspectives, this study positions advertising expenditure volatility as a market-facing form of investment uncertainty and ESG performance as a credibility-based boundary condition that shapes investor responses to such uncertainty.

Empirically, we examine a comprehensive panel of publicly listed firms on the Korea

Composite Stock Price Index (KOSPI) and KOSDAQ over the period from 2012 to 2023. We utilize annual data on advertising expenditures to construct measures of advertising volatility and employ next-period Tobin's Q as a proxy for firm value. ESG ratings, as well as Environmental (E), Social (S), and Governance (G) pillar scores, are obtained from the Korea Corporate Governance Service (KCGS). Korea provides a particularly suitable research setting given the prominence of large business groups, increasing regulatory scrutiny, and growing societal expectations regarding corporate sustainability and governance. During the sample period, ESG performance became an increasingly salient firm characteristic in the Korean capital market, while listed firms faced growing pressure to demonstrate both strategic flexibility and sustainable long-term orientation.

Our empirical design allows us to address two related questions. First, we examine whether advertising expenditure volatility has an unconditional negative association with future firm value after controlling for firm characteristics, industry effects, and year effects. Second, and more importantly, we investigate whether this association depends on ESG performance. This distinction is important because advertising volatility is inherently ambiguous: it may be interpreted either as strategic inconsistency or as adap

〈Table 1〉 Comparison with Prior Literature

Study	Focal Construct	Theoretical Mechanism	Outcome Variable	ESG Consideration	Contribution
Joshi and Hanssens (2010)	Advertising expenditure level	Advertising as brand capital	Firm value	Not considered	Shows the persistent value effect of advertising expenditure.
Vitorino (2014)	Advertising and brand capital	Structural valuation of brand capital	Stock returns / firm value	Not considered	Demonstrates that advertising-created brand capital explains market value.
Du and Osmonbekov (2020)	Advertising expenditure	Public information flow and signaling	Firm value	Not considered	Shows that advertising conveys value-relevant information to investors.
Srinivasan et al. (2005); Deleersnyder et al. (2009)	Advertising under downturns	Strategic adjustment under uncertainty	Firm performance / market outcomes	Not considered	Explains advertising behavior under adverse market conditions.
Broadstock et al. (2021); Ding et al. (2021)	ESG / CSR performance	Resilience and stakeholder trust	Stock market performance	Central focus	Shows that ESG/CSR mitigates adverse market reactions during crises.
Our study	Advertising expenditure volatility	Investment uncertainty and ESG-based credibility	Future Tobin's Q	Explicitly modeled as a moderator	Shows that advertising volatility is conditionally value-relevant, primarily among low-ESG firms.

tive marketing flexibility. Therefore, the valuation effect of advertising volatility may not appear as a universal main effect across all firms, but may become more pronounced when firms lack ESG-based credibility. In additional analyses, we further examine whether this moderating effect varies across firms' financial leverage, advertising expansion behavior, audit quality, and industry-adjusted advertising practices. In additional analyses, we further examine whether this moderating effect varies across firms' financial leverage, advertising expansion behavior, audit quality, and industry-adjusted advertising practices. These analyses are designed not merely as robustness checks, but as cross-sectional tests of the conditions under which ESG signals are more or less likely to mitigate advertising-related uncertainty.

The contributions of this study are threefold. First, it extends the marketing-finance literature by shifting attention from the level of advertising expenditure to the volatility of advertising expenditure. In doing so, this study introduces advertising volatility as a distinct and conditionally value-relevant dimension of marketing investment risk that captures instability in public brand commitment and strategic market signaling. Second, it contributes to the ESG-finance literature by demonstrating that ESG performance shapes investor responses to uncertain marketing activities. Rather than treating ESG

only as a direct value-enhancing attribute, this study highlights its role as an interpretive mechanism through which capital markets assess ambiguous strategic behavior. Third, this study contributes to the broader literature on intangible investment and firm valuation by showing that the value consequences of marketing investment depend not only on the amount of resources allocated to advertising, but also on the stability of such allocation and the credibility context in which it is observed. Overall, this research provides new insights into the intersection of marketing investment risk, ESG signaling, and firm valuation.

As summarized in <Table 1>, prior studies have primarily examined the level, persistence, or crisis-period adjustment of advertising expenditures, whereas the present study focuses on the intertemporal volatility of advertising investment. Moreover, while ESG studies have generally examined the direct valuation or resilience effects of ESG performance, this study conceptualizes ESG as a credibility-based boundary condition that shapes how investors interpret ambiguous marketing investment behavior.

II. Prior Literature and Hypotheses

Prior research at the intersection of mar-

keting and finance has firmly established that advertising expenditures convey value-relevant information to capital markets. A central insight from this literature is that advertising should be viewed not merely as a discretionary operating expense, but as a strategic investment in intangible assets—most notably brand equity—that yields long-term benefits for firm value. Joshi and Hanssens (2010), for example, demonstrate that advertising spending exerts a positive and persistent effect on market capitalization that extends beyond contemporaneous sales and accounting profitability. Using industry-level data, they show that higher advertising investment generates durable increases in firm value and can even erode competitors' valuations, underscoring the strategic importance of advertising in shaping market perceptions. Complementing this evidence, Vitorino (2014) models advertising as an investment in brand capital and empirically finds that advertising-driven brand equity can explain a substantial fraction—approximately 23 percent—of firms' market value. Taken together, these studies suggest that the level of advertising expenditure is generally value-enhancing and positively priced by investors.

More recent marketing-finance research further supports the view that advertising has valuation implications beyond its indirect effects through sales and profits. Du

and Osmonbekov (2020) argue that advertising can increase firm value by generating public information flows and by producing signaling effects that are observable to external capital market participants. This perspective is particularly important for the present study because it implies that advertising expenditures are not merely internal resource allocations, but market-facing strategic signals. Accordingly, the stability or instability of advertising spending may also carry value-relevant information for investors.

However, an implicit assumption underlying much of the existing marketing-finance literature is that advertising expenditures follow relatively smooth, stable, or deliberately planned paths over time. Advertising budgets are typically treated either as static inputs in firm valuation models or as context-specific strategic choices, such as whether to maintain or cut advertising during economic downturns (Srinivasan et al., 2005; Deleersnyder et al., 2009). While this perspective has yielded important insights, it leaves largely unexplored the consequences of intertemporal volatility in advertising expenditures. In practice, firms are frequently exposed to macroeconomic fluctuations, competitive pressures, technological disruption, regulatory changes, and financial constraints, all of which can induce substantial variation in marketing budgets from year to year.

The distinction between the level of advertising and the volatility of advertising is theoretically important. A high level of advertising may signal strong brand investment, market confidence, and long-term commitment. By contrast, high volatility in advertising expenditure may signal instability in marketing strategy, inconsistent brand commitment, or managerial difficulty in maintaining a coherent market-facing investment policy. Thus, even when advertising expenditures are generally value-enhancing, their unstable allocation over time may create a different and potentially negative signal for investors.

From an investment-theoretic standpoint, volatile allocation of resources is often interpreted as a signal of heightened uncertainty, inefficiency, or risk. In finance, greater volatility in cash flows or investment is typically associated with lower firm value, reflecting higher risk premia and increased difficulty in forecasting future performance.

Nevertheless, advertising expenditure volatility differs from general investment volatility in several important respects. Capital expenditures are often embedded in production capacity, while R&D expenditures are frequently opaque until innovation outcomes become observable. Advertising, however, is highly visible to consumers, competitors, analysts, and investors. Because advertising is repeatedly observed in product markets, fluctuations in advertising spend-

ing may be interpreted not only as investment instability but also as instability in the firm's public brand commitment.

By analogy, volatility in advertising expenditures may carry adverse informational content. Advertising strategies are generally intended to build and sustain brand equity over time, and persistent advertising has been shown to reinforce demand stability and long-term market positioning (Dekimpe and Hanssens, 1995). When advertising outlays fluctuate sharply, investors may question the continuity and effectiveness of the firm's marketing strategy. Such volatility can be interpreted as signaling inconsistent strategic priorities, short-term managerial behavior, or difficulty in forecasting future cash flows. From an investor's perspective, these concerns undermine confidence in the firm's long-term strategic orientation and may translate into a valuation discount.

This argument is also consistent with the signaling perspective of advertising. If advertising functions as a public signal of firm quality and strategic confidence, then volatile advertising weakens the consistency of that signal. Investors may find it difficult to distinguish whether advertising volatility reflects rational adaptation to changing market conditions or a lack of disciplined strategic planning. This ambiguity can increase perceived information risk and reduce the valuation benefits normally associated with

advertising investment.

Consistent with this intuition, prior research suggests that volatility itself is an important dimension through which marketing activities may affect firm value. Although most studies focus on average levels of advertising, there is growing recognition that marketing decisions can contribute to volatility in sales, demand, and cash flows. Indeed, Joseph and Wintoki (2013) show that firms engaging in advertising activities are subject to greater information asymmetry between insiders and outsiders, implying that variability in advertising may further exacerbate informational opacity. When advertising patterns are erratic, the signals conveyed to the market become harder to interpret, potentially amplifying uncertainty about future profitability. Consequently, higher advertising expenditure volatility is likely to be penalized by investors, resulting in lower firm value.

Recent evidence on marketing strategy under crisis conditions further suggests that firms' marketing actions are actively adjusted in response to environmental shocks. Wang et al. (2020) show that firms may alter marketing strategies under the COVID-19 crisis, indicating that advertising-related decisions can reflect strategic adaptation under uncertainty. However, from the capital market's perspective, such adjustments are not always easy to interpret. Advertising

volatility may therefore be perceived either as adaptive flexibility or as strategic inconsistency. This interpretive ambiguity provides a key reason why advertising volatility may have negative valuation consequences.

Building on these insights, we posit a baseline expectation that advertising expenditure volatility may be negatively associated with firm value. However, this relationship should be understood as a baseline main-effect prediction rather than a claim that advertising volatility is universally value-destroying across all firms. Because advertising volatility is inherently ambiguous, investors may interpret it differently depending on the firm's broader credibility context. Thus, the unconditional effect of advertising volatility may be weak or statistically insignificant in the full sample if positive interpretations for some firms offset negative interpretations for others. This possibility provides an important motivation for examining ESG performance as a boundary condition. All else equal, firms that exhibit greater fluctuations in advertising spending are expected to experience lower market valuations, reflecting heightened perceived risk, increased information asymmetry, and diminished confidence in the firm's long-term marketing strategy.

Accordingly, we formulate the first hypothesis as follows:

Hypothesis 1. Advertising expenditure volatility is negatively associated with firm value.

