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Competitive Actions under Analyst Pressure: The Role of CEO Time Horizons

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ABSTRACT Leveraging upper echelons theory and the Awareness-Motivation-Capability (AMC) framework of competitive dynamics, we investigate the moderating influence of CEO time horizons on the relationship between negative analyst recommendations and the temporal patterning of competitive actions. We argue that negative recommendations are associated with less intensity but greater irregularity in competitive actions. Moreover, CEO time horizons weaken these effects, such that CEOs with longer time horizons are less influenced by such recommendations. Results from a longitudinal study of 296 CEOs from 2004 to 2015 support these arguments. Our study contributes by underscoring CEO time horizon as a critical contingency in studying the impact of analyst pressures.

Keywords: CEO time horizons, competitive actions, financial analysts, intensity, rhythm, temporality

INTRODUCTION

Financial analysts, 'visible and knowledgeable experts who constantly collect, analyze, and disseminate information about the future prospects of publicly listed firms', have attracted increasing academic attention (Brauer and Wiersema, 2018, p. 218). Research from an agency perspective, has long documented the impact of negative analyst reports on firm competitive actions. Because analyst advice drives stock prices, negative evaluations can pressure executives, motivating them sometimes to take actions that hurt their firms (Currim et al., 2018; DesJardine and Bansal, 2019; Zhang and Gimeno, 2010, 2016). For example, poor analyst evaluations are associated with reduced R&D expenditures (Benner and Ranganathan, 2012; Gentry and Shen, 2013).

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This research suggests that CEOs under pressure from negative analyst valuations tend to pursue short-term outcomes, with uniform consequences for their competitive actions. However, studies rooted in upper echelons theory (Hambrick and Mason, 1984) and a rich body of psychological evidence on temporality (Shipp et al., 2009; Zimbardo and Boyd, 1999), point to the critical role of CEO temporal orientations in moderating their reactions to negative media coverage (Gamache and McNamara, 2019) and risk (DesJardine and Shi, 2021). Adopting a similar logic, responses to analyst recommendations also may vary across CEOs depending on their temporal orientations. For example, when CEOs have resolute strategic plans and are motivated by pursuing long-term value despite the short-term costs involved, they may feel less pressure from negative analyst reports. In fact, a recent review by Brauer and Wiersema (2018) calls for research into how CEO temporal attributes moderate the way analyst demands shape firm competitive actions.

Drawing on upper echelons theory (Hambrick and Mason, 1984) and the Awareness-Motivation-Capability (AMC) framework from competitive dynamics (Chen, 1996; Chen et al., 2007), we examine the moderating role of CEO time horizons on the relationship between negative analyst recommendations and the temporal patterning of competitive actions. CEO time horizons are defined as *the degree to which a CEO considers long-term outcomes for current behaviours* (Strathman et al., 1994). We focus on two key temporal attributes of competitive actions: *intensity* and *rhythm*. Intensity refers to the number of competitive actions that a firm carries out over a given period (Ferrier, 2001). Active competitive engagement reflects initiative for continued development, whereas having few actions is more suggestive of passivity or preservation (Connelly et al., 2010). Rhythm is characterized by regularity in temporal intervals between competitive actions (Shi and Prescott, 2012; Vermeulen and Barkema, 2002). An irregular pattern is suggestive of disruption versus orchestrated strategic development (Kunisch et al., 2017). Both intensity and rhythm provide insight into patterned strategic action, thereby signalling the importance of CEO time horizons in shaping reactions to contingencies such as analyst pressure.

Our central contention is that negative analyst recommendations, on average, will induce executives to reduce the intensity of competitive action and become more irregular in their actions. However, and more importantly, these relationships will be moderated by CEO time horizons, such that the latter will mitigate the impact of negative analyst recommendations. Because CEOs with long time horizons make themselves aware of opportunities in the distant future, are motivated by long-term outcomes, and build long-term strategic capabilities (Andrevski et al., 2021; Andrevski and Miller, 2022; Nadkarni et al., 2016), they can better resist short-term analyst pressures and continue to act competitively in a concerted and orchestrated way. We test our propositions with a longitudinal analysis of 296 CEOs over 1325 CEO-year observations from 2004 to 2015.

