

ONLY I CAN DO IT: CEOs' LEVEL OF CONFIDENCE AND MARKETING OUTCOMES

"Not everything you believe that you can achieve, can be achieved but that won't stop you from trying." - Auliq Ice

Purpose:

This study examines how CEO overconfidence shapes strategic marketing decisions, with a focus on advertising and R&D investments under short-term performance pressure. Drawing on upper echelons theory, it tests whether overconfident CEOs engage in myopic marketing management and whether this relationship changes over time. The study also assesses the moderating role of internal organizational factors in this process.

Design/methodology/approach:

The study uses a longitudinal panel covering two periods, 2011–2015 and 2017–2022. The sample includes 485 firm-year observations in the first period and 741 in the second, drawn from publicly traded U.S. firms across multiple industries based on one-digit SIC codes. Key variables include CEO overconfidence, advertising intensity, and R&D intensity. Fixed effects models control for unobserved firm heterogeneity. Additional tests address endogeneity and sample selection bias. This design allows direct comparison of CEO behavior across periods.

Findings:

CEO overconfidence significantly affects marketing investments. In 2011–2015, overconfident CEOs are associated with higher advertising intensity. In 2017–2022, the association turns negative, indicating a shift away from advertising under newer market conditions. R&D intensity shows no stable relationship with CEO overconfidence. Marketing department power weakens the negative advertising effect in the later period.

Originality/value:

The study links executive psychology to marketing resource allocation across time. It shows that the strategic impact of CEO overconfidence is context dependent and changes with the environment. The findings inform research on executive cognition and guide boards and investors in evaluating marketing strategy risk.

Keywords: *CEO overconfidence, upper echelons theory, marketing investment, advertising intensity, R&D intensity, myopic marketing management*

Introduction

In today's competitive landscape, firms face mounting pressure to deliver short-term financial results—often at the expense of long-term strategic investments. This tendency, known as *myopic marketing management*, reflects a persistent prioritization of quarterly performance metrics over marketing activities like advertising and R&D that yield delayed payoffs (Gu 2023; Mizik and Jacobson, 2007; Erickson and Jacobson, 1992). While similar in spirit to Levitt's (1984) concept of marketing myopia, myopic marketing management speaks to a deeper organizational dysfunction: the undervaluation of marketing in executive decision-making (Aaker, 1991; Hauser et al., 1994; Pauwels et al., 2004; Lehmann, 2004; Eriksson, Robertson and Näppä, 2025).

Scholars have long pointed to the declining influence of marketing within the firm, particularly in the boardroom (Verhoef and Leeflang, 2009; Jung and Shegai, 2023). Marketing executives often find themselves overshadowed by CFOs, COOs, and other C-suite officers, resulting in marketing budget cuts and reduced strategic input. Yet, at the heart of these decisions lies the firm's top leadership—most notably, the CEO (Hambrick and Mason, 1984). As the architect of corporate strategy and culture, the CEO's personality traits shape how marketing is perceived, prioritized, and funded (Gala et al., 2024; Gala and Kashmiri, 2022).

Among the most influential psychological traits is overconfidence—a cognitive bias characterized by an inflated sense of personal capability and control over outcomes (Langer, 1975; Malmendier and Tate, 2005; Lee et al., 2023; Saesen et al., 2024). Recent research has increasingly examined the strategic consequences of CEO overconfidence, with several high-impact studies offering new insights into its effects on corporate decisions and performance. For instance, Kraft, Dickler, and Withers (2025) find that overconfident CEOs are more likely to

pursue breakthrough innovations. However, this heightened focus on innovation does not necessarily extend to other forms of long-term investment, such as advertising.

A particularly relevant study by Chung, Low and Rust (2023) bridges the gap between CEO psychology and marketing strategy, showing that highly confident CEOs are *more* likely to engage in myopic marketing management—cutting current marketing spending to boost short-term earnings—because they believe in their ability to compensate for future losses through superior performance elsewhere. This research is among the first to systematically link CEO overconfidence to marketing budget decisions, yet it focuses primarily on the propensity for short-termism, rather than the allocation of marketing resources like advertising and R&D. On other hand, work by Wong and Wang (2018) suggests that overconfident CEOs may overspend on advertising due to inflated expectations of its effectiveness. However, this finding has not been consistently re-examined or contextualized within more recent strategic or market environments.

Despite these advances, literature remains narrow. Most studies, including those by Wong, Lee and Chang (2017), Kubick and Lockhart (2017), Kim and Jang (2021), and Li and Tong (2022), focus overwhelmingly on investment intensity, innovation, risk-taking, or crisis response, rather than on the nuanced allocation of marketing resources. Moreover, limited research has examined whether the influence of CEO overconfidence on marketing decisions changes over time or varies across different strategic and market contexts. For example, while recent studies suggest that overconfident CEOs may advocate for innovation-oriented strategies, there is little evidence on whether this translates into sustained advertising investment or how such behavior evolves in response to changing competitive conditions over time.

This body of research collectively advances our understanding of CEO overconfidence—yet leaves a critical gap. Few studies directly examine how CEO overconfidence shapes the allocation of marketing resources such as advertising and R&D, or whether this relationship is stable or subject to change as external conditions evolve. Building on this gap, we argue that the relationship between CEO overconfidence and marketing investments may not be stable over time but contingent on shifting strategic and market contexts. In particular, the period beginning in 2017 marks a notable transformation in the advertising environment. The rise of digital platforms and algorithm-driven targeting heightened demands for accountability and measurable ROI, while at the same time, growing skepticism emerged around the effectiveness of traditional advertising channels. These changes suggest that overconfident CEOs—who typically favor bold, high-visibility strategies—may have recalibrated their reliance on advertising, redirecting attention toward alternatives such as innovation, acquisitions, or digital transformation initiatives. This possibility motivates our longitudinal design, enabling us to test not only whether overconfidence influences marketing allocation but also whether its effects shift across distinct temporal contexts. Our study directly addresses this gap by analyzing advertising intensity and R&D across two distinct periods (to address the external conditions), providing fresh evidence on how CEO overconfidence influences marketing commitment in an era marked by both myopic pressures and rapid digital transformation.

What is Overconfidence?

Overconfidence is broadly defined as an overestimation of one's abilities and outcomes, especially those related to personal or firm-level success—a phenomenon commonly referred to as the “better-than-average” effect (Langer, 1975). In the strategic management and behavioral finance literature, overconfidence has been linked to overly optimistic assessments of risk,

control, and decision outcomes, often without appropriate calibration (Hilary and Menzly, 2006; Hribar and Yang, 2016, Saesen et al., 2024).

While sometimes used interchangeably with terms like hubris or narcissism, overconfidence is conceptually distinct. Narcissistic leaders are driven by a need for attention, admiration, and ego validation (Schrand and Zechman, 2012; Kraft 2022), whereas overconfident leaders tend to operate under an internalized belief in their own judgment and foresight—even in the absence of supporting evidence (Malmendier and Tate, 2005; Li and Tang, 2010). Although these constructs may coexist, not all overconfident leaders are narcissistic, and their strategic behaviors diverge in important ways (Schrand and Zechman, 2012, Brunzel 2021).

Overconfident CEOs often demonstrate specific behavioral patterns: they overestimate their abilities relative to peers (Harrison and Shaffer, 1994; Weinstein, 1982), show a strong belief in their ability to control uncertain outcomes (Hayward and Hambrick, 1997), and tend to rely on intuition and internal conviction over external feedback (Simon and Houghton, 2003, Shepherd et al., 2024). These characteristics have been empirically linked to increased risk-taking, bold acquisition strategies, and innovation-oriented investments (Brown and Sarma, 2006; Galasso and Simcoe, 2011; Goel and Thakor, 2008, Burkhard et al., 2023).

Yet, the consequences of overconfidence are not uniformly positive. While overconfident CEOs may invest heavily in growth initiatives during stable economic periods, their confidence may also lead to underperformance when contextual dynamics shift. CEO overconfidence has been recognized as a managerial bias that can yield both significant benefits and severe drawbacks for organizations, depending on the broader context. Meta-analytic research demonstrates that overconfident CEOs, on average, deliver higher firm performance, largely by

catalyzing strategic risk-taking and innovative initiatives in stable or expansionary environments (Burkhard et al., 2023). However, the favorable impact of CEO overconfidence is far from universal. During economic downturns or in volatile conditions, the same confidence that spurred innovation can exacerbate underperformance, as overconfident leaders often underestimate risk and overinvest in projects ill-suited to the new environment (Gervais et al., 2011; Malmendier and Tate, 2008; Leng et al., 2021). Such CEOs may sacrifice organizational flexibility, failing to recalibrate strategy or heed corrective feedback, and increase the probability of costly outcomes—including corporate failure and litigation (Banerjee et al., 2018). Furthermore, firms with overconfident CEOs are notably more prone to shareholder lawsuits and regulatory scrutiny, as legal action often follows overly optimistic projections and delayed loss recognition (Banerjee et al., 2018). Collectively, the literature underscores that the effects of CEO overconfidence are highly contingent on both external economic conditions and internal governance systems designed to constrain excessive risk-taking.