At the same time, firms differ markedly in their ability to mitigate the adverse consequences of strategic uncertainty. In this regard, Environmental, Social, and Governance (ESG) performance may play a critical moderating role. A growing body of research demonstrates that strong ESG engagement enhances firm reputation, improves transparency, and signals superior managerial quality and long-term orientation (Eccles et al., 2014; Khan et al., 2016). Firms with high ESG ratings tend to enjoy valuation premia, lower cost of capital, and reduced exposure to reputational, regulatory, and litigation risks. Importantly, ESG performance has also been shown to dampen stock price volatility and cushion firms against adverse shocks, thereby stabilizing investor expectations (Lins et al., 2017; Albuquerque et al., 2019).

Recent studies provide further support for the risk-mitigating and credibility-enhancing role of ESG and CSR. Broadstock et al. (2021) find that ESG performance played a positive role during the COVID-19 crisis in China, suggesting that investors may interpret ESG as a signal of future performance and risk mitigation during periods of market-wide uncertainty. Similarly, Ding et al.

(2021) show that firms with stronger pre-crisis corporate social responsibility activities experienced milder stock price declines during the pandemic, consistent with the view that stakeholder-oriented firms possess greater resilience under adverse conditions.

From a stakeholder-theoretic perspective, ESG engagement reduces information asymmetry, mitigates agency conflicts, and builds relational capital with key stakeholders, including investors, customers, regulators, and employees (Cheng et al., 2014). As a result, ESG can function as a credibility-enhancing signal that reassures investors when other aspects of a firm's strategy appear uncertain or risky (Bénabou and Tirole, 2010).

In other words, ESG performance may provide a broader interpretive context in which investors evaluate ambiguous corporate decisions. When a firm has strong ESG performance, investors may be more willing to believe that uncertain or volatile managerial actions are guided by long-term value creation rather than opportunistic short-term behavior.

This mechanism is particularly relevant to advertising expenditure volatility. Advertising volatility is not inherently negative in all circumstances. In some cases, it may reflect strategic flexibility, such as rapid responses to changes in consumer demand, competitor actions, or digital media conditions. In other

cases, however, it may reflect inconsistent strategy, financing constraints, or short-termism. ESG performance can help resolve this ambiguity. Because high-ESG firms are generally perceived as more transparent, responsible, and long-term oriented, investors may interpret their advertising volatility less negatively. By contrast, similar advertising volatility in low-ESG firms may reinforce concerns about managerial opportunism, weak strategic discipline, or unstable future cash flows.

The product-market channel of CSR further supports this argument. Bardos et al. (2020) show that CSR can improve product market perceptions and firm value by signaling product quality and strengthening favorable stakeholder evaluations. This finding is relevant because advertising is itself a product-market-facing activity. If CSR or ESG enhances stakeholder trust in the product market, it may also affect how investors interpret changes in advertising expenditures. In this sense, ESG may moderate the valuation effect of advertising volatility by providing reputational capital that reduces the perceived risk of unstable marketing investment.

In the context of advertising, this implies that firms with superior ESG performance may be granted greater leeway by the market to adjust or vary their advertising expenditures. Investors may interpret advertising volatility in high-ESG firms as re-

flecting flexible, long-term value-maximizing behavior rather than strategic inconsistency or short-termism. By contrast, similar volatility in advertising spending by low-ESG firms is more likely to be perceived as a negative signal, reinforcing concerns about managerial quality and future cash flow uncertainty.

Therefore, ESG performance is expected to weaken the negative relationship between advertising expenditure volatility and firm value. This expectation does not imply that ESG necessarily eliminates the risk associated with advertising volatility. Rather, it suggests that ESG changes the interpretation of such volatility by reducing perceived information risk and strengthening investor confidence in the firm's long-term strategic orientation.

In this sense, ESG performance is expected to attenuate the negative market impact of advertising uncertainty. While advertising expenditure volatility may generally reduce firm value, its adverse effect should be weaker for firms with strong ESG engagement, as ESG acts as a buffer that stabilizes investor perceptions and mitigates perceived risk.

Accordingly, we formulate the second hypothesis as follows.

Hypothesis 2. ESG performance attenuates the negative association between advertising expenditure volatility and firm value.

In addition to examining aggregate ESG performance, this study also considers the Environmental, Social, and Governance pillars separately. The three ESG dimensions may not operate through identical channels. Environmental performance may signal regulatory preparedness and long-term sustainability orientation; social performance may capture stakeholder trust, customer relationships, and reputational capital; and governance performance may indicate managerial discipline and monitoring quality. Therefore, examining the separate ESG pillars allows us to identify which dimensions of ESG are more strongly associated with the market's interpretation of advertising volatility.

III. Methodology

3.1 Research Model

To examine the relationship between advertising expenditure volatility and firm value, we estimate a series of panel regression models. Following the theoretical structure developed in the previous section, we first examine the main effect of advertising expenditure volatility on firm value and then introduce ESG performance and its interaction with advertising volatility to test the moderating effect of ESG. The baseline model

for testing the main effect of advertising expenditure volatility is specified as follows:

$$TBQ_{i,t+1} = \beta_0 + \beta_1 \sigma(ADV)_{i,t} + \sum_k \beta_k Controls_{i,t} + YearFE + IndustryFE + \varepsilon_{i,t}$$

In this model, $TBQ_{i,t+1}$ denotes next-period firm value, measured by Tobin's Q. The key explanatory variable, $\sigma(ADV)_{i,t}$, represents advertising expenditure volatility. A negative coefficient on β_1 would indicate that firms with more volatile advertising expenditures are associated with lower future firm value, consistent with Hypothesis 1. Next, we include ESG performance as an additional explanatory variable to control for the direct association between ESG and firm value:

$$TBQ_{i,t+1} = \beta_0 + \beta_1 \sigma(ADV)_{i,t} + \beta_2 ESG^{HIGH}_{i,t} + \sum_k \beta_k Controls_{i,t} + YearFE + IndustryFE + \varepsilon_{i,t}$$

Finally, to test whether ESG performance moderates the relationship between advertising expenditure volatility and firm value, we estimate the following interaction model:

$$TBQ_{i,t+1} = \beta_0 + \beta_1 \sigma(ADV)_{i,t} + \beta_2 ESG^{HIGH}_{i,t} + \beta_3 \sigma(ADV)_{i,t} \times ESG^{HIGH}_{i,t} + \sum_k \beta_k Controls_{i,t} + YearFE + IndustryFE + \varepsilon_{i,t}$$

The interaction term, $\sigma(ADV)_{i,t} \times ESG^{HIGH}_{i,t}$, is the primary variable for testing Hypothesis 2. If ESG performance attenuates the neg-

ative valuation effect of advertising expenditure volatility, the coefficient on the interaction term, β_3 , is expected to be positive. To further examine whether different dimensions of ESG performance operate through distinct channels, we replace ESG^{HIGH} with each ESG pillar indicator, namely EG^{HIGH} , SG^{HIGH} , and GG^{HIGH} . These additional models allow us to assess whether environmental, social, and governance performance differentially moderate the valuation consequences of advertising expenditure volatility.

3.2 Variable Measurement

The dependent variable is firm value, measured by next-period Tobin's Q. Tobin's Q is calculated as the market capitalization of common equity at fiscal year-end plus total liabilities, divided by the book value of net assets. We use $TBQ_{i,t+1}$ rather than contemporaneous Tobin's Q to mitigate potential reverse causality and to capture how current advertising behavior and ESG performance are reflected in subsequent market valuation.

The main explanatory variable is advertising expenditure volatility, denoted by $\sigma(ADV)$. Advertising intensity is first measured as advertising expenditures scaled by sales. We then calculate the three-year rolling standard deviation of advertising intensity. This measure captures the extent to which a firm's advertising investment deviates from a stable

pattern over time.

The use of advertising intensity rather than the absolute amount of advertising expenditure is appropriate because firms differ substantially in size. Scaling advertising expenditures by sales allows us to compare advertising behavior across firms with different operating scales. In addition, the three-year rolling window captures persistent instability in advertising policy while reducing the influence of temporary year-specific shocks. A one-year change may reflect a short-term adjustment, whereas a three-year standard deviation better reflects whether the firm maintains a stable or unstable advertising investment pattern over time.

ESG performance is measured using ESG ratings provided by the Korea Corporate Governance Service. ESG^{HIGH} is defined as a dummy variable equal to one if a firm's overall ESG rating is B+ or higher, and zero otherwise. The B+ cutoff is used because it represents a practically meaningful threshold that distinguishes firms with relatively superior ESG performance from those with average or weaker ESG practices in the Korean ESG rating system. In additional analyses, we separately examine the environmental, social, and governance pillars by constructing EG^{HIGH} , SG^{HIGH} , and GG^{HIGH} , each of which equals one if the corresponding pillar rating is B+ or higher, and zero otherwise.

We include a set of control variables that

〈Table 2〉 Variable Definition

Variable	Definition
TBQ_{t+1}	Tobin's Q in year t+1, measured as market capitalization of common equity at fiscal year-end plus total liabilities, divided by the book value of net assets.
$\sigma(ADV)$	Advertising expenditure volatility, measured as the three-year rolling standard deviation of advertising intensity. Advertising intensity is advertising expenditures divided by sales.
$\sigma(ADV_2)$	Alternative advertising volatility measure based on the two-year rolling standard deviation of advertising intensity.
$\sigma(ADV_5)$	Alternative advertising volatility measure based on the five-year rolling standard deviation of advertising intensity.
ΔADV	Rate of change in advertising intensity from year t-1 to year t.
ESG^{HIGH}	A dummy variable equal to one if the firm's ESG rating is B+ or higher, and zero otherwise.
EG^{HIGH}	A dummy variable equal to one if the firm's Environmental rating is B+ or higher, and zero otherwise.
SG^{HIGH}	A dummy variable equal to one if the firm's Social rating is B+ or higher, and zero otherwise.
GG^{HIGH}	A dummy variable equal to one if the firm's Governance rating is B+ or higher, and zero otherwise.
$SIZE$	Firm size, measured as the natural logarithm of total assets at the beginning of the fiscal year.
LEV	Leverage, measured as total liabilities divided by total assets at the beginning of the fiscal year.
ROA	Profitability, measured as net income divided by total assets at the beginning of the fiscal year.
GRW	Growth, measured as the change in sales from the previous year divided by prior-year sales.
CUR	Liquidity or short-term liquidity pressure. If measured as current assets divided by current liabilities, it captures liquidity. If measured as current liabilities divided by current assets, it captures short-term liquidity pressure.
FOR	Foreign ownership, measured as the percentage of common shares held by foreign investors at fiscal year-end.
BET	Systematic risk, measured by market beta.
VOL	Stock return volatility, measured as the standard deviation of daily stock returns.
$Year\ FE$	Year fixed effects.
$Industry\ FE$	Industry fixed effects based on the two-digit KSIC classification.

have been widely used in prior studies on firm value and capital market valuation. Firm size ($SIZE$) is measured as the natural logarithm of total assets at the beginning of the fiscal year and controls for scale effects.