Our study makes several contributions. First, it challenges the agency premise of prior research (Currim et al., 2018; Zhang and Gimeno, 2010, 2016), showing that CEO responses to analyst pressures vary. Instead, their time horizons will influence how they react to analyst reports, such that negative recommendations will have less impact on firm competitive actions when CEOs are long-term oriented.

Second, our study extends the AMC framework (Chen et al., 2007; Upson et al., 2012) by demonstrating CEO time horizon as a critical factor in shaping a firm's competitive

awareness, motivation, and capability. It shows that CEOs with long time horizons are both motivated and capable of resisting analyst pressures and maintaining competitive intensity and orchestration.

Finally, our work extends competitive dynamics research by investigating the joint effects of analyst stock recommendations and CEO time horizons on the *temporal pattern* of competitive actions: intensity and rhythm. This focus on temporal patterns reveals 'the entire configuration of competitive actions, and so provides a more holistic picture of competitive posture' (Chen and Miller, 2012, p. 146).

THEORY DEVELOPMENT AND HYPOTHESES

The Impact of Financial Analyst Stock Recommendations

Financial analysts are visible, knowledgeable, highly trained securities specialists employed by investment banks and brokerage firms (Brauer and Wiersema, 2018). They collect and analyse information such as historical market data, industry trends, and information disclosed by managers (He and Tian, 2013; Washburn and Bromiley, 2014). They also interact with executives regularly via quarterly conference calls and private communications (Brown et al., 2015; Guo et al., 2020). By sharing their opinions about firm prospects, analysts reduce information asymmetries between managers and investors.

Research highlights negative analyst reports as critical antecedents of firm actions. Because analyst evaluations drive stock prices, they can influence board decisions on CEO compensation (Matsunaga and Park, 2001) and succession (Farrell and Whidbee, 2003; Wiersema and Zhang, 2011). As a result, negative evaluations can exert significant pressure on CEOs and influence actions such as cost-cutting (Currim et al., 2018; Graham et al., 2005; He and Tian, 2013; Zhang and Gimeno, 2010, 2016). For example, Gentry and Shen (2013) found that failure to meet analyst earnings forecasts related to cuts in R&D expenditures. However, this research focused on *main effects* from analyst evaluations on firm actions and assumes that most CEOs will respond similarly to negative evaluations.

By contrast, we examine the *moderating role* of CEO time horizons in the relationship between analyst recommendations and firm actions. Specifically, we focus on analyst recommendations of whether to 'buy', 'hold', or 'sell' a stock (Brown et al., 2015; Ioannou and Serafeim, 2015). A high proportion of negative recommendations represents a negative assessment that may drive down stock prices (Womack, 1996). In fact, Wiersema and Zhang (2011) found that negative stock recommendations drove CEO dismissals. Thus, we expect that such recommendations will have a significant impact upon firm actions.

Negative Recommendations and Competitive Actions

Competitive dynamics scholars have long adopted the *Awareness-Motivation-Capability* (AMC) perspective as a central framework for explaining competitive actions (Chen,

1996; Chen and Miller, 1994, 2012). Simply stated, competitive actions are said to occur when executives are aware of the competitive landscape, motivated to act, and have the capability to do so (Chen et al., 2007). Researchers have employed the AMC framework to relate market factors or executive characteristics to competitive actions (Chen et al., 2010; Miller and Chen, 1996a; Nadkarni et al., 2016). A recent study by Lien et al. (2021), for example, has adopted the AMC model to explain the relationship between analyst stock recommendations of a rival firm and focal firm responses. Drawing on this perspective, we link a firm's negative analyst recommendations to temporal patterns in its strategic actions.