Our own findings reflect this nuance: during the 2011–2015 period, overconfident CEOs were positively associated with advertising intensity, consistent with prior research on proactive investment behavior (David et al., 2007; Malmendier and Tate, 2008). However, in the 2017–2022 period, the same trait was associated with reduced advertising intensity—suggesting that overconfident CEOs may have reevaluated advertising’s strategic role in light of changing market expectations, digital fragmentation, or internal innovation priorities.

Despite the growing body of work on CEO personality and strategic outcomes, the marketing domain remains underrepresented. Very few studies explore how CEO-level psychological traits influence marketing resource allocation, particularly in the context of myopic decision-making. Given that overconfident CEOs are likely to cast a strong behavioral

imprint on the firm's priorities, this study asks: How do overconfident CEOs navigate the tension between short-term performance and long-term marketing investment? Do they view marketing expenditures as essential strategic levers—or as dispensable costs? In answering these questions, we extend the application of upper echelons theory (Hambrick and Mason, 1984) and examine how overconfidence as a cognitive trait shapes firm-level marketing decisions across changing economic contexts. Our conceptual framework is illustrated in Figure 1.

[Insert Figure 1 about here]

Using two longitudinal samples spanning 2011–2015 and 2017–2022, we uncover a striking pattern: in the earlier period, CEO overconfidence is positively associated with advertising intensity, consistent with prior findings linking overconfidence to proactive investment behavior (David et al., 2007). Yet in the latter period, this relationship reverses—overconfidence is now negatively associated with advertising intensity, even as other contextual variables remain stable. For clarity, we refer to the 2011–2015 period as the Pre-Transition Period and the 2017–2022 period as the Post-Transition Period throughout the remainder of this study. This terminology reflects our theoretical assumption that 2016 represents a structural break, marking a shift in the strategic and market context under investigation.

This reversal signals a fundamental shift in how overconfidence manifests in strategic behavior. It suggests that while early overconfident CEOs viewed advertising as a tool for signaling market dominance, recent overconfident CEOs may prioritize other internal technologies over traditional marketing investments—particularly in a digital landscape marked by increased measurement demands, stakeholder scrutiny, and macroeconomic uncertainty. To demonstrate this shift, as a post-hoc analysis, we examined whether overconfident CEOs increased their investment in digital orientation in response to shifting trends during that period.

Controlling for all other variables, we found a positive relationship between CEO overconfidence and digital orientation.

Our study makes three contributions. First, it extends upper echelons theory (Hambrick and Mason, 1984) by demonstrating how CEO cognition interacts with shifting environmental norms to shape marketing resource allocation. Second, it introduces a temporal lens to the CEO overconfidence literature, showing how the same trait can produce divergent strategic outcomes across time. Third, it brings renewed attention to the role of the CEO in addressing (or perpetuating) myopic marketing practices.

Theoretical Framework

Upper Echelons Theory

As the central figure in corporate decision-making, the Chief Executive Officer (CEO) plays a pivotal role in shaping strategic outcomes—including how resources are allocated to marketing. This premise is grounded in *Upper Echelons Theory*, introduced by Hambrick and Mason (1984), which argues that organizational outcomes are partially predicted by the characteristics of top executives. The theory rests on two key tenets: (1) executives interpret strategic situations through their own subjective lenses, and (2) these interpretations are shaped by the executives' experiences, values, and psychological traits.

In essence, executives are not perfectly rational actors—they construe firm challenges and opportunities through their “own highly personalized lenses” (Hambrick et al., 2014). Early applications of the theory examined demographic variables such as age, tenure, education, and gender to explain firm outcomes (Carpenter et al., 2004). However, these demographic indicators have been widely recognized as proxies for deeper psychological mechanisms (Lawrence, 1997),

prompting scholars to explore the “black box” of executive psychology (Hiller and Hambrick, 2005).

Subsequent research has linked various CEO personality traits to firm behavior—including narcissism (Chatterjee and Hambrick, 2007), charismatic leadership (Waldman and Yammarino, 1999), integrity (Gala and Kashmiri, 2022); regulatory focus (Kashmiri et al., 2019) and core self-evaluations (Simsek et al., 2010). Building on this work, our study focuses on CEO overconfidence, a psychological trait that has gained increasing attention in strategic and financial domains but remains underexplored in marketing decision-making. Given our findings that the effects of overconfidence on advertising intensity shift over time, this trait may offer new insight into how psychological characteristics interact with external contexts to shape firm strategy.

Psychological Attributes of Overconfidence: Over-Optimism and Miscalibration

Overconfidence is often expressed through two interrelated cognitive tendencies: over-optimism and miscalibration (Skala, 2008; Libby and Rennekamp, 2012; Hribar and Yang, 2016). These mechanisms offer explanatory power for how overconfident CEOs evaluate, fund, and execute strategic initiatives, including marketing investments.

Over-optimism refers to the tendency to overestimate one’s abilities and the likelihood of favorable outcomes (Weinstein, 1982; Fulton and Larson, 2009). In corporate settings, overconfident CEOs often assume that projects they sponsor—such as new campaigns or strategic pivots—will succeed simply because they believe in their vision and capabilities. This bias is reinforced when strategic initiatives originate from internally generated proposals, which often emphasize upside potential while minimizing risk (Lichtenstein et al., 1977). As a result,

overconfident CEOs may view long-term marketing investments, such as advertising or CSR, as strategic levers to assert market leadership—particularly in periods of perceived stability or firm momentum.

Miscalibration, on the other hand, reflects the CEO's tendency to underestimate uncertainty or risk surrounding a given outcome (David et al., 2007; Hribar and Yang, 2016). This leads to overly narrow confidence intervals in decision forecasting, which can distort resource allocation. For instance, a miscalibrated CEO may assume that marketing expenditures will yield predictable results—even in volatile or fast-changing media environments—until experience or external feedback challenges this assumption.

These two dimensions—over-optimism and miscalibration—suggest that overconfident CEOs are more likely to pursue bold, marketing-intensive strategies when they perceive alignment with firm goals and control over the outcome. However, as our study reveals, this pattern may change over time. In earlier years (2011–2015), overconfident CEOs appeared to channel their optimism into advertising spend, consistent with prior findings. In contrast, in more recent years (2017–2022), the same trait was associated with reduced advertising intensity—potentially due to a growing skepticism about marketing's effectiveness or a redirection of resources toward innovation, M&A, or internal platforms.

Taken together, these attributes offer a theoretical foundation for understanding how CEO overconfidence shapes—and reshapes—marketing decision-making across shifting strategic environments. The next section details our empirical approach and tests these ideas using two large-scale panel datasets.

Hypotheses

CEO Overconfidence and Advertising Intensity

Advertising remains one of the most prominent components of a firm's marketing mix. It enhances brand recognition, builds reputation, and can command a price premium even when product features are indistinguishable (Erickson and Jacobson, 1992). Through sustained advertising, firms create strong, enduring brands that drive customer loyalty and long-term profitability (Mela et al., 1997). However, advertising is also expensive, time-consuming, and—perhaps most critically—perceived to deliver uncertain returns (White and Miles, 1996).

Despite its strategic importance, advertising often faces internal resistance. Managers perceive it as risky and wasteful: early studies estimated that up to 90% of advertising fails to meet objectives (Rogers, 1995), and others have noted its potential for unintended backlash if poorly executed (El-Murad and West, 2003). Moreover, advertising is commonly treated as a discretionary cost rather than a long-term investment. Under pressure to meet quarterly earnings targets, many firms reduce or delay advertising to inflate short-term financial results—exemplifying the problem of marketing myopia (Mizik and Jacobson, 2007).

This dynamic raises a compelling question: would a CEO with high confidence interpret advertising differently? Drawing on upper echelons' theory (Hambrick and Mason, 1984), we argue that overconfident CEOs—characterized by over-optimism and miscalibration—are more likely to view advertising as a strategic investment rather than a cost. Due to their over-optimism, these CEOs may overestimate the probability of advertising success and their own ability to drive results. Because of their miscalibration, they may underestimate the risks or uncertainties historically associated with advertising performance (Fulton and Larson, 2009; Weinstein, 1982; Hribar and Yang, 2016).