Leverage (LEV) is measured as total liabilities divided by total assets and controls for capital structure and financial risk. Profitability (ROA) is measured as net income divided by beginning total assets. Sales

growth (GRW) controls for firms' growth opportunities. Liquidity conditions are captured by CUR. Foreign ownership (FOR) controls for external monitoring by foreign investors. Finally, systematic risk (BET) and stock return volatility (VOL) are included to control for market-based risk characteristics that may affect firm valuation.

All regressions include year fixed effects and industry fixed effects based on the two-digit Korean Standard Industrial Classification. Year fixed effects control for common macro-economic shocks and time-specific market conditions, while industry fixed effects account for structural differences in advertising practices, ESG relevance, and valuation across industries. Standard errors are clustered at the firm level to address heteroskedasticity and serial correlation within firms.

3.3 Additional Analyses and Robustness Tests

To address concerns regarding model specification and variable operationalization, we conduct several additional analyses and robustness tests. First, we use alternative measures of advertising expenditure volatility. Although the main analysis uses the three-year rolling standard deviation of advertising intensity, we additionally calculate advertising volatility using two-year and five-year rolling windows. These tests examine whether the main findings are sensitive to

the specific window length used to capture advertising instability.

Second, we construct an alternative measure based on the rate of change in advertising intensity. Because the economic meaning of advertising fluctuations may differ across firms of different sizes, the percentage change in advertising intensity provides a complementary measure of advertising instability. This analysis directly addresses the possibility that the rate of advertising expenditure change may be more relevant than the absolute variation in advertising intensity.

Third, we use industry-adjusted advertising volatility. Specifically, we subtract the industry-year mean advertising intensity from each firm's advertising intensity and then calculate the rolling standard deviation of the adjusted value. This approach helps ensure that the results are driven by firm-specific advertising instability rather than industry-level advertising norms.

Fourth, given the panel structure of the data, we estimate random-effects panel regressions as a robustness check. Although our main specification includes year and industry fixed effects, random-effects models provide an additional test of whether the results are sensitive to alternative panel-data modeling assumptions.

Fifth, we discuss the economic magnitude of the estimated coefficients. In addition to statistical significance, we calculate the change

in Tobin's Q associated with a one-standard-deviation increase in advertising expenditure volatility. This allows us to assess whether the estimated effects are economically meaningful.

Finally, we conduct cross-sectional analyses to examine whether the moderating effect of ESG varies depending on firm characteristics and information environments. Specifically, we examine differences based on firms' financial leverage, advertising expansion behavior, audit quality, and industry-adjusted advertising practices. These analyses are designed to identify the conditions under which ESG performance is more or less effective in mitigating the negative valuation consequences of advertising expenditure volatility.

3.4 Sample Selection

To examine the hypotheses of this study, we initially collect firm-level financial data covering the period from 2010 to 2023. However, due to the operational definitions of key variables and the construction of lagged measures, the effective sample period for the empirical analysis spans from 2012 to 2023. All financial and accounting data are obtained from the ValueSearch database provided by NICE Information Service Co., Ltd.

We apply several screening criteria to construct the final sample. Specifically, firm-year

observations are excluded if the firm (1) does not have a fiscal year ending in December, (2) is designated as a management issue firm, (3) has negative equity, (4) receives an audit opinion other than unqualified, (5) belongs to the financial industry under the Korean Standard Industrial Classification, or (6) lacks the required data necessary for empirical analysis. After applying these filters, the final sample consists of 4,722 firm-year observations, which form the basis of the empirical analyses reported in this study.

〈Table 3〉 reports the distribution of the sample by year over the period from 2012 to 2023. The final sample consists of a total of 4,722 firm-year observations. The annual distribution is relatively balanced across the sample period, with each year accounting for approximately 6 - 10 percent of the total observations. The number of observations increases gradually over time, reflecting improved data availability and expanded ESG coverage in later years.

In the earlier part of the sample, the number of firm-year observations ranges from 321 to 344 per year between 2012 and 2016. Beginning in 2017, the sample size grows more noticeably, exceeding 350 observations per year and continuing to rise thereafter. The largest number of observations is observed in 2023, with 493 firm-year observations, representing approximately 10.44 percent of the total sample. Overall, the

〈Table 3〉 Sample Distribution by year

year	Freq.	Percent	Cum.
2012	324	6.86	6.86
2013	321	6.80	13.66
2014	337	7.14	20.80
2015	338	7.16	27.95
2016	344	7.29	35.24
2017	356	7.54	42.78
2018	361	7.65	50.42
2019	435	9.21	59.64
2020	454	9.61	69.25
2021	473	10.02	79.27
2022	486	10.29	89.56
2023	493	10.44	100.00
Total	4,722	100.00	

time-series distribution suggests that the sample is not unduly concentrated in any particular year, thereby reducing concerns that the empirical results are driven by a specific subperiod.

〈Table 4〉 presents the industry composition of the sample based on the Standard Industrial Classification (SIC) system. The sample is dominated by manufacturing firms, which account for 3,233 observations, or approximately 68.47 percent of the total sample. This reflects the structure of the Korean capital market, where manufacturing firms—particularly in export-oriented and technology-intensive industries—constitute a large share of listed companies.

Other industries are also well represented. Wholesale and retail trade firms comprise 429 observations (9.09 percent), followed by information and communication services with

393 observations (8.32 percent). Transportation and storage firms account for 158 observations (3.35 percent), while construction firms represent 160 observations (3.39 percent). Utilities-related industries, including electricity, gas, steam, and air conditioning supply, account for 91 observations (1.93 percent).

The remaining industries—such as professional, scientific, and technical activities; business support services; arts and recreation; education; and accommodation and food services—each represent smaller proportions of the sample. Importantly, no single non-manufacturing industry dominates the sample, suggesting that the results are not driven by a narrow subset of firms outside manufacturing. Overall, the industry distribution indicates that the sample is sufficiently diverse across sectors, while re-

〈Table 4〉 Sample Distribution by Industry

SIC	Freq.	Percent	Cum.
Agriculture, forestry and fishing	15	0.32	0.32
Manufacturing	3,233	68.47	68.78
Electricity, gas, steam and air conditioning supply	91	1.93	70.71
Water supply; sewage, waste management, materials recovery	5	0.11	70.82
Construction	160	3.39	74.21
Wholesale and retail trade	429	9.09	83.29
Transportation and storage	158	3.35	86.64
Accommodation and food service activities	22	0.47	87.10
Information and communication	393	8.32	95.43
Real estate activities	13	0.28	95.70
Professional, scientific and technical activities	85	1.80	97.50
Business facilities management and business support services	63	1.33	98.84
Education	12	0.25	99.09
Arts, sports and recreation related services	31	0.66	99.75
Membership organizations, repair and other personal services	12	0.25	100.00
Total	4,722	100.00	

maintaining broadly representative of the industrial composition of publicly listed firms.

IV. Empirical Results

4.1 Descriptive Statistics

〈Table 5〉 reports descriptive statistics for the main variables used in the empirical analysis. The sample consists of 4,722 firm-year observations. For each variable, the table presents the mean, standard deviation, and the 25th, median, and 75th percentiles, providing an overview of both central tendency and dispersion.

The dependent variable, next-period Tobin's Q (TBQ), has a mean value of 1.3669, indicating that, on average, firms in the sample are valued above the replacement cost of assets. The median Tobin's Q is 0.9984, suggesting a right-skewed distribution in which a subset of firms exhibits relatively high market valuations. The standard deviation of 1.5058 further indicates substantial cross-sectional variation in firm value, which is typical in studies of publicly listed firms.

Advertising expenditure volatility, measured as the three-year standard deviation of advertising intensity ($\sigma(ADV)$), has a relatively small mean of 0.0028, reflecting the scaling of advertising expenditures by firm size. However, the distribution is highly

skewed, as indicated by a median value of 0.0004 and a 75th percentile of 0.0018. This suggests that while many firms maintain relatively stable advertising expenditures, a smaller group experiences pronounced fluctuations in advertising spending over time.

The ESG indicator (ESG^{HIGH}), defined as a dummy variable equal to one for firms with high ESG ratings, has a mean of 0.2402. This implies that approximately 24 percent of the sample firms are classified as having superior ESG performance, while the majority fall into the lower ESG category.

Firm size ($SIZE$), measured as the natural logarithm of total assets, has a mean value of 26.9562, with a relatively small standard deviation of 1.4870, indicating moderate dispersion in firm size across the sample. Financial leverage (LEV) averages 0.4240, suggesting that liabilities account for approximately 42 percent of total assets on average. Profitability,

measured by return on assets (ROA), has a mean of 0.0863, although the presence of negative values at the lower quartile reflects heterogeneity in firm performance. Growth opportunities, proxied by sales growth (GRW), exhibit a mean of 0.0579, with considerable dispersion across firms, as indicated by both negative values at the 25th percentile and relatively high values at the 75th percentile. Liquidity (CUR), measured by the current ratio, has a mean of 0.8390, suggesting that, on average, firms maintain current assets that are somewhat lower than current liabilities, although the distribution indicates substantial variation in short-term financial conditions. Foreign ownership (FOR) averages 0.1089, indicating that foreign investors hold approximately 11 percent of shares on average, with noticeable cross-sectional dispersion. Systematic risk (BET) has a mean of 0.8899, slightly below unity, implying that the average

〈Table 5〉 Descriptive Statistics

Variable	n	Mean	S.D.	.25	Mdn	.75
TBQ_{t+1}	4722	1.3669	1.5058	0.7823	0.9884	1.4292
$\sigma(ADV)$	4722	0.0028	0.0158	0.0001	0.0004	0.0018
ESG^{HIGH}	4722	0.2402	0.4272	0.0000	0.0000	0.0000
$SIZE$	4722	26.9562	1.4870	25.9539	26.6663	27.6934
LEV	4722	0.4240	0.2137	0.2515	0.4202	0.5722
ROA	4722	0.0863	0.5156	-0.0010	0.0074	0.0462
GRW	4722	0.0579	0.3022	-0.0538	0.0264	0.1195
CUR	4722	0.8390	0.6433	0.4165	0.6919	1.0540
FOR	4722	0.1089	0.1320	0.0175	0.0523	0.1529
BET	4722	0.8899	0.5102	0.5176	0.8819	1.2129
VOL	4722	0.4137	0.1725	0.2876	0.3796	0.5013

note 1. All variables are defined as in Section 3.1.

firm in the sample exhibits marginally lower market risk than the overall market portfolio. Finally, stock return volatility (*VOL*) has a mean of 0.4137, with relatively tight inter-quartile dispersion, reflecting meaningful but not extreme variation in firm-level risk.

Overall, the descriptive statistics indicate substantial heterogeneity across firms in terms of valuation, advertising behavior, ESG performance, and financial characteristics. The absence of extreme outliers in the inter-quartile ranges suggests that the variables are well behaved for regression analysis. These distributions provide a suitable empirical setting for examining the relationship between advertising expenditure volatility, firm value, and the moderating role of ESG performance in subsequent multivariate analyses.