Taking competitive actions as building blocks of competition, competitive dynamics research suggests that vis-à-vis *tactical* actions like price cuts and advertising promotions – immediate responses involving few resources and allowing easier implementation and reversal, *strategic* actions such as new product introductions, strategic alliances, mergers and acquisitions, and major market expansions require more resources, are harder to implement and reverse, and take longer (Connelly et al., 2010; Miller and Chen, 1996a). Patterns or repertoires in strategic actions provide a holistic picture of a firm's strategic posture (Chen and Miller, 2012). For example, scholars have investigated patterns such as strategic action intensity (the number of strategic actions), complexity versus simplicity (the distribution of strategic actions across different categories), and nonconformity (the extent to which a firm departs from industry norms) (Andrevski et al., 2021; Chen et al., 2010; Connelly et al., 2017; Miller and Chen, 1996b; Ndofor et al., 2011).

We examine two temporal attributes of strategic actions: intensity and rhythm. *Strategic action intensity* refers to the number of strategic actions that a focal firm carries out over a given period. Performing many strategic actions suggests that a firm is continually seeking avenues of strategic growth and advantage via initiatives such as product line improvements, strategic alliances, and operational alignments (Andrevski and Ferrier, 2019; Chen et al., 1992). Distinct from strategic action intensity representing the number of actions, *strategic action rhythm* reflects how a firm distributes its actions over time (Kunisch et al., 2017). Rhythm is defined as regularity in the temporal pattern of strategic actions; it captures consistency versus irregularity in the time between strategic actions over time (Ancona and Chong, 1996; Shi and Prescott, 2012). Firms can initiate strategic actions with regular or irregular timing. For example, some firms initiate actions every month (a regular pattern); others are idle for many months and then erupt in a burst of activity (an irregular pattern). Regularity indicates that the time between strategic actions is more evenly spaced, a little like sunrises or heartbeats. In contrast, irregularity indicates that temporal distances between strategic actions are irregularly spaced, sporadic, and varying greatly in duration (Laamanen and Keil, 2008; Vermeulen and Barkema, 2002).

Negative analyst recommendations and temporal patterns. We propose that negative analyst recommendations will decrease strategic action intensity. First, as prominent information intermediaries in financial markets, analyst recommendations are visible signals that convey firm prospects and constitute important information for top executives (Brown et al., 2015). Because negative stock recommendations represent poor market assessments,

and executives may retaliate by refusing future contacts, analysts are reluctant to issue such ratings (Westphal and Clement, 2008). Accordingly, negative recommendations are relatively rare and represent unpleasant surprises for top executives (Bradley et al., 2014). Once issued, negative stock recommendations can more easily capture executive attention than neutral or positive recommendations and thus serve as critical signals of which CEOs must be acutely *aware*.

Moreover, negative stock recommendations drive down stock prices and erode firm reputation, putting significant pressure on CEOs (Womack, 1996). For example, Wiersema and Zhang (2011) found that negative stock recommendations occasioned CEO dismissal. Thus, compared with executives who receive neutral or positive stock recommendations, executives with significantly negative stock recommendations are motivated to take action or revise strategic plans to boost firm performance (Stickel, 1995). However, compared to tactical actions such as pricing, strategic actions are more costly, take far more time to implement, and rarely generate profitability in the short run (Connelly et al., 2010). Thus, CEOs are amply *motivated* to limit the number of strategic actions so that they can allocate limited financial resources to actions that can yield immediate returns.

Finally, public firms depend on financial markets to access capital. Negative recommendations may reduce firms' *capability* to raise funds and undertake strategic initiatives involving significant financial resource commitments (Jung et al., 2015). Thus, compared with executives who receive neutral or positive stock recommendations, those with negative recommendations are likely to curtail the number of strategic actions to boost short-term performance. Indeed, evidence suggests that when firms experience negative evaluations, CEOs cut R&D expenses and other strategic investments that cannot yield quick returns (Benner and Ranganathan, 2012; Gentry and Shen, 2013).