In earlier periods of our analysis, this perspective appeared to result in higher advertising intensity. However, shifts in the media environment and firm-level strategic priorities suggest that the influence of overconfidence on advertising may be context-dependent. Nonetheless, grounded in the theoretical attributes of overconfident CEOs, we propose:

H1. CEO overconfidence is positively related to the advertising intensity of the firm.

CEO Overconfidence and R&D Intensity

R&D activity often aligns with broader strategic goals driven by market demands, customer preferences, and competitive positioning—factors typically central to marketing decision-making (Gatignon & Xuereb, 1997; Sarin & O'Connor, 2009). While traditionally categorized under operations or product development, R&D investments are often driven by market-oriented goals such as enhancing customer value, differentiating the brand, or responding to unmet consumer demands (Kohli & Jaworski, 1990; Lee, Smith, & Grimm, 2003). In this sense, R&D is not only a technical or engineering activity but also a signal of how firms anticipate and shape market trends, reflecting a proactive market orientation (Narver & Slater, 1990 ; Moorman & Slotegraaf, 1999). From a marketing perspective, R&D outcomes influence brand positioning, customer perceptions of innovativeness, and long-term value creation—making it a consequential output of marketing strategy, especially in firms with a strong market orientation (Jindal & Slotegraaf, 2024, Mizik & Jacobson, 2003, *JM*).

Like advertising, research and development (R&D) is a strategic investment that drives long-term competitive advantage. R&D fosters knowledge accumulation, product innovation, and future growth (Artz et al., 2010). It contributes to the firm's intangible asset base, increasing its valuation over time (Hall, Griliches, and Hausman, 1986). However, R&D also carries

significant short-term costs and delayed, uncertain payoffs—making it a common casualty of short-term financial pressures (Porter and Garman, 1992).

Firms exhibiting myopic behavior often underinvest in R&D, prioritizing immediate returns over strategic development. In such contexts, the role of the CEO becomes vital. An overconfident CEO—one who is inclined to overestimate the value of their decisions and underestimate uncertainty—may approach R&D differently. Their over-optimism could lead them to believe that long-term innovation projects will yield high returns, while miscalibration might cause them to discount the inherent risk or delay in realizing those returns (Libby and Rennekamp, 2012; Skala, 2008).

This cognitive framing helps reduce the perceived risk of R&D, thereby increasing the likelihood of investment. CEOs with high confidence may thus be more willing to fund R&D initiatives, viewing them as high-potential opportunities rather than speculative costs. In this way, overconfidence may act as a psychological buffer against the pressures of short-termism.

Accordingly, we hypothesize:

H2. CEO overconfidence is positively related to the R&D intensity of the firm.

The Moderating Role of Marketing Department Power on CEO Confidence and Marketing Investments

The power of a functional department—such as marketing—is defined as its capacity to influence strategic decision-making within the firm (Hickson et al., 1971; Pfeffer, 1981). When a department is powerful, it can shape organizational priorities, secure resources, and elevate its role in firm-wide strategy. According to organizational theory, one mechanism through which

departmental power exerts influence is by directing the attention of the top management team (TMT) toward the department's goals and expertise (Child, 1997; Delmas and Toffel, 2008).

A powerful marketing department typically possesses greater decision-making authority, cross-functional influence, and access to specialized talent (Perrow, 1970; Feng et al., 2015). This influence allows marketing to collaborate more effectively across departments and secure its seat at the strategic table. As a result, marketing priorities—such as advertising and R&D—are more likely to be integrated into firm strategy (Moorman and Rust, 1999; Webster, 1991).

Advertising, the external-facing function of marketing, is instrumental in building brand equity and customer loyalty. Marketing departments often house advertising experts whose role is to manage this process effectively (Webster, 1991). When marketing wields power, it can ensure sustained investment in advertising—even when other executives may view it as a discretionary or risky expense.

R&D, on the other hand, represents marketing's internal-facing function, focusing on product innovation and alignment with customer needs (Feng et al., 2015; Srinivasan et al., 1997). A powerful marketing function can guide R&D priorities by translating market insights into actionable product design inputs and ensuring that sufficient resources are allocated toward innovation.

Building on the upper echelons' theory, we propose that the influence of CEO overconfidence on marketing investments may be moderated by the power of the marketing department. A highly confident CEO might independently prioritize advertising and R&D, trusting their own intuition and optimism. However, in firms with a strong marketing department, decision-making may be more distributed. In such cases, overconfident CEOs may

delegate authority, while less confident CEOs may be persuaded to invest in marketing due to pressure from a powerful function.

Thus, regardless of the CEO's level of confidence, a powerful marketing department is likely to elevate marketing's strategic importance, reducing the variance in decision-making attributed to CEO traits. As a result, we expect the relationship between CEO overconfidence and marketing investments to weaken when marketing holds more power.

H3a. Marketing department power weakens the positive relationship between CEO overconfidence and advertising intensity.

H3b. Marketing department power weakens the positive relationship between CEO overconfidence and R&D intensity.

Methodology

Sample

To construct the sample, we began with all publicly traded firms listed in the S&P 500. This choice ensures access to reliable, archival data from secondary sources—such as Compustat and Execucomp—on key firm-level variables including size, performance, and governance, thereby reducing the potential threat of common method variance (Short et al., 2010).

For the pre-transition period (2011–2015), we focused on firms whose CEOs were appointed prior to 2010 and remained in their roles through at least the end of 2015. This restriction, following Kashmiri and Mahajan (2015) and Gala and Kashmiri (2022), ensured that any observed firm-level strategic outcomes could be attributed to the same CEO's influence rather than a leadership transition. We started with roughly 2,000 firm-year observations. After excluding firms with CEO turnover during the study window and dropping cases with missing values on key variables, the final sample included 485 firm-year observations, representing 242

unique firms.. These firms spanned a broad cross-section of industries, with representation across all major 1-digit SIC codes (1 through 9), supporting generalizability across sectors. For the post transition analysis (2017–2022), a similar sampling approach was used. We began with firms in the S&P 500 and restricted the sample to those whose CEOs were appointed prior to 2016 and remained in their roles through at least the end of 2022. This dataset was approximately 3,000 firm-year observations, after applying all filters and excluding cases with missing data on key variables, the final sample for the post-transition period (2017–2022) consisted of 213 unique firms and 741 firm-year observations. We retained firms from the original list that continued to have consistent CEO leadership across this second time window. This allows us to observe whether the relationships between CEO overconfidence and strategic outcomes remained stable or evolved over time. Again, we ensured a diverse industrial representation using SIC codes, and we maintained consistency in variable construction, estimation techniques, and model specifications to facilitate direct comparisons between Pre-Transition and Post-Transition period findings. To provide greater transparency, Appendix B reports the industry distribution of firm-year observations across both periods. As shown, all 1-digit SIC codes are represented, with manufacturing, services, and finance comprising the largest shares. This confirms that our findings are not driven by any single sector and are broadly generalizable across industries.

Rationale for Temporal Sample Separation and Exclusion of 2016

We employ two separate longitudinal samples (2011–2015 and 2017–2022) rather than combining them into a single continuous dataset for both conceptual and methodological reasons. Conceptually, our study aims to examine whether the relationship between CEO overconfidence and advertising intensity is temporally robust or contextually shifting. A pooled analysis could obscure evolving dynamics over time, particularly in response to changing macro-

environmental factors (e.g., digital transformation, economic shocks, shifts in consumer behavior) that may alter how overconfident CEOs perceive and allocate marketing resources (Byun and Yoo 2025; Mizik & Jacobson, 2003). Splitting the data allows us to capture potential temporal inflection points in strategic decision-making, which would otherwise be masked in a single aggregated analysis (Bergh & Fairbank, 2002; Bergh, 1995).

Methodologically, we exclude the year 2016 as a deliberate buffer to separate the two periods. This approach is consistent with recommendations in longitudinal research to address potential structural breaks caused by exogenous shocks or inflection points that could otherwise bias inferences about temporal patterns (Helfat & Eisenhardt, 2004). The year 2016 represents a potential structural break due to global and industry-specific events—including Brexit, the U.S. presidential election, and significant advances in digital advertising technologies—that could influence CEO decision-making. Treating 2016 as a transition year mitigates the risk of contamination or carry-over effects between the two periods and enhances the internal validity of our comparative analysis (Hamilton & Nickerson, 2003).

We refer to the period following 2016 as the Post-Transition Period, reflecting the confluence of multiple shifts in the strategic environment. First, this was a digital transition, as programmatic advertising, platform concentration (Google, Facebook), and algorithmic targeting reshaped how advertising was evaluated and executed. Second, it was an economic and political transition, marked by Brexit, the U.S. election, and heightened volatility, which increased executive sensitivity to risk and investor scrutiny. Third, it was a governance transition, as institutional investors and boards demanded greater accountability and measurable ROI from discretionary expenditures such as advertising. Together, these shifts redefined the strategic calculus of

overconfident CEOs, making advertising appear less attractive as a dominant lever for signaling and growth.