4.2 Mean Differences Test

〈Table 6〉 presents descriptive statistics for the main variables and reports mean difference tests between firms classified as having high ESG ratings and those with low ESG ratings. The final sample consists of 4,722 firm-year observations spanning the period from 2012 to 2023. The mean value of future Tobin's Q (*TBQ*) is 1.367, with a relatively large standard deviation of 1.506, indicating substantial cross-sectional variation in firm valuation across Korean listed firms.

Advertising expenditure volatility ($\sigma(ADV)$) exhibits a small mean value but notable dispersion, suggesting that while most firms maintain relatively stable advertising budgets, a nontrivial subset experiences sizable fluctuations. Approximately 24% of the observations are categorized as high ESG firms, indicating that ESG engagement remains concentrated among a limited portion of listed firms during the sample period.

The t-test results reveal that firms with high ESG ratings exhibit a marginally higher average Tobin's Q than low ESG firms; however, the difference is not statistically significant. This finding suggests that ESG performance alone does not mechanically translate into higher firm value in univariate comparisons. In contrast, several firm characteristics differ significantly across ESG groups. High ESG firms tend to be larger, less leveraged, more profitable, and characterized by higher levels of foreign ownership. These patterns are consistent with prior evidence that ESG engagement is correlated with firm size, financial strength, and international investor participation.

Importantly, there is no statistically significant difference in advertising expenditure volatility between high and low ESG firms. This result alleviates concerns that ESG status simply reflects different advertising strategies and supports the empirical design that treats advertising volatility and ESG per-

〈Table 6〉 T-test

	High ESG	Low ESG	Diff.	t-stat
TBQ_{t+1}	1.381	1.321	0.060	1.17
$\sigma(ADV)$	0.003	0.003	0.000	0.28
<i>SIZE</i>	26.447	28.567	-2.119***	-52.73
<i>LEV</i>	0.406	0.480	-0.073***	-10.20
<i>ROA</i>	0.108	0.018	0.090***	5.14
<i>GRW</i>	0.057	0.061	-0.004	-0.39
<i>CUR</i>	0.811	0.928	-0.116***	-5.33
<i>FOR</i>	0.085	0.185	-0.100***	-23.51
<i>BET</i>	0.906	0.839	0.067***	3.88
<i>VOL</i>	0.430	0.362	0.068***	11.83

note 1. All variables are defined as in Section 3.1.

formance as conceptually distinct firm attributes. Overall, the descriptive evidence motivates the subsequent multivariate analysis, which examines whether ESG performance moderates the valuation effects of advertising volatility after controlling for firm fundamentals.

4.3 Correlations

〈Table 7〉 presents the pairwise correlation coefficients among the main variables used in the empirical analysis. The lower triangular matrix reports Pearson correlation coefficients, while the upper triangular matrix reports Spearman rank correlation coefficients. This dual presentation allows us to assess both linear associations and monotonic relationships that are less sensitive to outliers and non-normal distributions.

With respect to the dependent variable, next-period Tobin's Q (TBQ), both Pearson

and Spearman correlations indicate a positive and statistically significant association with advertising expenditure volatility ($\sigma(ADV)$). The Pearson correlation between TBQ and $\sigma(ADV)$ is positive and significant, and the Spearman correlation confirms a similar monotonic relationship. This positive unconditional correlation likely reflects omitted firm characteristics and growth-related factors, which are explicitly controlled for in the multivariate regression framework. The multivariate regressions later account for these factors and provide a more appropriate test of the hypothesized relationships.

Firm value is negatively correlated with firm size (*SIZE*) in both Pearson and Spearman measures, suggesting that larger firms tend to exhibit lower Tobin's Q, which is consistent with prior literature documenting a size-related valuation discount. In contrast, leverage (*LEV*), sales growth (*GRW*), foreign ownership

〈Table 7〉 Correlation

	<i>TBQ</i>	$\sigma(ADV)$	<i>ESG</i> ^{HIGH}	<i>SIZE</i>	<i>LEV</i>	<i>ROA</i>	<i>GRW</i>	<i>CUR</i>	<i>FOR</i>	<i>BET</i>	<i>VOL</i>
<i>TBQ</i>	1	0.267***	0.002	-0.172***	0.094***	0.019	0.121***	-0.017	0.108***	0.079***	0.307***
$\sigma(ADV)$	0.094***	1	0.078***	-0.003	-0.109***	-0.006	0.036**	-0.066***	0.136***	0.002	0.087***
<i>ESG</i> ^{HIGH}	-0.017	-0.004	1	0.560***	0.153***	-0.178***	0.013	0.130***	0.365***	-0.046***	-0.165***
<i>SIZE</i>	-0.113***	-0.046***	0.609***	1	0.179***	-0.284***	0.003	0.197***	0.548***	-0.146***	-0.289***
<i>LEV</i>	-0.068***	-0.047***	0.147***	0.187***	1	-0.061***	0.115***	0.717***	-0.121***	0.139***	0.155***
<i>ROA</i>	-0.015	0.016	-0.075***	-0.158***	-0.009	1	0.033**	-0.084***	-0.157***	0.036**	0.066***
<i>GRW</i>	0.156***	0.149***	0.006	-0.025*	0.119***	0.008	1	0.005	0.046***	0.011	0.033**
<i>CUR</i>	-0.109***	-0.033**	0.077***	0.163***	0.525***	-0.053***	-0.017	1	-0.155***	0.097***	0.075***
<i>FOR</i>	0.109***	-0.004	0.324***	0.481***	-0.128***	-0.077***	0.007	-0.117***	1	-0.148***	-0.206***
<i>BET</i>	0.028*	0.029**	-0.056***	-0.152***	0.127***	0.067***	0.004	0.046***	-0.200***	1	0.499***
<i>VOL</i>	0.190***	0.077***	-0.170***	-0.303***	0.132***	0.091***	0.041***	0.031**	-0.220***	0.476***	1

note 1. All variables are defined as in Section 3.1.

note 2. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

(*FOR*), beta (*BET*), and stock return volatility (*VOL*) show positive and statistically significant correlations with *TBQ*, indicating that growth opportunities and risk-related characteristics are reflected in market valuation.

Advertising expenditure volatility ($\sigma(ADV)$) is positively correlated with sales growth and foreign ownership, suggesting that firms experiencing greater advertising fluctuations may also be firms with more dynamic growth patterns and greater exposure to global investors. At the same time, $\sigma(ADV)$ is negatively correlated with leverage and liquidity, indicating that firms with more volatile advertising expenditures tend to operate under tighter financial conditions.

High ESG status (ESG^{HIGH}) exhibits strong positive correlations with firm size, foreign ownership, and liquidity, under both Pearson and Spearman measures. These patterns indicate that firms with superior ESG performance tend to be larger, more liquid, and more closely monitored by foreign investors. ESG^{HIGH} is negatively correlated with stock return volatility, consistent with the view that ESG performance is associated with lower firm risk. The simple correlation between ESG^{HIGH} and firm value is weak and not statistically significant, suggesting that ESG's effect on valuation may be more nuanced and potentially operates through interaction effects rather than a direct unconditional association.

Among the control variables, several ex-

pected relationships emerge. Firm size is positively correlated with leverage, liquidity, and foreign ownership, while negatively correlated with profitability and risk measures. Leverage is strongly positively correlated with liquidity, reflecting balance-sheet structure, and profitability (*ROA*) is negatively correlated with leverage and firm size but positively correlated with risk measures. Beta and stock return volatility exhibit a strong positive correlation with each other, consistent with standard asset pricing intuition.

Importantly, while some variables exhibit relatively high correlations—particularly between firm size and ESG-related variables—none of the pairwise correlation coefficients exceed conventional thresholds that would raise serious concerns about multicollinearity. This assessment is further supported by variance inflation factor (VIF) diagnostics reported in the regression analysis. Overall, the correlation structure suggests economically meaningful relationships among the variables, while indicating that the multivariate regression framework is appropriate for disentangling the distinct effects of advertising expenditure volatility, ESG performance, and firm value.

4.4 Regression Results

〈Table 8〉 presents the baseline regression results examining the relationship between

advertising expenditure volatility and future firm value and the moderating role of ESG performance. The dependent variable in all specifications is next-period Tobin's Q. Model (1) examines the main effect of advertising expenditure volatility without including ESG performance. Model (2) adds the high-ESG indicator to control for the direct association between ESG performance and firm value. Model (3) introduces the interaction term between advertising expenditure volatility and high ESG performance to test whether ESG moderates the valuation effect of advertising volatility.

In Model (1), the coefficient on advertising expenditure volatility is negative but statistically insignificant. Specifically, the coefficient on $\sigma(ADV)$ is -2.975, with a t-statistic of -1.46. This result indicates that, when ESG performance is not considered, advertising expenditure volatility does not have a statistically significant unconditional association with future firm value. Model (2) shows a similar pattern. After including the high-ESG indicator, the coefficient on $\sigma(ADV)$ remains negative but insignificant, with a coefficient of -3.013 and a t-statistic of -1.48. The coefficient on ESG^{HIGH} is positive but statistically insignificant, suggesting that high ESG performance does not have a direct and independent valuation effect in this specification.

These results imply that the unconditional main effect of advertising expenditure volatility

should be interpreted cautiously. Although the negative signs of the coefficients are consistent with the predicted direction, Models (1) and (2) do not provide strong statistical evidence that advertising volatility, by itself, reduces firm value across the full sample. Therefore, the main-effect hypothesis receives only limited support from the baseline models.

These results have important implications for Hypothesis 1. The insignificant coefficients on $\sigma(ADV)$ in Models (1) and (2) indicate that the data do not support a universal unconditional negative effect of advertising expenditure volatility on firm value. Therefore, Hypothesis 1 receives only limited support in the full-sample main-effect specifications. This finding does not necessarily invalidate the theoretical argument that advertising volatility can convey negative value-relevant information. Rather, it suggests that the market's interpretation of advertising volatility is conditional. In the pooled sample, the negative interpretation of advertising volatility among some firms may be offset by more benign interpretations among firms with stronger credibility, better stakeholder relationships, or more disciplined governance structures. Accordingly, the main-effect results should be interpreted as evidence that advertising volatility is not uniformly penalized across all firms.