Hypothesis 1 Negative analyst stock recommendations are negatively related to strategic action intensity (i.e., the higher the percentage of negative recommendations, the fewer the number of strategic actions).

We further propose that negative analyst stock recommendations will increase strategic action irregularity. As noted, such recommendations represent salient market signals of which CEOs must develop an acute *awareness*. Once analysts issue negative ratings, CEOs have a strong *motivation* to revise their strategic plans to quickly boost performance, for example, by curtailing strategic actions or investments. Accordingly, their original initiatives may be interrupted, resulting in an irregular pace of action.

Finally, negative stock recommendations can limit a firm's *capability* to gain capital from the stock market. Because of such limited resources, executives with negative stock recommendations may be forced to delay or alter their current pace of strategic development and contemplate ways of reorienting strategy to enhance short-term performance. For example, some costly strategic initiatives may be postponed or cancelled; others may be bunched up to regularize expenses and cash flow to boost quarterly earnings reports. Accordingly, compared with executives with neutral or positive stock recommendations, executives who receive negative recommendations

are more likely to interrupt the rhythm of their strategic actions and thus show greater irregularity.

> *Hypothesis 2* Negative analyst stock recommendations are positively related to strategic action irregularity (i.e., the higher the percentage of negative analyst recommendations, the greater the irregularity of strategic actions).

The moderating role of CEO time horizons. We have argued that negative analyst recommendations put significant pressure on executives to curtail the intensity and enhance the irregularity of their strategic actions, thereby disrupting their developmental trajectories. *However, not all CEOs will react in the same way to such pressures*. According to upper echelons theory, as chief decision-makers of the dominant coalition, CEOs assume primary responsibility for setting strategic direction and guiding plans towards its realization (Finkelstein and Hambrick, 1990; Hambrick and Mason, 1984). Thus, CEO attributes can shape strategic decisions such as new product introductions (Yadav et al., 2007), new market expansions (Eggers and Kaplan, 2009), mergers and acquisitions (Gamache et al., 2015), and strategic alliances (Das and Kumar, 2011). A recent study also found that CEO attributes determine their reaction to external market stimuli such as negative media reports in initiating strategic actions (Gamache and McNamara, 2019).

We draw on this line of inquiry to propose that CEOs with different attributes will act differently in shaping firm strategy when facing pressure from negative analyst recommendations. Specifically, we propose that the effect of negative recommendations on strategic action intensity and rhythm will depend very much on CEO time horizons. As a fundamental strategic orientation, time horizon refers to the extent to which individuals consider more distant future potential outcomes of their current behaviours and are influenced by those potential outcomes (Das, 1987; Tang et al., 2020; Wallace, 1956). Studies have shown that time horizons are inherent and relatively stable personal temporal characteristics, with high test–retest reliabilities (Strathman et al., 1994). CEOs with long time horizons recognize distant future developments not readily perceived, and prepare well in advance to seize opportunities (Andrevski and Miller, 2022; Lin et al., 2019; Miller and Le Breton-Miller, 2005, 2014; Wang and Bansal, 2012). In contrast, CEOs with short future time horizons prioritize current environmental signals and act to satisfy immediate needs (Crossan et al., 2005; Shipp et al., 2009). We believe those with long-term focus will be less influenced by short-term priorities and be more reluctant to abandon long-term developmental trajectories in exchange for immediate relief. Accordingly, CEOs with long future time horizons will be more persistent in pursuing vigorous and orchestrated strategic actions despite potentially disruptive short-term external pressures.