Moreover, keeping the samples distinct strengthens the temporal inference about a reversal in the CEO overconfidence–advertising intensity relationship. By demonstrating that this relationship flips direction between the two timeframes while contextual controls remain stable, we provide more robust evidence of a shifting strategic logic rather than a spurious statistical artifact, aligning with calls for greater attention to temporal heterogeneity in strategic leadership research (Quigley & Hambrick, 2015).

Data Sources and Measures

Data was collected annually from 2011 to 2015 and from 2017 to 2022. Table 1 lists all the variables that were used in the analyses, along with their definitions and sources.

[Insert Table 1 about here]

Measure of CEO Level of Confidence

Multiple methods have been used to measure the level of confidence of a CEO, including the stock options, press measures for overconfidence as well as CEO pay. Till date the method which uses stock options has been the most used measure for determining the confidence level of the CEO. We used unexercised exercisable stock options (Malmendier and Tate 2005) to measure confidence level of CEO¹.

¹ While our behavioral measure of CEO overconfidence (i.e., unexercised in-the-money stock options) is well-established in the literature (e.g., Malmendier & Tate, 2005; Lee et al., 2023), we recognize it may reflect confidence in firm performance rather than the CEO's intrinsic personality trait. As such, the measure may align more with contextual or strategic optimism than with stable psychological overconfidence.

Considered as a reliable resource for compensation, the Execucomp of WRDS was used to measure the level of confidence of the CEO. As per the definition, a CEO is high on confidence when he retains in-the-money options that are vested (Banerjee, Jenner, and Nanda 2015; Malmendier and Tate 2008). On the other hand, the under confident CEOs exercise the stock options well before expiration due to the risk involved in keeping them (Carpenter 1998; Hall and Murphy 2002). Thus, holding vested in-the-money options represents a degree of high confidence (see e.g., Malmendier and Tate 2005). Following Banerjee, Jenner, and Nanda (2015), the total value per option was obtained by dividing the value of all unexercised exercisable options (Execucomp item: opt unex exer est val) by the number of options (Execucomp item: opt unex exer num). This value per options were then scaled by the price of that stock at the end of the fiscal year as reported in Compustat (item: prcc_f).

Measure of Dependent Variables

a. Advertising Intensity: Firms' advertising intensity was calculated as a percentage of their total assets $[(\text{Advertising expenditure}/\text{Total assets}) * 100]$. Firms with missing data was coded as 0 (Kashmiri and Mahajan 2015). Compustat was used as a source to measure these values for advertising intensity – Advertising Expenditure (XAD) and total assets (AT).

b. R&D Intensity: Firms' R&D intensity was calculated as a percentage of their total assets $[(\text{R\&D expenditure}/\text{Total assets}) * 100]$. Firms with missing data was coded as 0 (Kashmiri and Mahajan 2015). Compustat was used as a source to measure these values for R&D intensity – R&D Expenditure (XRD) and total assets (AT).

[Insert Table 2 here]

Measure of Moderator - Marketing Power in the firm

Following Feng et al. (2015), marketing power was a result of the following five indicants for each firm-year: “(1) the number of TMT members with marketing titles as a proportion of the total number of TMT executives, (2) a dummy variable indicating whether a marketing executive was mentioned among the top-5 most highly compensated TMT members in the firm’s proxy statement, (3) the hierarchical level of the highest-level marketing executive in the TMT, where president was recorded as 6, executive vice president as 5, senior vice president as 4, vice president as 3, other as 2, and no marketing executives as 1, (4) the cumulative hierarchical level of all the marketing executives in the firm’s TMT, and (5) the number of responsibilities reflected in marketing TMT executives’ job titles. These five indicants were then combined using principal component factor analysis loading onto a single factor. The saved Bartlett factor score was rescaled between 1 and 100 and used as an alternative measure of marketing department power in each firm-year. Source: DEF-14A proxies; 10-Ks; Firm website.”

This measure of marketing power has been validated in prior research. Feng, Morgan, and Rego (2015) developed and demonstrated the robustness of this construct, showing that it reliably captures the influence of the marketing function on firm-level strategy and performance. Their results provide evidence of both convergent and predictive validity across a wide range of industries. Moreover, subsequent studies (e.g., Nath & Mahajan, 2008; Verhoef & Leeflang, 2009) have adopted similar approaches, reinforcing the measure’s credibility as an indicator of marketing’s structural power within the firm. By aligning with this established literature, we ensure that our operationalization of marketing power accurately reflects its strategic role in organizational decision-making.

Regression models

Model of firms' advertising and R&D intensity.

Advertising and R&D both being continuous variables and measured across years, the study used a GLS fixed effects regression² to model firms' advertising and R&D intensity and employed the following equations:

$$(1) \text{ Advertising intensity}_{it} = \delta_0 + \delta_1(\text{CEO's Level of Confidence})_i + \delta_{2-8}(\text{Control variables})_{it} + \delta_{9-17}(\text{One-digit SIC code})_i + \alpha_i + \varepsilon_{it} ,$$

$$(2) \text{ R\&D intensity}_{it} = \delta_0 + \delta_1(\text{CEO's Level of Confidence})_i + \delta_{2-8}(\text{Control variables})_{it} + \delta_{9-17}(\text{One-digit SIC code})_i + \alpha_i + \varepsilon_{it} ,$$

where i and t represent the firm i and the year t , respectively; $\delta_0, \dots, \delta_{18}$ are the regression coefficients and α_i and ε_{it} were unobserved randomly distributed error terms.

Advertising intensity, R&D intensity, and CEO's Level of Confidence were measured as discussed in previous section; Control variables (besides industry dummies) include firm age, firm size, globalization, CEO gender, and leverage, CEO age and CEO tenure. Table 1 explains how each control variable was measured.

We controlled firm age and firm size since both were found to be negatively correlated with the degree of confidence the CEO shows in making decisions (Serolin 2023). We controlled the CEO age as past studies have found that older managers are less confident than young managers in terms of decision making (Taylor 1975). CEO gender was controlled for because research has found males to be more confident than females (Gala et al., 2024). We also controlled CEO tenure since longer tenure has been associated with greater confidence (Schrand and Zechman 2012; Milevoj et al., 2021). Furthermore, globalization was controlled for, since

² Hausman Test was used to check if Random and Fixed effects to be used. Results were significant, hence fixed effects regression.

more global firms, due to their need for customizing advertising based on country (globalization) or industry are expected to have higher advertising intensities (Kashmiri and Mahajan 2015). Leverage was controlled because past studies have shown that CEO characteristic of high confidence causes them to reduce leverage (Malmendier et al. 2005; Strebulaev and Yang 2013; Pratt et al., 2023). Industry type was controlled for since; some industries advertise more than others or do more R&D than others. For example: manufacturing industries may have more R&D than food and beverage industries.

Analysis and Results

Pre-transition period T1

[Insert Table 3A about here]

Mean, standard deviations and inter-correlations for the observed variables are noted in Table 3A for pre-transition period. None of the correlations were greater than 0.5, thus suggesting no multicollinearity problems. To confirm this further, we ran some more diagnostics like variation inflation factors (VIF) and conditional indices (CI). VIF measures the degree to which multicollinearity is present between two variables. The model variance inflation factors were smaller than the benchmark of 10. Similarly, conditional indices examine multicollinearity between a combination of variables unlike VIF and correlation which measure multicollinearity between two variables. In the study sample, condition indices associated with the eigenvalues were less than the benchmark of 30. Thus, consistent with Kennedy (2003), the multicollinearity problems were not a concern for the data.

Since the sample was panel data over 2 years and 485 firms, we addressed certain estimation issues before starting the analysis. First, the stationarity of the outcome variables was

examined, as non-stationarity can result in biased estimates (Cuthbertson and Gasparro 1995). A panel unit root test was run for each outcome variable and all the results were significant, suggesting that the outcomes were stationary. Second, Hausman test (1978) was run to verify the use of random or fixed effects for regression analysis. Since the results of this test were significant ($p < 0.05$), the use of random effects treatment was not justifiable. Thus, fixed effects panel model was used to perform the analysis.

[Insert Table 4 about here]

Table 4 presents the individual models run only with control variables, wherein Model A was run with Advertising Intensity as the outcome, Model B with R&D as the outcome, at pre transition period T1.

[Insert Table 5 about here]

Table 5 shows the results of the main effects of CEO level of confidence on the outcomes. As expected, the higher the level of confidence the more the firm is likely to invest in advertising expenditures ($\beta = 1.83$, $p < 0.001$), thus supporting H1. Although the study expected the positive impact of level of confidence on R&D intensity, we could not find support for it ($\beta = -0.75$, ns). Thus, no support was found for H2.