A clearer pattern emerges in Model (3),

〈Table 8〉 Regression Results

	Model (1)	Model (2)	Model (3)
	<i>Dependent Variable : TBQ_{t+1}</i>		
$\sigma(ADV)$	-2.975 (-1.46)	-3.013 (-1.48)	-6.200*** (-2.62)
ESG^{HIGH}		0.083 (0.95)	-0.000 (-0.00)
$\sigma(ADV) \times ESG^{HIGH}$			43.020*** (2.66)
<i>SIZE</i>	-0.176*** (-6.94)	-0.190*** (-6.50)	-0.184*** (-6.29)
<i>LEV</i>	3.804*** (21.36)	3.789*** (21.19)	3.788*** (21.20)
<i>ROA</i>	-0.129* (-1.87)	-0.130* (-1.88)	-0.126* (-1.82)
<i>GRW</i>	0.036 (0.30)	0.036 (0.30)	0.033 (0.28)
<i>CUR</i>	0.175*** (3.25)	0.177*** (3.28)	0.178*** (3.31)
<i>FOR</i>	2.324*** (8.70)	2.319*** (8.68)	2.272*** (8.49)
<i>BET</i>	-0.375*** (-4.45)	-0.378*** (-4.47)	-0.379*** (-4.49)
<i>VOL</i>	2.680*** (11.47)	2.684*** (11.49)	2.705*** (11.58)
<i>cons</i>	3.793*** (3.45)	4.164*** (3.56)	4.018*** (3.44)
F-value	35.540	35.065	34.732
Adj. R-Square	0.345	0.345	0.346
N	4,722	4,722	4,722

note 1. All variables are defined as in Table 2.

note 2. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

where the interaction between advertising expenditure volatility and high ESG performance is included. In this model, the coefficient on $\sigma(ADV)$ is -6.200 and statistically significant at the 1 percent level, with a t-statistic of -2.62. Because Model (3) includes an interaction term, this coefficient represents the effect of advertising expenditure volatility

on future firm value for low-ESG firms, namely firms with $ESG^{HIGH}=0$. The result indicates that, among low-ESG firms, greater advertising expenditure volatility is significantly associated with lower future Tobin's Q.

This finding suggests that advertising volatility is penalized by the capital market when

firms lack strong ESG performance. For low-ESG firms, unstable advertising expenditures may be interpreted by investors as a signal of strategic inconsistency, short-term managerial behavior, weak brand commitment, or increased uncertainty about future cash flows. In this context, advertising volatility appears to convey negative value-relevant information.

More importantly, the interaction term between advertising expenditure volatility and high ESG performance is positive and statistically significant. The coefficient on $\sigma(ADV) \times ESG^{HIGH}$ is 43.020, with a t-statistic of 2.66, indicating significance at the 1 percent level. This positive interaction coefficient shows that the negative valuation effect of advertising volatility is significantly attenuated for firms with high ESG performance. In other words, while advertising volatility is associated with lower firm value among low-ESG firms, this negative association becomes substantially weaker for firms with superior ESG ratings.

This result provides strong evidence for the moderating role of ESG performance. ESG does not appear to operate primarily as a direct value-enhancing factor in the baseline specification, as the coefficient on ESG^{HIGH} itself is statistically insignificant. Rather, ESG functions as a credibility-enhancing condition that changes how investors interpret volatile advertising behavior. For high-ESG

firms, advertising volatility may be perceived less as a signal of strategic instability and more as an adaptive adjustment within a credible long-term strategic orientation. Therefore, ESG performance mitigates the valuation penalty associated with advertising expenditure volatility.

The conditional nature of the results can be explained by the interpretive ambiguity of advertising expenditure volatility. In the full sample, advertising volatility may combine two different signals. For some firms, it may indicate unstable brand commitment, short-term resource allocation, or uncertainty about future cash flows. For other firms, it may reflect adaptive responses to changing market conditions, competitive dynamics, or digital media opportunities. As a result, these opposing interpretations may offset each other in the pooled sample, producing an insignificant unconditional main effect. Among low-ESG firms, however, investors have fewer credibility-based reasons to interpret volatile advertising behavior favorably. Weak ESG performance may reinforce concerns about short-termism, limited stakeholder orientation, and insufficient managerial discipline. Therefore, advertising volatility is more likely to be interpreted as strategic inconsistency among low-ESG firms, leading to a negative valuation effect. By contrast, high ESG performance provides reputational and governance-based credibility that allows investors to in-

interpret similar volatility as adaptive flexibility rather than opportunistic instability.

4.5 Moderating Effects of ESG Pillars

〈Table 9〉 further examines whether the moderating effect of ESG performance differs across the individual ESG pillars. Specifically, Models (1), (2), and (3) replace the aggregate ESG indicator with the Environmental, Social, and Governance pillar indicators, respectively. This analysis allows us to identify which dimension of ESG performance is more relevant in mitigating the valuation penalty associated with advertising expenditure volatility.

In Model (1), which focuses on the Environmental pillar, the coefficient on advertising expenditure volatility is negative and marginally significant. The coefficient on $\sigma(ADV)$ is -4.082, with a t-statistic of -1.84, indicating significance at the 10 percent level. This suggests that among firms with low Environmental ratings, greater advertising expenditure volatility is weakly associated with lower future Tobin's Q. However, the interaction term between advertising expenditure volatility and high Environmental performance is positive but statistically insignificant. The coefficient on $\sigma(ADV) \times EG^{HIGH}$ is 20.712, with a t-statistic of 1.22. Thus, the results do not provide sufficient statistical evidence that Environmental performance significantly mod-

erates the relationship between advertising volatility and firm value.

Model (2) examines the moderating role of the Social pillar. The coefficient on $\sigma(ADV)$ is -6.493 and statistically significant at the 1 percent level, with a t-statistic of -2.78. Because the model includes an interaction term, this coefficient represents the effect of advertising expenditure volatility for firms with low Social ratings. The result indicates that advertising volatility significantly reduces future firm value among firms with weak Social performance.

More importantly, the interaction term between advertising volatility and high Social performance is positive and statistically significant. The coefficient on $\sigma(ADV) \times SG^{HIGH}$ is 39.940, with a t-statistic of 3.05, indicating significance at the 1 percent level. This finding suggests that the negative valuation effect of advertising volatility is significantly attenuated for firms with strong Social performance. In other words, the Social dimension of ESG appears to play an important role in shaping how investors interpret volatile advertising expenditures.

This result is theoretically meaningful because the Social pillar is closely related to stakeholder trust, customer relationships, employee relations, community engagement, and reputational capital. Since advertising is a market-facing activity, instability in advertising spending may be interpreted more neg-

atively when firms lack strong stakeholder relationships. By contrast, firms with superior Social performance may be perceived as having stronger relational capital and more credible long-term market commitments. Therefore, investors may be less likely to interpret advertising volatility in high-Social firms as evidence of strategic inconsistency or short-termism.

Model (3) reports the results for the Governance pillar. The coefficient on $\sigma(ADV)$ is -5.969 and statistically significant at the 5 percent level, with a t-statistic of -2.55. This indicates that among firms with low Governance ratings, advertising expenditure volatility is negatively associated with future Tobin's Q. The interaction term between advertising volatility and high Governance performance is positive and statistically significant. The coefficient on $\sigma(ADV) \times GG^{HIGH}$ is 30.150, with a t-statistic of 2.61, indicating significance at the 1 percent level.

This result suggests that strong Governance performance also mitigates the negative valuation effect of advertising volatility. Governance quality may reassure investors that volatile advertising expenditures are not driven by managerial opportunism, weak internal control, or short-term resource allocation. Rather, when firms have stronger governance structures, investors may interpret advertising fluctuations as more disciplined and strategically justified. Thus, Governance performance appears to function as an important credi-

bility mechanism in the capital market's assessment of advertising-related uncertainty.

It is also notable that the coefficients on the ESG pillar dummy variables themselves are not statistically significant. Specifically, EG^{HIGH} , SG^{HIGH} , and GG^{HIGH} do not show significant direct effects on future Tobin's Q. This pattern is consistent with the aggregate ESG results and suggests that ESG performance does not operate primarily through a direct valuation premium in this setting. Instead, the value relevance of ESG appears to emerge through its interaction with advertising expenditure volatility. That is, ESG—particularly the Social and Governance dimensions—affects firm value by changing how investors interpret uncertain or unstable marketing investment behavior.

Overall, the results indicate that the moderating role of ESG is not uniform across all ESG pillars. Environmental performance does not significantly moderate the relationship between advertising volatility and firm value, whereas Social and Governance performance provide significant buffering effects. These findings suggest that investors place greater weight on stakeholder trust and governance credibility than on environmental performance when evaluating the implications of volatile advertising expenditures. Accordingly, the evidence supports the view that ESG performance attenuates the negative valuation effect of advertising volatility, but this effect

is primarily driven by the Social and Governance dimensions rather than the Environmental dimension.

〈Table 9〉 ESG Pillar Interaction Results

	Model (1)	Model (2)	Model (3)
	<i>Dependent Variable : TBQ_{t+1}</i>		
$\sigma(ADV)$	-4.082* (-1.84)	-6.493*** (-2.78)	-5.969** (-2.55)
$\sigma(ADV) \times EG^{HIGH}$	20.712 (1.22)		
EG^{HIGH}	0.042 (0.49)		
$\sigma(ADV) \times SG^{HIGH}$		39.940*** (3.05)	
SG^{HIGH}		-0.062 (-0.74)	
$\sigma(ADV) \times GG^{HIGH}$			30.150*** (2.61)
GG^{HIGH}			-0.114 (-1.40)
$SIZE$	-0.187*** (-6.51)	-0.173*** (-6.02)	-0.166*** (-6.11)
LEV	3.791*** (21.24)	3.808*** (21.35)	3.818*** (21.40)
ROA	-0.128* (-1.85)	-0.124* (-1.79)	-0.123* (-1.78)
GRW	0.029 (0.24)	0.034 (0.28)	0.034 (0.28)
CUR	0.176*** (3.28)	0.171*** (3.18)	0.172*** (3.20)
FOR	2.305*** (8.61)	2.267*** (8.47)	2.298*** (8.58)
BET	-0.377*** (-4.46)	-0.373*** (-4.42)	-0.372*** (-4.40)
VOL	2.687*** (11.50)	2.682*** (11.49)	2.684*** (11.49)
$cons$	4.082*** (3.53)	3.736*** (3.22)	3.527*** (3.13)
$F\text{-value}$	34.612***	34.762***	34.714***
$Adj. R\text{-Square}$	0.345	0.346	0.346
N	4,722	4,722	4,722

note 1. All variables are defined as in Table 2.

note 2. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

4.6 The Moderating Role of ESG Conditional on Net Debt Position

〈Table 10〉 reports the results of the cross-sectional analysis based on firms' net debt positions. The purpose of this analysis is to examine whether the moderating effect of ESG performance differs depending on firms' financial conditions. The sample is divided into high-net-debt firms and low-net-debt firms. Models (1) - (4) report the results for high-net-debt firms, while Models (5) - (8) report the results for low-net-debt firms.