Research suggests that executive time horizons shape their interpretation of the temporal significance of competitive stimuli and alternatives (Nadkarni et al., 2016). When CEOs have short time horizons, they develop an acute *awareness* of short-term issues and prioritize immediate competitive opportunities or threats (Bluedorn, 2002). Thus, negative recommendations are more likely to be associated with stopgap measures. Because CEOs with short time horizons care more about immediate consequences (Strathman et al., 1994), they feel stronger pressure from negative

recommendations. Thus, they may have ample *motivation* to boost near-term performance by avoiding costly strategic initiatives such as product line development, alliance formation, and market expansion to improve current quarterly performance. Moreover, because CEOs with short time horizons tend to pursue quick returns from immediate competitive opportunities and fail to prepare for strategic initiatives (Bluedorn, 2002; Bluedorn and Martin, 2008), they have limited *capability* to undertake strategic actions. Strategic action intensity is thereby reduced. These actions to find remedial expedients also affect the rhythm of strategic actions, forestalling regular and cumulative development.

In contrast, CEOs with long future time horizons are likely to be more *aware* of long-term technological and market developments and opportunities while paying less heed to and being less perturbed by current developments and pressures (Nadkarni et al., 2016; Wang and Bansal, 2012). As a result, negative recommendations and the short-term stock price fluctuations they occasion will be less apt to derail their strategic trajectories or be reflected in strategic action intensity. In addition, CEOs with long time horizons pursue long-term projects and initiatives and care more about long-term consequences (Das, 1987; Miller and Le Breton-Miller, 2014). Because the active and persistent pursuit of farsighted strategic actions may generate competitive advantage in the long run, long-term oriented CEOs may have less *motivation* to limit such initiatives when facing negative recommendations. Indeed, Barringer and Bluedorn (1999, p. 425) suggest that long-term orientations 'engender a reluctance to deviate from a long-term view of the future despite short-term environmental change'. Also, CEOs with long time horizons prepare for future development and thus have the *capability* to initiate strategic actions at a regular pace. Therefore, when confronted by negative stock recommendations, CEOs with long time horizons will preserve intensity and pacing in their strategic initiatives.

Hypothesis 3a When CEOs have shorter time horizons, negative analyst recommendations are more negatively related to strategic action intensity.

Hypothesis 3b When CEOs have shorter time horizons, negative analyst recommendations are more positively related to strategic action irregularity.

METHODS

Sample and Data

To test our hypotheses, we constructed a sample of 500 randomly selected firms from the Standard and Poor (S&P) 1500 covering the years from 2004 to 2015. Focusing on these public firms allowed us to obtain comprehensive data from multiple databases. We collected data on financial analysts' stock recommendations and CEO time horizons from 2004 to 2013, and information on strategic actions from 2005 to 2014. These periods were long enough to capture both economic strength and recovery (2004–7 and 2011–5) as well as a crisis (2008–9), which could interact with and serve as a confound for firm strategic actions. Thus, consistent with prior research (Nadkarni et al., 2016) and

to mitigate any confound, we employed a time span that encompassed both triggers and inhibitors of strategic actions.

We gathered data from several sources. We collected analyst recommendations from the Institutional Brokers' Estimate System (I/B/E/S) database, which uses a five-point ranking scale, with recommendations of 1 meaning 'strong buy', 2 'buy', 3 'hold', 4 'underperform', and 5 'sell' (Wiersema and Zhang, 2011). Consistent with Shi et al. (2018), we collected data on strategic actions from the Capital IQ Key Development database, designed and maintained by S&P. The database comprehensively monitors and aggregates information from over 20,000 news sources and provides detailed news and events that may influence financial markets. Data on each action includes a date, the news headline, and a summarized description. The database also classifies four types of strategic actions, including product-related actions, M&A transactions, strategic alliances, and business expansions. Because Capital IQ provides transparent news stories, it has been widely used in the finance and accounting fields (e.g., Livnat and Zhang, 2012; Pan et al., 2015).