[Insert Table 6 about here]

Table 6 demonstrates the impact of high marketing power and its interaction with CEO confidence on various outcomes. As expected, marketing power had a positive significant impact on advertising intensity in the firm ($\beta = 0.14$, $p < 0.1$). Similarly, the marketing power significantly weakened the relationship between CEO level of confidence and advertising ($\beta = -0.10$, $p < 0.1$), thus, supporting, H3a. We could not find support for H3b ($p = ns$). This may be

because although marketing does have a say in advertising investment, R&D expenditures decision making is based on multiple departments along with marketing.

Post Transaction Period T2

[Insert Table 3B about here]

Descriptive statistics, including means, standard deviations, and inter-correlations for the study variables, are presented in Table 3B for post-transition period. No pairwise correlations exceeded 0.50, indicating that multicollinearity was not a concern. Additional diagnostics—including Variance Inflation Factors (VIFs) and Condition Indices (CIs) confirmed this assessment, with all VIF values below 10 and CIs below 30 (Kennedy, 2003).

Given the panel data structure across 741 firms from 2017 to 2022, we addressed several estimation issues. Panel unit root tests confirmed stationarity for all outcome variables (Cuthbertson and Gasparro, 1995; Fang et al., 2008). A Hausman test (Hausman, 1978) supported the use of fixed effects over random effects ($p < 0.05$), and thus all models were estimated using a fixed effects approach.

Table 4 reports baseline models estimated using control variables only. Model C focuses on advertising intensity, and Model D examines R&D intensity for post transition period T2.

Table 5, Model C and D presents the main effects of CEO overconfidence on advertising and R&D intensity for post-transition period. Compared to pre transition period results, CEO overconfidence exhibits a significant negative association with advertising intensity ($\beta = -4.2715, p = 0.003$). This supports the observed shift in CEO behavior: rather than investing aggressively in advertising, overconfident CEOs during this period appear to pull back—due to

skepticism about advertising ROI, digital complexity, or a stronger preference for alternative signaling strategies like innovation or M&A.

For R&D intensity, CEO overconfidence does not have a statistically significant effect ($\beta = 1.2725, p = 0.715$), providing no support for H2. This suggests that R&D investment decisions may no longer be meaningfully influenced by CEO confidence levels, potentially due to increased scrutiny or shared governance across functional areas.

Table 6, model C and D introduces the interaction effect between CEO overconfidence and marketing power on advertising and R&D intensity, in T2. For advertising, the interaction term is positive and significant ($\beta = 0.5024, p = 0.019$), indicating that customer-oriented firms moderate the negative impact of CEO overconfidence on advertising spend. This suggests that a strong marketing power may help overconfident CEOs recalibrate their strategic decisions and recognize advertising's continued value in customer acquisition and engagement.

For R&D intensity, however, the interaction term was not statistically significant ($\beta = 0.2569, p = 0.412$), offering no support for a moderating effect. As with the main effects, this reinforces the view that R&D decisions are shaped by broader cross-functional collaboration, limiting the influence of both CEO psychology and customer-centric strategies.

Taken together, the post transition period T2 results reinforce the evolving role of CEO overconfidence in shaping marketing investments. While advertising appears increasingly deprioritized by overconfident leaders, this tendency can be softened when firms maintain a strong orientation toward customers, via marketing power. In contrast, R&D investment appears more resilient to psychological influences, pointing to a broader diffusion of decision authority.

Post-hoc Analyses

As a post-hoc analysis, we examined whether CEO overconfidence is positively associated with firms' digital orientation—reflecting how executives allocate strategic attention in response to increasing digitalization. We measured digital orientation using content analysis of shareholder letters, following Short et al. (2010), wherein we applied the targeted word list developed by Kindermann et al. (2021) to identify four core dimensions: digital architecture configuration, organizational digital capabilities, coordination within digital ecosystems, and the scope of digital technologies. The frequency of these keywords was normalized to every 500 words using DICTION software. This approach captures how firms narrate and prioritize digital initiatives in communications directed at stakeholders. Controlling for firm size, age, globalization, leverage, CEO tenure, gender, age, industry (SIC) and year fixed effects, and selection bias (IMR), we found a significant positive effect of CEO overconfidence on digital orientation ($\beta = 95.116$, $SE = 40.954$). Although the model explains a modest amount of variance ($Adj-R^2 = 0.0012$), the result suggests that overconfident CEOs are more likely to emphasize and potentially invest in digital transformation. We have demonstrated these results in Appendix A. Given the exploratory nature of this finding, further research is warranted. We are currently investigating this relationship in greater depth as the foundation for a forthcoming study.

Additional Analyses

Addressing Endogeneity Concerns

To address potential endogeneity in the relationship between CEO overconfidence and firm marketing outcomes, we employed a control function approach. Specifically, we first modeled CEO overconfidence as a function of industry-level norms and relevant firm-level covariates, including the presence of a Chief Marketing Officer, advertising and R&D intensity, CEO and firm demographics, and external contextual factors. In the first stage we regress CEO

overconfidence on a set of industry-level and firm-level predictors. At the industry level, we include the average CEO overconfidence at the 2-digit SIC level, capturing normative expectations within industries (following Malmendier & Tate, 2005). At the firm level, we include firm size (log of assets), firm age (years since listing), leverage, globalization, CEO tenure, CEO age, CEO gender, and presence of a CMO. Year and industry fixed effects are also incorporated. These predictors reflect structural and governance-related factors that may shape CEO decision-making and the likelihood of exhibiting overconfidence, while remaining exogenous to the firm's contemporaneous advertising or R&D allocations. The residuals from this first stage represent the firm-specific deviation in CEO overconfidence unexplained by these covariates, which we then include in the second-stage regressions to correct for potential endogeneity.

This method helps correct for bias stemming from unobserved, time-varying firm characteristics that could simultaneously influence both the CEO's psychological traits and marketing investments. Following the guidance of Petrin and Train (2010) and Wooldridge (2015), incorporating the residuals allows for more robust estimation by isolating the exogenous component of overconfidence. This approach enhances our confidence in making causal inferences about the influence of CEO overconfidence on advertising and R&D intensity.

Controlling for Sampling Bias

Because our sample focused on firms with sustained CEO leadership, there was a risk that sample selection bias might influence our results if CEO stability was systematically related to firm outcomes.

To mitigate this concern, we used a two-stage Heckman selection model. In the first stage, we constructed a broader comparison group of firms from the same time period and estimated the probability of inclusion in our final sample using key firm-level characteristics and industry controls. We estimate a probit where the dependent variable equals 1 if a firm-year is included in our final analysis panel and 0 otherwise, using the broader set of S&P 500 firm-years in each period as the comparison pool. Predictors include firm size (log total assets), firm age (years since listing), performance (ROA), and industry and year fixed effects. From this model, we derived the inverse mills ratio, which was then included as a control variable in all second-stage regressions. This correction helps account for potential bias due to non-random sample selection and ensures greater validity of the findings.

Discussion

This study examined the role of CEO overconfidence in shaping firm-level investments in advertising and R&D, drawing on upper echelons' theory (Hambrick and Mason, 1984) and psychological theory around overconfidence biases. We investigated this relationship across two distinct time periods (T1: 2011–2015 and T2: 2017–2022) to explore not only the presence of a consistent effect but also potential temporal shifts in how overconfidence manifests in strategic decision-making. Our findings reveal an important and evolving narrative around CEO psychology, organizational context, and marketing strategy.

Reversal in the Overconfidence–Advertising Relationship

The reversal in this relationship we observe can be better understood by recognizing the multifaceted nature of the transition after 2016. Rather than a single event, this period reflects the

intersection of digital transformation, macroeconomic uncertainty, and investor pressures for accountability. Each of these forces challenged the role of advertising as a bold, visible strategic lever—especially for overconfident CEOs—leading to a reallocation of attention and resources toward alternatives such as innovation, M&A, or digital transformation initiatives.

In Time T1 (2011–2015), we found a positive relationship between CEO overconfidence and advertising intensity, aligning with past literature suggesting that overconfident leaders pursue bold, high-visibility investments (Galasso and Simcoe, 2011; Malmendier and Tate, 2005). Advertising, in this context, may have served as a vehicle for signaling firm strength, capturing market attention, and enhancing CEO visibility—particularly in an era when traditional media spending still dominated brand-building strategies.