In the high-net-debt subsample, advertising expenditure volatility is consistently and significantly negatively associated with future firm value. Across Models (1) - (4), the coefficients on $\sigma(ADV)$ range from -42.409 to -36.343, and all are statistically significant at the 1 percent level. This result indicates that among firms with relatively high net debt burdens, greater advertising expenditure volatility is associated with lower future Tobin's Q. In financially constrained or highly leveraged firms, unstable advertising expenditures may be interpreted by investors as a stronger signal of strategic uncertainty, financial pressure, or difficulty in maintaining consistent marketing investment.

However, the ESG interaction effects are not statistically significant in the high-net-debt subsample. In Model (1), the interaction

between advertising volatility and high ESG performance is positive but insignificant. The coefficient on $\sigma(ADV) \times ESG^{HIGH}$ is 19.723, with a t-statistic of 0.34. Similarly, the interaction between advertising volatility and high Environmental performance is positive but insignificant, with a coefficient of 45.732 and a t-statistic of 0.86. The interaction with high Social performance is also positive but statistically insignificant, with a coefficient of 66.074 and a t-statistic of 1.64. Finally, the interaction with high Governance performance is negative but insignificant, with a coefficient of -29.167 and a t-statistic of -0.61.

These findings suggest that, for firms with high net debt, ESG performance does not significantly mitigate the negative valuation effect of advertising expenditure volatility. Although some of the interaction coefficients are positive, they do not reach conventional levels of statistical significance. This implies that when financial risk is high, investors may place greater weight on debt-related concerns than on ESG signals. In other words, the credibility-enhancing role of ESG may be weakened when firms face substantial financial pressure.

The results are different in the low-net-debt subsample. In Models (5) - (8), the coefficients on advertising expenditure volatility are generally negative, but their significance is weaker than in the high-net-debt subsample. Specifically, $\sigma(ADV)$ is negative

and significant in Models (5), (7), and (8), while it is negative but insignificant in Model (6). This suggests that advertising volatility still tends to be negatively associated with firm value among low-net-debt firms, but the baseline negative effect is less severe than that observed among high-net-debt firms.

More importantly, ESG-related interaction effects become significant in the low-net-debt subsample. In Model (5), the interaction between advertising volatility and high ESG performance is positive and statistically significant. The coefficient on $\sigma(ADV) \times ESG^{HIGH}$ is 56.746, with a t-statistic of 3.19. This indicates that the negative valuation effect of advertising expenditure volatility is significantly attenuated for low-net-debt firms with high ESG performance.

The pillar-level results provide further evidence. In Model (6), the interaction between advertising volatility and high Environmental performance is positive but statistically insignificant, with a coefficient of 27.861 and a t-statistic of 1.55. Thus, Environmental performance does not provide strong evidence of a moderating effect in this subsample. In contrast, Model (7) shows that the interaction between advertising volatility and high Social performance is positive and statistically significant. The coefficient on $\sigma(ADV) \times SG^{HIGH}$ is 52.303, with a t-statistic of 3.67. Model (8) also shows a positive and statistically significant interaction between

advertising volatility and high Governance performance. The coefficient on $\sigma(ADV) \times GG^{HIGH}$ is 39.586, with a t-statistic of 3.16.

These results suggest that ESG performance, especially the Social and Governance dimensions, plays a significant buffering role when firms are not heavily burdened by net debt. In financially more flexible firms, investors may be more willing to interpret advertising volatility as adaptive strategic adjustment rather than as a signal of distress or inconsistent resource allocation. By contrast, when firms are highly indebted, the market may discount the credibility of ESG signals because financial risk dominates investors' interpretation of volatile advertising behavior.

Overall, <Table 10> shows that the moderating effect of ESG performance is conditional on firms' financial positions. For high-net-debt firms, advertising expenditure volatility has a strong negative association with future firm value, and ESG performance does not significantly alleviate this negative effect. For low-net-debt firms, however, high ESG performance significantly mitigates the negative valuation effect of advertising volatility. This buffering effect is mainly driven by the Social and Governance pillars rather than the Environmental pillar. These findings suggest that ESG is more effective as a credibility-based moderating mechanism when firms possess sufficient financial flexibility.

〈Table 10〉 Cross-sectional Analysis by Net Debt Position

	High net debt ratio firms				Low net debt ratio firms			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<i>Dependent Variable : TBQ_{it+1}</i>							
$\sigma(ADV)$	-38.528*** (-3.20)	-39.033*** (-3.23)	-42.409*** (-3.45)	-36.343*** (-2.95)	-5.318** (-2.13)	-2.461 (-1.06)	-5.441** (-2.23)	-4.922** (-2.02)
$\sigma(ADV) \times ESG^{HIGH}$	19.723 (0.34)				56.746*** (3.19)			
ESG^{HIGH}	-0.215 (-1.40)				-0.102 (-0.70)			
$\sigma(ADV) \times EG^{HIGH}$		45.732 (0.86)				27.861 (1.55)		
EG^{HIGH}		-0.054 (-0.37)				-0.172 (-1.28)		
$\sigma(ADV) \times SG^{HIGH}$			66.074 (1.64)				52.303*** (3.67)	
SG^{HIGH}			-0.109 (-0.77)				-0.313** (-2.43)	
$\sigma(ADV) \times GG^{HIGH}$				-29.167 (-0.61)				39.586*** (3.16)
GG^{HIGH}				-0.193 (-1.40)				-0.065 (-0.51)
<i>F-value</i>	19.414	19.381	19.433	19.456	12.275	12.123	12.374	12.277
<i>Adj. R-Square</i>	0.391	0.391	0.391	0.392	0.298	0.295	0.299	0.298
<i>N</i>	1,865	1,865	1,865	1,865	1,864	1,864	1,864	1,864

note 1. All variables are defined as in Table 2.

note 2. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

4.7 The Moderating Role of ESG by Advertising Increase

〈Table 11〉 reports the cross-sectional analysis based on whether firms increased their advertising expenditures relative to the previous year. This analysis examines whether the moderating effect of ESG performance differs depending on firms' advertising expenditure dynamics. Models (1) - (4) present the results for firms that increased advertising expenditures, while Models (5) - (8) report the results for firms that did not increase advertising expenditures.

In the subsample of firms that increased advertising expenditures, the coefficients on advertising expenditure volatility are not statistically significant across Models (1) - (4). Specifically, the coefficient on $\sigma(ADV)$ is 1.153 in Model (1), 2.467 in Model (2), -0.454 in Model (3), and 0.872 in Model (4), none of which reaches conventional levels of statistical significance. These results suggest that, among firms increasing their advertising spending, advertising expenditure volatility itself is not significantly associated with future firm value.

The interaction effects are also generally insignificant in this subsample. In Model (1), the interaction between advertising volatility and high ESG performance is positive but insignificant, with a coefficient of 21.477 and a t-statistic of 0.95. In Model (2), the inter-

action with high Environmental performance is also positive but insignificant, with a coefficient of 10.892 and a t-statistic of 0.38. The interaction with high Social performance in Model (3) is positive and marginally significant, with a coefficient of 33.734 and a t-statistic of 1.95. This indicates weak evidence that Social performance may attenuate the valuation effect of advertising volatility when firms are expanding advertising expenditures. However, the interaction with high Governance performance in Model (4) is positive but statistically insignificant, with a coefficient of 21.770 and a t-statistic of 1.22.

These findings suggest that when firms increase advertising expenditures, the market does not systematically penalize advertising volatility. One possible interpretation is that advertising volatility in the context of advertising expansion may be viewed as part of an active marketing strategy rather than as a signal of strategic inconsistency. In this setting, ESG performance does not provide a strong additional buffering effect, except for limited evidence related to the Social dimension. Because advertising increases may already convey a growth-oriented or market-expansion signal, the adverse informational content of advertising volatility may be relatively weak.

In contrast, the results are much stronger among firms that did not increase advertising expenditures. In Models (5) - (8), the coefficients on $\sigma(ADV)$ are consistently neg-

ative and statistically significant at the 1 percent level. Specifically, the coefficient on advertising volatility is -13.231 in Model (5), -11.667 in Model (6), -12.235 in Model (7), and -12.481 in Model (8). These results indicate that, among firms whose advertising expenditures did not increase, greater advertising expenditure volatility is significantly associated with lower future Tobin's Q.

This finding suggests that advertising volatility is interpreted more negatively when firms are not expanding their advertising investments. In such firms, advertising volatility may be perceived as unstable or inconsistent resource allocation rather than as an active strategic adjustment. If advertising expenditures are not increasing, volatility may reflect reductions, interruptions, or uneven allocation of marketing resources, which can raise investor concerns about the continuity of brand-building efforts and the firm's long-term market commitment.

The interaction results in the non-increase subsample provide clear evidence of ESG's moderating role. In Model (5), the interaction between advertising volatility and high ESG performance is positive and statistically significant, with a coefficient of 68.196 and a t-statistic of 2.90. This indicates that high ESG performance significantly attenuates the negative valuation effect of advertising volatility among firms that did not increase advertising expenditures.

The ESG pillar results show a similar pattern. In Model (6), the interaction between advertising volatility and high Environmental performance is positive and statistically significant, with a coefficient of 50.037 and a t-statistic of 2.11. In Model (7), the interaction with high Social performance is also positive and statistically significant, with a coefficient of 53.280 and a t-statistic of 2.65. Model (8) further shows that the interaction with high Governance performance is positive and statistically significant, with a coefficient of 43.368 and a t-statistic of 2.79. These results suggest that, when firms do not increase advertising expenditures, all three ESG pillars help mitigate the negative valuation effect of advertising volatility.

Overall, <Table 11> indicates that the valuation effect of advertising expenditure volatility depends on firms' advertising expenditure dynamics. When firms increase advertising expenditures, advertising volatility does not have a significant negative association with future firm value, and ESG-related moderating effects are generally weak. However, when firms do not increase advertising expenditures, advertising volatility is strongly and negatively associated with future firm value. In this setting, high ESG performance significantly weakens the negative effect of advertising volatility, and this buffering effect is observed across the Environmental, Social, and Governance dimensions.

〈Table 11〉 Cross-sectional Analysis by Advertising Increase

	Advertising Expenditure Increased firms				not Advertising Expenditure Increased firms			
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)
<i>Dependent Variable : TBQ_{it+1}</i>								
$\sigma(ADV)$	1.153 (0.34)	2.467 (0.81)	-0.454 (-0.13)	0.872 (0.26)	-13.231*** (-3.85)	-11.667*** (-3.39)	-12.235*** (-3.67)	-12.481*** (-3.74)
$\sigma(ADV) \times ESG^{HIGH}$	21.477 (0.95)				68.196*** (2.90)			
ESG^{HIGH}	0.033 (0.26)				-0.061 (-0.45)			
$\sigma(ADV) \times EG^{HIGH}$		10.892 (0.38)				50.037** (2.11)		
EG^{HIGH}		0.116 (0.96)				-0.060 (-0.48)		
$\sigma(ADV) \times SG^{HIGH}$			33.734* (1.95)				53.280*** (2.65)	
SG^{HIGH}			0.032 (0.28)				-0.183 (-1.48)	
$\sigma(ADV) \times GG^{HIGH}$				21.770 (1.22)				43.368*** (2.79)
GG^{HIGH}				-0.154 (-1.38)				-0.101 (-0.85)
<i>cons</i>	5.311*** (3.13)	5.619*** (3.33)	5.429*** (3.22)	4.613*** (2.81)	2.951* (1.80)	2.889* (1.79)	2.296 (1.41)	2.737* (1.74)
<i>F-value</i>	17.137	17.140	17.210	17.162	18.767	18.675	18.739	18.747
<i>Adj. R-Square</i>	0.339	0.339	0.340	0.339	0.352	0.350	0.351	0.351
<i>N</i>	2,329	2,329	2,329	2,329	2,393	2,393	2,393	2,393

note 1. All variables are defined as in Table 2.

note 2. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

These results suggest that ESG performance is particularly valuable as a credibility-enhancing mechanism when advertising volatility occurs in the absence of advertising expansion.