We used firm letters to shareholders (LTS) and transcripts of earnings conference calls to assess CEO time horizons. We collected LTS from the Mergent Online database and transcripts of earnings conference calls from the Capital IQ database, on which basis we constructed an annual narrative for each CEO. Specifically, each CEO narrative includes aggregated information composed of both LTS and CEO quotes extracted from earnings conference calls of the same year (CEO remarks and answers from Q&A sections). Letters to shareholders, which incorporate CEOs' public pronouncements of firm strategies and priorities, have been widely used to examine CEO cognitive characteristics (Gamache and McNamara, 2019; Nadkarni and Chen, 2014). Moreover, like speeches or public interviews, CEO quotes from earnings conference calls represent first-order assertions (Peterson et al., 2003). Thus, scholars have concluded that such CEO quotes are valid sources for measuring CEO characteristics (e.g., DesJardine and Shi, 2021).

Consistent with prior research (Chatterjee and Hambrick, 2007; Nadkarni and Chen, 2014), we dropped yearly observations in which a CEO changes. In addition, we only included firms with CEOs who had been in that position for at least three consecutive years. Data unavailability in Mergent, Execucomp, COMPUSTAT, and Capital IQ databases restricted our sample to 296 CEOs with 1325 CEO-year observations having complete information.

Measures

Negative analyst recommendations. Following Wiersema and Zhang (2011), we measured negative recommendations using the percentage of analysts that issued a sell recommendation. Because analysts issue sell recommendations far less frequently than buy recommendations, the percentage of sell recommendations represents a strong indicator of negative market assessments (Francis and Soffer, 1997; Womack, 1996). We also used the average recommendation ratings as an alternative measure and the results remained consistent with those in our main analysis.

We measured the percentage of sell recommendations as the weighted average percentage of analysts' recommendations in a given year t that underperform (4) or

sell (5) (Wiersema and Zhang, 2011). We calculated this variable in two steps. First, we calculated the percentage of sell recommendations monthly. Second, because the number of recommendations for a specific firm may differ from month to month, we weighted this measure by the number of analysts providing firm coverage for firm i in year t. The percentage of sell recommendations ranged from 0 to 1 with a mean of 0.057.

Strategic actions. We used the Capital IQ Development database to collect strategic action data. Capital IQ automatically identifies four categories of actions for each firm, including product-related actions, mergers and acquisitions, strategic alliances, and business expansions. However, Capital IQ classifies all the product-related announcements, including new product introductions and pricing actions related to an existing product, into one category. Because we are only interested in new product introductions that are strategic actions, we followed Shi et al. (2018) to manually check each announcement in the product-related category to drop pricing actions. This approach ensured that we only included announcements related to new product introductions. In total, there are 25,008 actions in our final sample: 15,143 new product introductions, 1705 M&A transaction announcements, 2950 strategic alliances, and 5210 business expansions. We have provided some examples for each category in Appendix A.

Consistent with previous studies (Connelly et al., 2010; Nadkarni et al., 2019), we measured strategic action *intensity* as the total number of strategic actions that a firm announced in a given year. The average number of strategic actions per firm per year was 18.874. Again, following prior studies (Shi and Prescott, 2012; Vermeulen and Barkema, 2002), we measured strategic action *irregularity* using the kurtosis score. Kurtosis captures how concentrated in time are changes in the number of strategic actions. A high kurtosis score indicates a concentrated distribution during any 12-month span such that a firm has many actions in some months, combined with longer periods of inactivity. Thus, a high kurtosis score captures a temporally irregular action pattern. A low kurtosis score indicates a relatively flat distribution such that a firm pursues a relatively constant and orchestrated pace of strategic actions. We used the formula specified by Vermeulen and Barkema (2002) to calculate the Kurtosis:

$$\text{Kurtosis} = \left\{ \frac{n(n+1)}{(n-1)(n-2)(n-3)} \sum \left(\frac{x_i - \overline{x}}{s} \right)^4 \right\} - \frac{3(n-1)^2}{(n-2)(n-3)}$$

where n denotes the total number of months used to calculate kurtosis, x_i denotes the number of strategic actions in month i, and s denotes the standard deviation of the number of strategic actions across n months.