However, in Time T2 (2017–2022), this relationship reversed, with CEO overconfidence now negatively associated with advertising intensity. This striking shift suggests a deeper transformation in the strategic calculus of overconfident leaders. Several contextual factors may explain this change. First, the advertising landscape has undergone significant disruption during the latter time period. With the rise of digital platforms, algorithm-driven content delivery, and heightened ROI scrutiny, traditional advertising is no longer perceived as the dominant or most effective growth lever. Overconfident CEOs—typically relying on intuition and grand strategic bets—may now view advertising as less impactful or insufficiently bold in comparison to pursuits such as M&A, platform expansion, or technological innovation.

Second, rising stakeholder pressures and increasing demands for accountability from investors and boards may have constrained the free rein previously enjoyed by overconfident CEOs. As advertising budgets are often viewed as discretionary and prone to inefficiency (Vakratsas and Ambler, 1999), overconfident leaders might now redirect resources toward areas

they perceive as offering clearer or more innovative strategic returns. These findings suggest that the behavioral expression of overconfidence is context-sensitive, evolving with changes in market norms, media effectiveness, and performance expectations.

The Overconfidence–R&D Relationship

Interestingly, the relationship between CEO overconfidence and R&D intensity remained statistically non-significant in Time T2, consistent with mixed or marginal results observed in Time T1. This may reflect the complex, cross-functional nature of R&D decision making. Unlike advertising, which is often led by the marketing function, R&D typically involves collaboration across marketing, technology, operations, and finance. The dilution of CEO influence in such multi-stakeholder environments may limit the observable impact of individual psychological traits.

Another plausible explanation is the increasing standardization and formalization of R&D processes in large firms. Overconfident CEOs may have less discretion in significantly altering R&D budgets unless such initiatives align with broader innovation pipelines or board-approved strategic agendas. As such, R&D may be less susceptible to the idiosyncratic behavior of any single executive, even one exhibiting strong psychological biases.

Moderating Role of marketing power

Our interaction analyses provide further nuance. Across both time periods, and especially in Time T2, we found that marketing power significantly moderates the relationship between CEO overconfidence and advertising intensity. Specifically, in firms with high marketing power, the negative effect of CEO overconfidence on advertising intensity is attenuated. This finding

aligns with theory suggesting that organizational culture and strategic orientation can shape, constrain, or amplify the influence of top executives (Hambrick, 2007).

Firms with high marketing power are structurally and culturally more attuned to market signals, consumer needs, and external brand perception. In such environments, overconfident CEOs may be persuaded—or socially constrained—to maintain or even support advertising investments, despite their personal biases or preferences. This suggests a balancing mechanism within the organization: when the firm is strongly externally focused, even psychologically dominant leaders must recalibrate their decisions to align with the firm's market-facing priorities.

The non-significant interaction between overconfidence and marketing power for R&D again supports the view that R&D decisions are more decentralized and less influenced by cultural alignment alone.

Implications

Theoretical Implications

Temporal shifts in executive influence: a contingency extension to upper echelons theory

Our study makes a critical contribution to upper echelons theory (Hambrick & Mason, 1984) by showing that the influence of CEO overconfidence on firm-level marketing decisions is not temporally stable. While prior research has emphasized the assertive and risk-taking behavior of overconfident CEOs—often associated with bold investments such as advertising and innovation (Malmendier & Tate, 2005; Hirshleifer et al., 2012)—our longitudinal design reveals a reversal over time. In the earlier window (T1: 2011–2015), overconfidence was positively associated with advertising intensity. However, in the later period (T2: 2017–2022), the relationship turned

significantly negative. This suggests that strategic manifestations of CEO traits are contingent on the evolving institutional, digital, and economic contexts, echoing Hambrick (2007)'s call for contingency-based extensions of executive effects.

Elevating marketing power as a moderating construct in strategic leadership

While marketing has often been underrepresented in strategic decision-making literature (Verhoef & Leeflang, 2009), this study repositions marketing department power as a critical structural moderator of CEO behavior. Our findings show that when marketing holds greater influence within the firm, it can counterbalance the effects of CEO overconfidence, particularly on advertising intensity. This insight complements the work of Feng, Morgan, and Rego (2015), who demonstrated that marketing department power influences firm performance by increasing marketing's strategic visibility. Here, we show that power not only shapes outcomes but serves as a cognitive and strategic check on psychologically dominant executives, enriching cross-disciplinary theories of power and behavioral governance (Pfeffer, 1981; Child, 1997).

Rethinking functional roles in decision bias mitigation

Our findings suggest that not all firm functions are equally effective at mitigating CEO bias. While marketing power moderated the overconfidence–advertising relationship, it did not significantly moderate the link between overconfidence and R&D intensity. This points to an important theoretical distinction: functional department power may be domain-specific in its ability to constrain top executives. Advertising is traditionally housed within marketing and thus more susceptible to departmental checks, whereas R&D often involves collaboration across multiple departments (e.g., operations, engineering), making it less sensitive to marketing's influence. This invites future research to investigate which functional powers are most effective in attenuating executive biases—and under what conditions (Homburg et al., 2015).

Managerial Implications

CEO psychological traits must be interpreted in light of firm structure

Our results underscore that the impact of CEO overconfidence is not automatic; rather, its strategic consequences depend on organizational context—specifically, the internal power dynamics among functional departments. Boards and senior leaders must recognize that firm structure can amplify or temper executive-level biases. Building formal mechanisms that elevate the voice of marketing in firm-level decisions—such as involving CMOs in strategy councils or increasing cross-functional integration—can safeguard against strategic myopia or erratic underinvestment.

Marketing leaders must assert structural influence—not just expertise

The findings offer an important lesson for CMOs and marketing departments: strategic influence requires organizational power, not just functional competence. Overconfident CEOs, especially in today's risk-averse, data-driven climate, may deprioritize traditional advertising without internal resistance. When marketing lacks political capital, these leaders can redirect resources toward pet projects or short-term wins. Marketing leaders should therefore invest in building legitimacy, demonstrating ROI, and aligning with broader firm goals to earn a seat at the strategic table (Nath & Mahajan, 2008).

Advertising strategy is becoming vulnerable without structural protection

Most notably, this study shows that advertising intensity is increasingly at risk in firms led by overconfident CEOs, particularly in periods of market disruption or digital transition. This highlights a strategic vulnerability: advertising, as a discretionary and visible investment, is easily deprioritized when power is centralized in a psychologically dominant CEO without counterbalancing functional input. Organizations that value brand equity and long-term customer

relationships should ensure sufficient institutional safeguards for marketing input, especially under dominant leadership styles.

Limitations and Future Research Directions

Despite offering valuable insights into the dynamic relationship between CEO overconfidence and firm-level marketing decisions, this study has several limitations that should be acknowledged and addressed in future research. Our first limitation relates to our operationalization of CEO overconfidence. While we adopt the widely used approach of measuring overconfidence through CEOs' retention of in-the-money stock options (Malmendier & Tate, 2005), this metric reflects a behavioral manifestation rather than a direct psychological assessment. As such, option-holding may also be influenced by alternative factors such as tax considerations, insider trading regulations, or firm-specific compensation practices (Banerjee, Jenner, & Nanda, 2015). This raises the possibility that our measure partially captures institutional or structural conditions rather than pure cognitive bias. Although prior research has validated this proxy as a reasonable indicator of CEO overconfidence, we caution against interpreting it as a one-to-one mapping of trait-level overconfidence. Future research could triangulate this construct by supplementing option-based measures with textual analysis of CEO communications (e.g., shareholder letters), psychometric profiling, or media-based indicators to better isolate psychological attributes from structural determinants.

Our models, while comprehensive, included a selected set of control variables such as CEO tenure, firm age, firm size, globalization, environmental dynamism, leverage, gender, and year/industry fixed effects. However, other CEO-level characteristics—such as educational background, compensation structure, or prior industry experience—may also influence advertising or R&D decisions (Chatterjee & Hambrick, 2007). Similarly, board characteristics

(e.g., independence, diversity), firm-level risk posture, or digital maturity were not included, which may confound or interact with CEO traits. Another limitation of this study is the operationalization of our dependent variables, advertising and R&D intensity. Following prior work (e.g., Kashmiri & Mahajan, 2015), we coded missing values as zero, assuming that non-reporting reflects negligible or no expenditure. However, reporting practices vary considerably across firms, and in some cases these expenditures may be aggregated under broader categories, potentially introducing measurement error—particularly for advertising, where underreporting is more common. While this approach is consistent with established practice, it may underestimate true expenditures for some firms. Ideally, robustness checks using alternative denominators (e.g., advertising-to-sales or R&D-to-sales ratios) or alternative imputation methods would strengthen validity, but data constraints prevented us from implementing these. We therefore encourage future research to replicate and extend our analysis with multiple operationalizations and additional data sources. A further limitation stems from the potential for survivorship bias in our sample. By restricting the analysis to firms that remained in the S&P 500 across the study window, our design emphasizes larger and more resilient firms while excluding those that exited the index due to decline, acquisition, or failure. This approach may underestimate the negative consequences of CEO overconfidence, particularly in cases where overconfident decision-making contributed to firm underperformance or exit. As such, our findings may best be interpreted as reflecting the dynamics of stable, publicly visible firms, rather than the broader population of firms subject to CEO psychological influences. Future research could address this by incorporating firms that entered and exited the S&P 500, or by examining smaller, more vulnerable firms where the consequences of CEO overconfidence may be more pronounced.