4.8 The Moderating Role of ESG by Auditor Size

〈Table 12〉 presents the cross-sectional analysis based on auditor size. This analysis examines whether the valuation effect of advertising expenditure volatility and the moderating role of ESG performance differ depending on the quality of the external information environment. Models (1) - (4) report the results for firms audited by Big 4 auditors, while Models (5) - (8) present the results for firms audited by non-Big 4 auditors.

For the Big 4 auditor subsample, advertising expenditure volatility is positively and significantly associated with future firm value across all specifications. Specifically, the coefficient on $\sigma(ADV)$ is 11.998 in Model (1), 12.005 in Model (2), 9.980 in Model (3), and 13.968 in Model (4), and all coefficients are statistically significant at the 1 percent level. This result is different from the baseline expectation that advertising volatility is generally interpreted as a negative signal. In firms audited by Big 4 auditors, advertising volatility may be viewed less as strategic in-

consistency and more as active strategic adjustment, because the external audit environment already provides a relatively high level of financial reporting credibility and information transparency.

However, the ESG-related interaction terms are generally not statistically significant in the Big 4 auditor subsample. In Model (1), the interaction between advertising volatility and high ESG performance is negative but insignificant, with a coefficient of -12.788 and a t-statistic of -0.77. The interaction with high Environmental performance is also negative but insignificant, with a coefficient of -17.367 and a t-statistic of -1.06. The interaction with high Social performance is positive but insignificant, with a coefficient of 4.900 and a t-statistic of 0.36. The interaction with high Governance performance is negative and marginally insignificant, with a coefficient of -23.617 and a t-statistic of -1.64.

These results suggest that, among Big 4-audited firms, ESG performance does not significantly moderate the relationship between advertising expenditure volatility and future firm value. One possible interpretation is that Big 4 audit quality already serves as a strong external credibility mechanism. Since Big 4 auditors enhance the reliability of financial reporting and reduce information asymmetry, ESG may provide limited additional certification value in this setting.

〈Table 12〉 Cross-sectional Analysis by Auditor Size

	Big4 Auditor firms			non Big4 Auditor firms				
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)
<i>Dependent Variable : TBQ_{t+1}</i>								
$\sigma(ADV)$	11.998*** (4.01)	12.005*** (4.48)	9.980*** (3.37)	13.968*** (4.56)	-25.480*** (-6.06)	-25.253*** (-6.01)	-25.306*** (-6.00)	-26.471*** (-6.25)
$\sigma(ADV) \times ESG^{HIGH}$	-12.788 (-0.77)				138.289 (1.45)			
ESG^{HIGH}	0.120 (1.24)				-0.371 (-1.45)			
$\sigma(ADV) \times EQ^{HIGH}$		-17.367 (-1.06)				-92.586 (-0.70)		
EQ^{HIGH}		0.059 (0.64)				0.046 (0.23)		
$\sigma(ADV) \times SG^{HIGH}$			4.900 (0.36)				-1.010 (-0.02)	
SG^{HIGH}			0.044 (0.49)				-0.097 (-0.49)	
$\sigma(ADV) \times GG^{HIGH}$				-23.617 (-1.64)				42.251** (2.07)
GG^{HIGH}				0.004 (0.05)				-0.192 (-1.08)
cons	2.631** (2.25)	2.300** (1.99)	2.375** (2.05)	2.058* (1.85)	8.888*** (3.79)	9.635*** (4.10)	9.329*** (3.94)	9.272*** (4.03)
F-value	26.197	26.186	26.170	26.228	16.636	16.577	16.572	16.674
Adj. R-Square	0.382	0.382	0.382	0.382	0.361	0.360	0.360	0.362
N	2,894	2,894	2,894	2,894	1,828	1,828	1,828	1,828

note 1. All variables are defined as in Table 2.

note 2. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Therefore, the moderating role of ESG is not clearly observed when firms already operate under a relatively strong external monitoring environment.

In contrast, the results for the non-Big 4 auditor subsample show a markedly different pattern. Across Models (5) - (8), advertising expenditure volatility is consistently and significantly negatively associated with future firm value. The coefficient on $\sigma(ADV)$ is -25.480 in Model (5), -25.253 in Model (6), -25.306 in Model (7), and -26.471 in Model (8), and all coefficients are statistically significant at the 1 percent level. These findings indicate that, among firms audited by non-Big 4 auditors, greater advertising expenditure volatility is strongly associated with lower future Tobin's Q.

This result suggests that advertising volatility is penalized more severely when external monitoring quality is relatively weak. In firms audited by non-Big 4 auditors, investors may have greater uncertainty about financial reporting credibility and managerial discipline. Under such conditions, unstable advertising expenditures may be interpreted as a stronger signal of strategic inconsistency, opportunistic resource allocation, or uncertainty regarding future cash flows.

The ESG interaction results in the non-Big 4 subsample are mixed. The interaction between advertising volatility and high ESG performance in Model (5) is positive but stat-

istically insignificant. The coefficient on $\sigma(ADV) \times ESG^{HIGH}$ is 138.289, with a t-statistic of 1.45. Similarly, the interactions with high Environmental and high Social performance are not statistically significant. Specifically, the coefficient on $\sigma(ADV) \times EG^{HIGH}$ is -92.586 with a t-statistic of -0.70, while the coefficient on $\sigma(ADV) \times SG^{HIGH}$ is -1.010 with a t-statistic of -0.02.

However, the interaction between advertising volatility and high Governance performance is positive and statistically significant in Model (8). The coefficient on $\sigma(ADV) \times GG^{HIGH}$ is 42.251, with a t-statistic of 2.07, indicating significance at the 5 percent level. This finding suggests that, among firms audited by non-Big 4 auditors, strong Governance performance attenuates the negative valuation effect of advertising expenditure volatility.

This result is theoretically meaningful because Governance performance may substitute, at least partially, for weaker external audit credibility. When firms are not audited by Big 4 auditors, investors may rely more heavily on internal governance quality to assess whether volatile advertising expenditures reflect disciplined strategic adjustment or managerial opportunism. Strong governance can reassure investors that advertising volatility is less likely to result from weak internal control or short-term managerial discretion. Therefore, Governance appears to play a particularly important credi-

bility-enhancing role when external monitoring quality is relatively weak.

Overall, <Table 12> indicates that the relationship between advertising expenditure volatility and firm value depends strongly on the audit environment. For Big 4-audited firms, advertising volatility is positively associated with future firm value, and ESG does not provide a significant additional moderating effect. For non-Big 4-audited firms, advertising volatility is negatively associated with future firm value, indicating that the market penalizes unstable advertising expenditures when external monitoring quality is weaker. In this setting, Governance performance significantly mitigates the negative valuation effect of advertising volatility, while aggregate ESG, Environmental, and Social performance do not show significant moderating effects. These findings suggest that the credibility-enhancing role of ESG is most evident in the Governance dimension when external audit credibility is relatively limited.

4.9 Robustness Test Using Industry-adjusted Advertising Volatility

<Table 13> reports the robustness test using industry-adjusted advertising expenditure (*adj_ADV*) volatility. This analysis is conducted to examine whether the main findings are driven by firm-specific advertising volatility rather than by systematic differences in

advertising practices across industries. By adjusting advertising intensity relative to industry-year norms, this test allows us to assess whether the valuation effect of advertising volatility remains robust after controlling for industry-level advertising patterns.

In Model (1), which uses the aggregate ESG indicator, advertising expenditure volatility is negatively and significantly associated with future firm value. The coefficient on advertising volatility is -6.200, with a t-statistic of -2.62, indicating significance at the 1 percent level. Since the model includes the interaction term between advertising volatility and high ESG performance, this coefficient represents the effect of advertising volatility for low-ESG firms. The result indicates that, even after considering industry-adjusted advertising behavior, advertising volatility is associated with lower future Tobin's Q among firms with low ESG performance.

The interaction term between advertising volatility and high ESG performance is positive and statistically significant. The coefficient on $\sigma(\text{adj_ADV}) \times \text{ESG}^{\text{HIGH}}$ is 43.020, with a t-statistic of 2.66. This result suggests that high ESG performance significantly attenuates the negative valuation effect of advertising volatility. Therefore, the baseline finding that ESG performance acts as a credibility-based moderating mechanism remains robust when advertising volatility is examined in an industry-adjusted setting.

Model (2) examines the Environmental pillar. The coefficient on advertising volatility is -4.082 and is marginally significant at the 10 percent level. This suggests that advertising volatility is weakly associated with lower future firm value among firms with low Environmental performance. However, the interaction between advertising volatility and high Environmental performance is not statistically significant. The coefficient on σ (adj_ADV) $\times EG^{HIGH}$ is 20.712, with a t-statistic of 1.22. Thus, the results do not provide sufficient evidence that Environmental

performance significantly moderates the valuation effect of advertising volatility.

Model (3) reports the results for the Social pillar. The coefficient on advertising volatility is -6.493 and statistically significant at the 1 percent level, with a t-statistic of -2.78. This indicates that advertising volatility has a negative valuation effect among firms with low Social performance. More importantly, the interaction between advertising volatility and high Social performance is positive and statistically significant. The coefficient on σ (adj_ADV) $\times SG^{HIGH}$ is 39.940, with a t-sta-

〈Table 13〉 Robustness Test Using Industry-adjusted Advertising Volatility

	Model (1)	Model (2)	Model (3)	Model (4)
		<i>Dependent Variable : TBQ_{t+1}</i>		
$\sigma(ADV)$	-6.200*** (-2.62)	-4.082* (-1.84)	-6.493*** (-2.78)	-5.969** (-2.55)
$\sigma(ADV)\times ESG^{HIGH}$	43.020*** (2.66)			
ESG^{HIGH}	-0.000 (-0.00)			
$\sigma(ADV)\times EG^{HIGH}$		20.712 (1.22)		
EG^{HIGH}		0.042 (0.49)		
$\sigma(ADV)\times SG^{HIGH}$			39.940*** (3.05)	
SG^{HIGH}			-0.062 (-0.74)	
$\sigma(ADV)\times GG^{HIGH}$				30.150*** (2.61)
GG^{HIGH}				-0.114 (-1.40)
<i>cons</i>	4.018*** (3.44)	4.082*** (3.53)	3.736*** (3.22)	3.527*** (3.13)
<i>F-value</i>	34.732***	34.612***	34.762***	34.714***
<i>Adj. R-Square</i>	0.346	0.345	0.346	0.346
<i>N</i>	4,722	4,722	4,722	4,722

note 1. All variables are defined as in Table 2.

note 2. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

tistic of 3.05. This result indicates that Social performance significantly mitigates the negative valuation effect of advertising volatility.