To address endogeneity, we used the average overconfidence of CEOs within 2-digit SIC industries as an instrument in a control function approach. While this method meets the standard criteria for instrument validity, it assumes industry-level homogeneity in CEO traits, which may not hold across highly diversified firms. Additionally, SIC codes may not fully account for nuanced differences in strategic norms, regulatory pressures, or digital adoption rates across industries. Our dependent variables focused on investment intensity—advertising intensity and R&D spending—but did not distinguish between types of advertising (e.g., digital vs. traditional) or R&D (e.g., product vs. process innovation). Overconfident CEOs may exhibit preferences toward high-profile or disruptive initiatives, which could be masked by aggregate spending measures. Future research could leverage textual analysis or project-level data to unpack these distinctions. The contrast in findings between Pre-Transition (2011–2015) and Post-Transition period (2017–2022) suggests a meaningful shift in CEO behavior over time. However, we cannot fully disentangle whether these changes stem from evolving market norms, regulatory pressures, stakeholder demands, or post-COVID strategic shifts. While the temporal design enhances theoretical richness, it also embeds the findings within a specific socio-economic window, limiting generalizability across different periods or geographies.

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Figure 1

FRAMEWORK OF THE LINK BETWEEN CEOs' OVERCONFIDENCE, CORPORATE GOVERNANCE AND MARKETING DECISIONS AND OUTCOMES

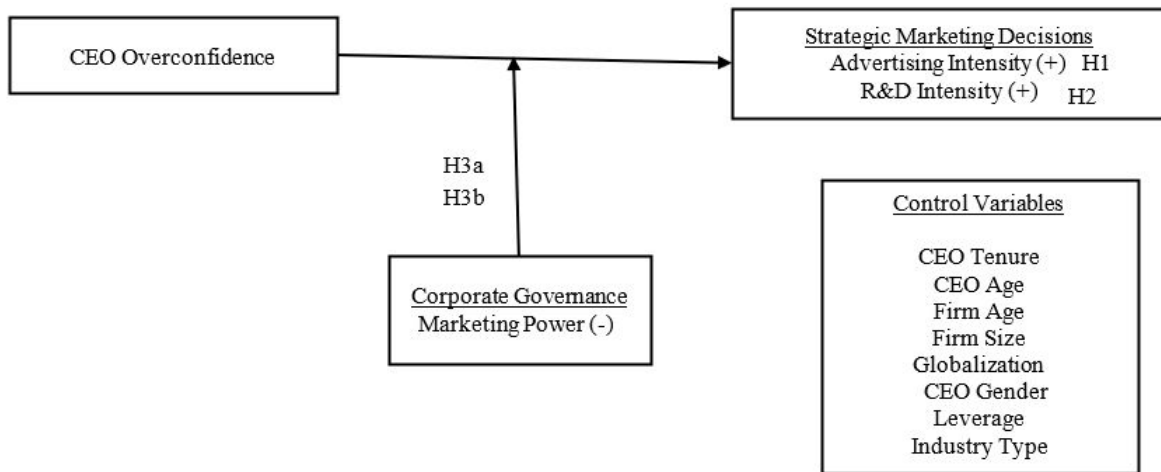


Table 1
VARIABLE DEFINITIONS AND SOURCES

Variable	Definition and Sources
1 CEO's level of confidence	Following Banerjee, Jenner and Nanda (2015), the total value per option of the in-the-money-option was obtained by dividing the value of all unexercised exercisable options (Execucomp item: opt unex exer est val) by the number of options (Execucomp item: opt unex exer num). This value per options is then scaled by the price of that stock at the end of the fiscal year as reported in Compustat (item: prcc f). Source: Compustat
2 Advertising Intensity	Firms' advertising expenditure as a % of their total assets i.e., (Advertising expenditure/Total assets) * 100. Firms with missing data are coded = 0. Source: Compustat.
3 R&D Intensity	Firms' R&D expenditure as a % of their total assets i.e., (R&D expenditure/Total assets) * 100. Firms with missing data are coded = 0. Source: Compustat.
4 Marketing Power	Following Feng, Morgan, and Rego (2015), the following five indicants are recorded for each firm-year: (1) the number of TMT members with marketing titles as a proportion of the total number of TMT executives, (2) a dummy variable indicating whether a marketing executive was mentioned among the top-5 most highly compensated TMT members in the firm's proxy statement, (3) the hierarchical level of the highest-level marketing executive in the TMT, where president was recorded as 6, executive vice president as 5, senior vice president as 4, vice president as 3, other as 2, and no marketing executives as 1, (4) the cumulative hierarchical level of all the marketing executives in the firm's TMT, and (5) the number of responsibilities reflected in marketing TMT executives' job titles. These five indicants were then combined using principal component factor analysis. The five indicants were loaded onto a single factor. The saved Bartlett factor score was rescaled between 1 and 100 and used as an alternative measure of marketing department power in each firm-year. Source: DEF-14A proxies; 10-Ks; Firm website.
5 Firm Age	Natural log of the difference between the year of observation and the firm's founding year. Sources: Firm Proxy; Firm website; Hoovers.
6 Firm Size	Natural log of total employees where total employees is recorded in '000s. Source: Compustat.
7 Globalization	The proportion of firm revenues from outside the U.S. Source: Compustat.
8 CEO Gender	Dummy Variable – 1 if the CEO is a male, 0 otherwise Source: Execucomp
9 Leverage	The ratio of long-term debt to total assets. Source: Compustat
10 CEO Tenure	Total number of years a specific individual has held the CEO position with the company. Source: Proxy Statements.
11 CEO Age	The natural log of the CEO's age. Sources: Execucomp; WRDS GMI Ratings; Hoovers.
12 Industry Type	The first digit of the 4 digits SIC codes for the company. Source: Compustat.

Table 3A: DESCRIPTIVE STATISTICS AND CORRELATION COEFFICIENTS (T1)

	1	2	3	4	5	6	7	8	9	10	11
1 Level of confidence	1										
2 Advertising intensity	0.1287***	1									
3 R&D Intensity	0.0741	-0.0252	1								
4 Marketing power	0.0654	0.0911*	-0.0015	1							
5 Firm Size	0.2276***	0.0725	-0.0521	0.0052	1						
6 Globalization	0.0045	0.0701	0.2749***	-0.0347	-0.0059	1					
7 Firm Age	-0.0352	-0.0553	-0.0821	-0.0739	0.0272	0.172***	1				
8 Leverage	0.0365	-0.0315	-0.1403***	0.0071	-0.0973**	-0.2107***	-0.0785	1			
9 CEO Tenure	0.117**	-0.0556	0.0952*	-0.0722	0.1523***	0.0114	-0.0325	-0.0157	1		
10 CEO Gender	0.0263	-0.0194	0.0364	0.031	-0.0115	-0.0651	-0.0589	0.0034	0.0626	1	
11 CEO Age	0.0292	-0.1859***	-0.1241**	-0.0539	0.0802	-0.0786	0.0918*	-0.0036	0.4404***	-0.005	1
Number of Observations	375	417	417	484	417	373	341	417	448	484	449
Mean	0.458	1.253	1.833	5.613	0.003	0.361	1.41	0.261	11.398	0.98	57.695
Standard Deviation	0.287	3.025	4.01	7.077	0.01	0.497	0.594	0.192	6.516	0.143	6.187

Table 3B: DESCRIPTIVE STATISTICS AND CORRELATION COEFFICIENTS (T2)

	1	2	3	4	5	6	7	8	9	10	11
1 Level of confidence	1										
2 Advertising intensity	-0.0372	1									
3 R&D Intensity	0.0066	0.0043	1								
4 Marketing power	0.0391	-0.0292	0.0051	1							
5 Firm Size	0.2325***	0.1267***	-0.0094	0.0443	1						
6 Globalization	0.037	0.0748**	-0.2416***	-0.034	-0.1237***	1					
7 Firm Age	-0.0375	-0.06*	-0.0548	0.0345	-0.0099	-0.0772	1				
8 Leverage	0.1079***	-0.0145	-0.132***	0.0318	0.0573	0.1198**	-0.0075	1			
9 CEO Tenure	0.0714	0.0334	-0.0615*	-0.0122	0.0843**	0.0416***	0.0281	0.0027	1		
10 CEO Gender	-0.0333	-0.1086***	0.0834**	-0.0597	-0.1181***	-0.158	-0.0021	0.0296	0.0222	1	
11 CEO Age	0.1214***	0.0303	-0.1092***	0.0577	0.2161***	0.0301***	0.1576***	0.0846**	0.2525***	-0.0167	1
Number of Observations	741	741	741	700	735	741	740	588	741	741	741
Mean	0.175	0.658	1.512	7.743	1.865	0.022	76.238	1.764	3.391	0.92	55.569
Standard Deviation	0.38	0.018	0.032	18.848	1.776	0.133	181.462	5.357	1.431	0.273	5.596

Table 4: REGRESSION TABLE FOR IMPACT OF CONTROL VARIABLES ON OUTCOMES

Model	A	B	C	D
Transaction Period	T1	T1	T2	T2
DV	Ad Intensity	R&D Intensity	Ad Intensity	R&D Intensity
IV	β (t-value)	β (t-value)	β (t-value)	β (t-value)
Firm Size	-3.311 (-0.06)	-237.69 (-4.15)***	-0.334 (-0.49)	-0.488 (-0.45)
Firm Age	0.001 (2.84)***	-0.001 (-1.03)	-0.045 (-2.16)**	-0.169 (-5.03)***
Globalization	0.176 (0.31)	1.918 (2.99)***	-0.915 (-0.37)	-22.016 (-5.66)***
Leverage	-1.669 (-1.72)*	-1.409 (-1.31)	0.122 (0.81)	-0.168 (-0.7)
CEO Tenure	0.025 (0.73)	0.062 (1.65)	-1.835 (-1.77)**	-2.961 (-1.8)**
CEO Gender	-0.470 (-0.5)	1.172 (1.12)	-4.136 (-1.2)	8.957 (1.64)*
CEO Age	-0.099 (-3.15)***	-0.104(-2.99)**	-0.028 (-0.16)	-0.537 (-1.95)**
SIC Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Constant	6.17 (2.71)***	4.44 (1.92)*	15.908 (1.57)	44.089 (2.73)**
N	328	328	421	421
F value	4.88	10.21	6.75	14.41
P - value	<0.001	<0.001	<0.001	<0.001
R ²	20.08%	34.43%	25.23%	41.88%
Adj-R ²	15.96%	31.06%	21.49%	38.98%

Note. T1 represents the Pre-Transition Period (2011–2015) and T2 represents the Post-Transition Period (2017–2022). All regressions include industry (SIC) and year fixed effects, though their coefficients are not shown for brevity. * $p < .10$, ** $p < .05$, *** $p < .01$.

Table 5: LEVEL OF CONFIDENCE AND MARKETING DECISIONS AND OUTCOMES

Model	A	B	C	D
Transaction Period	T1	T1	T2	T2
DV	Ad Intensity	R&D Intensity	Ad Intensity	R&D Intensity
IV	β (t-value)	β (t-value)	β (t-value)	β (t-value)
Level of confidence	1.83 (2.38)***	-0.744 (-0.83)	-4.271 (-1.96)***	1.272 (0.37)
Firm Size	-41.77 (-0.72)	-199.05 (-2.94)	0.079(0.11)	-0.610 (-0.54)
Firm Age	-.18 (-0.31)	-4.7E-05 (-0.11)	-0.04 (-2.16) ***	-0.169 (-5.03) ***
Globalization	1.265 (0.51)	1.441 (2.03)	-0.789 (-0.32)	-22.05 (-5.66) ***
Leverage	-2.26 (-2.33)***	-1.63 (-1.42)	0.181 (1.19)	-0.186 (-0.76)
CEO Tenure	.045 (1.28)	0.038 (0.91)	-1.658 (-1.6)	-3.014 (-1.82) *
CEO Gender	-.738 (-0.84)	1.202 (1.19)	-4.983 (-1.44)	9.209 (1.67) **
CEO Age	-.113 (-3.56)***	-0.04 (-1.20)	-0.023 (-0.14)	-0.53 (-1.95) ***
SIC Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Constant	7.151 (3.42)***	3.88 (1.66)*	15.22 (1.51)	44.29 (2.74) ***
N	275	275	421	421
F value	4.81	2.52	6.66	13.70
P - value	<0.001	<0.05	<0.001	<0.001
R ²	21.79%	34.96%	25.95%	41.90%
Adj-R ²	17.26%	30.92%	22.05%	38.84%

Note. T1 denotes the Pre-Transition Period (2011–2015), and T2 denotes the Post-Transition Period (2017–2022). The models are based on an unbalanced panel of firm-year observations: All models include industry (SIC) and year fixed effects; their coefficients are omitted for brevity. * $p < .10$, ** $p < .05$, *** $p < .01$.

Table 6: LEVEL OF CONFIDENCE, MARKETING POWER AND MARKETING DECISIONS AND OUTCOMES

Model	A	B	C	D
Transaction Period	T1	T1	T2	T2
DV	Ad Intensity	R&D Intensity	Ad Intensity	R&D Intensity
IV	β (t-value)	β (t-value)	β (SE)	β (SE)
Level of confidence (LC)	2.05 (1.99)**	0.117 (0.10)	-7.791 (-2.91)***	-0.664 (-0.16)
Marketing Power (MP)	0.139 (1.77)*	.124 (1.34)	-0.521 (-2.61)***	-0.292 (-0.92)
LC*MP	-0.102 (-2.69)***	-.203 (-1.16)	0.502 (2.33)***	0.256 (0.75)
Firm Size	-37.489 (-0.65)	-200.91 (-2.96)***	-0.118 (-0.16)	-1.210 (-1.03)
Firm Age	9.21E-05 (0.25)	-9.9E-05 (-0.23)	-0.0418 (-1.9)**	-0.178 (-5.09)***
Globalization	-0.206 (-0.34)	1.439 (2.02)**	-2.451 (-0.95)	-19.88 (-4.86)***
Leverage	-2.189(-2.22)**	-1.569 (-1.35)	0.218 (1.41)	-0.181 (-0.74)
CEO Tenure	0.073 (2.04)**	0.046 (1.10)	-1.216 (-1.15)	-2.763 (-1.63)*
CEO Gender	-0.753 (-0.88)	1.239 (1.22)	-6.922 (-1.91)**	13.753 (2.38)***
CEO Age	-0.134(-4.18)***	-0.050 (-1.34)	-0.008 (-0.05)	-0.491 (-1.77)***
SIC Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Constant	7.572	1.328	17.943 (1.74)*	34.559 (2.1)**
N	275	275	399	399
F value	4.83	7.81	5.71	12.68
P - value	<0.001	<0.001	<0.01	<0.01
R ²	25.36%	35.43%	25.95%	42.55%
Adj-R ²	20.11%	30.9%	21.41%	38.60%

T1 refers to the Pre-Transition Period (2011–2015) and T2 refers to the Post-Transition Period (2017–2022). Industry-specific (SIC) dummies and fiscal year controls were included in all models, though their coefficients are not reported here for brevity. * Significant at $p < .10$, ** Significant at $p < .05$, *** Significant at $p < .01$.

Appendix A: Post-Hoc Analyses for Digital Orientation

DV	Digital Orientation
Variable	β (Standard Error)
Level Of Confidence	95.116 (40.954)***
Firm Size	4.784 (13.55)
Firm Age	0.456 (0.407)
Globalization	-57.503 (47.14)
Leverage	7.944 (19.543)
CEO Tenure	74.55 (66.759)
CEO Gender	1.195 (3.223)
CEO Age	-0.771 (2.856)
IMR	71.687 (83.992)
Residual	0.002 (0.005)
Sic Dummies	Yes
Year Dummies	Yes
Constant	-121.333 (190.843)
N	399
F Value	F (21, 377) = 1.02
P - Value	0.433
R ²	5.39%
Adj-R ²	0.12%

Appendix B: Industry Distribution of Sample (Firm-Year Observations)

SIC Code	Industry Description	Pre-Transition (2011–2015)	Post-Transition (2017–2022)	Total (%)
1	Agriculture, Forestry, Fishing	24	76	8.17
2	Mining & Construction	94	61	12.66
3	Manufacturing – Durable Goods	98	215	25.56
4	Manufacturing – Nondurable Goods	52	91	11.68
5	Transportation & Utilities	46	64	8.98
6	Wholesale & Retail Trade	106	169	22.45
7	Finance, Insurance, Real Estate	50	49	8.09
8	Services	10	16	2.13
9	Public Administration/Other	5	0	0.33
Total		485	741	100%