Model (4) presents the results for the Governance pillar. The coefficient on advertising volatility is -5.969 and statistically significant at the 5 percent level. The interaction between advertising volatility and high Governance performance is also positive and statistically significant, with a coefficient of 30.150 and a t-statistic of 2.61. This finding suggests that Governance performance also attenuates the negative relationship between advertising volatility and future firm value.

Overall, the results in <Table 13> are broadly consistent with the baseline findings. Advertising expenditure volatility is negatively associated with future firm value, particularly among firms with low ESG-related performance. High ESG performance significantly mitigates this negative relationship, and the moderating effect is mainly driven by the Social and Governance dimensions rather than the Environmental dimension. These findings suggest that the main results are not solely attributable to industry-level advertising norms, but reflect firm-specific instability in advertising investment and the role of ESG performance in shaping investor interpretation of such instability.

4.10 Robustness Tests Using Alternative Volatility Windows

<Table 14> presents robustness tests using alternative measurement windows for advertising expenditure volatility. While the main analysis measures advertising volatility as the three-year rolling standard deviation of advertising intensity, this additional analysis uses two-year and five-year rolling windows to examine whether the main findings are sensitive to the choice of measurement period.

In Model (1), advertising expenditure volatility is measured using a two-year rolling window. The coefficient on $\sigma(adj_ADV_2)$ is negative and marginally significant, with a coefficient of -4.957 and a t-statistic of -1.91. This result suggests that, among low-ESG firms, short-term advertising volatility is associated with lower future firm value. More importantly, the interaction term between two-year advertising volatility and high ESG performance is positive and marginally significant. The coefficient on $\sigma(adj_ADV_2) \times ESG^{HIGH}$ is 34.284, with a t-statistic of 1.78. This indicates that high ESG performance weakly attenuates the negative valuation effect of short-term advertising volatility.

Model (2) uses a five-year rolling window to capture longer-term advertising volatility. The coefficient on $\sigma(adj_ADV_5)$ is negative but statistically insignificant, with a co-

〈Table 14〉 Robustness Tests Using Alternative Volatility Windows

	Model (1)	Model (2)
	<i>Dependent Variable : TBQ_{t+1}</i>	
$\sigma(ADV_2)$	-4.957* (-1.91)	
$\sigma(ADV_2) \times ESG^{HIGH}$	34.284* (1.78)	
ESG^{HIGH}	0.037 (0.41)	-0.033 (-0.32)
$\sigma(ADV_5)$		-2.973 (-1.09)
$\sigma(ADV_5) \times ESG^{HIGH}$		26.253** (2.01)
cons	4.085*** (3.50)	4.652*** (3.80)
F-value	34.636***	28.387***
Adj. R-Square	0.345	0.338
N	4,722	3,810

note 1. All variables are defined as in Table 2.

note 2. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

efficient of -2.973 and a t-statistic of -1.09. Thus, the direct negative effect of long-term advertising volatility is not clearly supported in this specification. However, the interaction term between five-year advertising volatility and high ESG performance is positive and statistically significant. The coefficient on $\sigma(adj_ADV_5) \times ESG^{HIGH}$ is 26.253, with a t-statistic of 2.01. This result suggests that ESG performance continues to moderate the relationship between advertising volatility and firm value even when volatility is measured over a longer period.

Overall, the results provide additional support for the robustness of the ESG moderation effect. Although the statistical significance of advertising volatility itself varies depending on the measurement window, the

interaction between advertising volatility and high ESG performance remains positive in both the two-year and five-year specifications. These findings indicate that the main conclusion of this study is not driven solely by the use of a three-year volatility window. Rather, ESG performance appears to consistently mitigate the negative or potentially adverse valuation implications of advertising

V. Conclusion

This study examines how advertising expenditure volatility affects firm value and whether ESG performance moderates this relationship. Prior research in the marketing

-finance literature has mainly emphasized the value-enhancing role of advertising expenditures as investments in brand capital. In contrast, this study shifts the focus from the level of advertising expenditure to the stability of advertising investment over time. This distinction is important because advertising is a market-facing investment that is repeatedly observed by consumers, competitors, analysts, and investors. Therefore, volatility in advertising expenditures may convey information not only about internal resource allocation, but also about the consistency of the firm's strategic commitment to brand building.

Using a comprehensive panel of publicly listed firms in the Korean capital market from 2012 to 2023, this study provides several important findings. First, the unconditional relationship between advertising expenditure volatility and future firm value is negative in direction but not consistently significant. This indicates that advertising volatility, by itself, does not uniformly reduce firm value across the full sample. However, when ESG performance is incorporated as a moderating variable, a clearer conditional pattern emerges. Advertising expenditure volatility is significantly negatively associated with future firm value among low-ESG firms. This suggests that, when firms lack strong ESG credibility, unstable advertising expenditures may be interpreted by investors

as a signal of strategic inconsistency, weak brand commitment, short-termism, or uncertainty about future cash flows.

Second, this study finds that ESG performance significantly attenuates the negative valuation effect of advertising expenditure volatility. The interaction between advertising volatility and high ESG performance is positive and statistically significant, indicating that the adverse effect of advertising volatility is weaker for firms with superior ESG ratings. This result suggests that ESG performance functions as a credibility-enhancing mechanism. Rather than directly increasing firm value in all circumstances, ESG appears to shape how investors interpret ambiguous corporate behavior. In high-ESG firms, advertising volatility may be perceived less as a signal of instability and more as a flexible strategic response within a credible long-term orientation.

Third, the ESG pillar analysis shows that the moderating effect of ESG is not uniform across its three dimensions. The Social and Governance pillars significantly mitigate the negative valuation effect of advertising expenditure volatility, whereas the Environmental pillar does not show a statistically significant moderating effect. This finding suggests that investors place particular weight on stakeholder trust, reputational capital, managerial discipline, and governance credibility when evaluating the implications of volatile adver-

tising expenditures. Since advertising is a market-facing activity, Social performance may help investors view advertising volatility as less damaging to stakeholder relationships and brand commitment. Similarly, strong Governance performance may reassure investors that volatile advertising decisions are made within a disciplined and well-monitored decision-making structure.

Fourth, the additional analyses show that the moderating effect of ESG depends on firms' financial and informational contexts. The buffering role of ESG is more evident among firms with lower net debt positions, suggesting that ESG signals are more effective when firms possess sufficient financial flexibility. In contrast, among highly indebted firms, financial risk appears to dominate investor interpretation, thereby weakening the credibility-enhancing role of ESG. The analysis based on advertising expansion also indicates that ESG is particularly relevant when firms do not increase advertising expenditures. In such cases, advertising volatility is more likely to be interpreted as instability or inconsistency, and ESG performance helps alleviate this negative interpretation. In addition, the auditor-size analysis shows that Governance performance plays a particularly important role among firms audited by non-Big 4 auditors, suggesting that internal governance quality may partially substitute for weaker external monitoring.

The findings should not be interpreted as evidence that advertising expenditure volatility universally reduces firm value across all firms. Rather, the results indicate that the valuation effect of advertising volatility is conditional on ESG performance. The full-sample main-effect models provide only limited support for Hypothesis 1, as the unconditional association between advertising volatility and future Tobin's Q is not statistically significant. However, once ESG performance is considered as a moderating condition, advertising volatility is negatively valued primarily among low-ESG firms, while this negative association is significantly attenuated among high-ESG firms. This pattern suggests that ESG performance shapes the interpretive frame through which investors evaluate unstable marketing investment behavior.

This study offers several theoretical implications. First, it contributes to the marketing-finance literature by introducing advertising expenditure volatility as a distinct dimension of marketing investment risk. Existing studies have largely focused on the amount or persistence of advertising expenditures. This study extends that literature by showing that the stability of advertising investment also carries value-relevant information. Second, this study contributes to the ESG literature by demonstrating that ESG performance can operate as an interpretive mechanism. The value of ESG lies not

only in its direct association with firm performance, but also in its ability to influence how capital markets interpret uncertain or ambiguous strategic decisions. Third, this study connects marketing investment behavior and ESG signaling by showing that stakeholder credibility can affect the market's evaluation of volatile marketing activities.

The findings also provide practical implications for managers. Managers should recognize that unstable advertising spending can be penalized by capital markets, especially when the firm lacks strong ESG credibility. Therefore, firms should manage advertising budgets not only from the perspective of short-term sales generation, but also as part of a broader strategic communication process with investors and stakeholders. At the same time, the results suggest that firms with strong ESG performance may have greater strategic flexibility in adjusting advertising expenditures. ESG engagement can create reputational and credibility capital that helps investors interpret marketing volatility less negatively. However, this does not imply that ESG can fully offset the risks associated with unstable advertising decisions. The effectiveness of ESG as a buffer depends on the firm's financial condition, advertising strategy, and information environment.

This study is subject to several limitations. First, although the empirical design uses next-period Tobin's Q and includes year and

industry fixed effects, the results should be interpreted as conditional associations rather than definitive causal evidence. Future research may employ stronger causal identification strategies, such as quasi-natural experiments, regulatory shocks, or instrumental variable designs. Second, this study measures advertising expenditure volatility using accounting-based advertising intensity. Future research could incorporate more granular marketing data, such as digital advertising expenditures, media-channel allocation, campaign-level spending, or consumer engagement metrics. Third, this study focuses on Korean listed firms, where ESG disclosure practices, corporate governance systems, and advertising strategies may differ from those in other institutional settings. Future research could examine whether the findings generalize to other countries or markets. Finally, future studies may further investigate how investor types, analyst coverage, media visibility, or product-market competition shape the valuation consequences of advertising volatility.

In conclusion, this study shows that the market value of advertising investment depends not only on the amount of advertising expenditure, but also on its stability and the credibility context in which it is observed. Advertising expenditure volatility can reduce firm value when investors interpret it as a signal of strategic inconsistency. However,

ESG performance—particularly Social and Governance performance—can mitigate this negative interpretation by enhancing firm credibility and stakeholder trust. These findings highlight the importance of integrating marketing investment strategy with ESG management and provide new evidence on how capital markets evaluate uncertain strategic behavior.

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