CEO time horizon. We defined *CEO time horizon* as the average time frame a CEO considers when thinking about the future (Nadkarni et al., 2016). Following prior temporal research (Liberman et al., 2007; Nadkarni et al., 2019), we employed content analysis to operationalize this variable, which involved three steps.

In Step 1, we developed a dictionary of time cues, including specific calendar-time points (e.g., 2005, 2006, 2007), numeric time spans (e.g., five years, twenty-years), and non-numeric temporal descriptors (e.g., soon, quickly, long term, short term) (see Appendix B). Then, a group of research assistants extracted temporal cues from CEO narratives (LTS and CEO quotes in earnings conference calls), based on the dictionary developed above, and manually sorted them into two groups: future-oriented versus past-oriented. For example, a calendar-time point of 2007 would be considered future-oriented if it was extracted from a CEO narrative before 2007, but past-oriented if it was from a CEO narrative after 2007. If it was from a CEO narrative in the year of 2007, then we further investigated the publication date to determine its future- versus past-orientation. We used a similar approach to determine the future- versus past-orientations of numeric time spans and non-numeric temporal descriptors.

In Step 2, we converted the future-oriented calendar-time points, numeric time spans, and non-numeric temporal descriptors identified in Step 1 into numeric time frames using year as the time unit. For calendar-time points, we calculated the number of years between the publication date of the CEO narrative and the expressed calendar time. For numeric time spans, we converted time units into years. For non-numeric descriptors, we first classified them into three categories: proximal time cues (e.g., now, immediately, and short term), distal time cues (e.g., long term), and medium-term time cues (e.g., sometime from now). We then followed Liberman et al. (2007) to assign a numeric time frame to each of these cues. Specifically, a proximal cue was assigned the shortest time frame identified from our operationalization of the calendar-time points and numeric time spans; a distal cue was assigned the longest time frame; a medium-term cue was assigned the median time frame (See Appendix B). In Step 3, consistent with Nadkarni et al. (2016), we then ranked the time cues and used the average time frame to calculate the scores of CEO time horizon.

Control variables. We controlled for a range of factors to account for alternative influences upon our dependent variables. At the firm level, we controlled for 'firm size' (measured by the logarithm of the total number of employees) and 'firm age' (measured as the number of years since founding). Research has shown that large firms tend to become more inertial and bureaucratic; older firms are less aware of their competitive environment and tend to adhere to their successful competitive strategies of the past (Miller, 1991; Smith et al., 2001). In addition, we controlled for 'prior firm performance' (measured as return on sales of the prior year) because poor past performance drives firms to compete more aggressively (Miller and Chen, 1996a). We also accounted for 'R&D intensity' (measured as R&D expenses/sales) because it can reduce competitive vulnerability and the need to act (Ferrier et al., 2002; Scherer and Ross, 1990). Because firms with ampler slack resources are more able to take actions (Ndofor et al., 2011), we controlled for 'organizational slack' (measured as current assets/current liabilities).

Because the board of directors may influence firm competitive actions (Connelly et al., 2017), we also controlled for 'board size, board independence', and 'outside director ownership' (Connelly et al., 2017). Board size was measured as the number of directors (Haynes and Hillman, 2010). Board independence was measured as the percentage of

outside directors sitting on the board (Connelly et al., 2019). Outside director ownership was calculated as the total percentage of shares held by those directors (Shi et al., 2017).

TMT demographic diversity and team size foster diverse opinions and perspectives in formulating competitive moves (Ferrier, 2001; Hambrick et al., 1996). We, therefore, controlled for several TMT characteristics, including 'TMT size', 'TMT average age', and 'TMT functional diversity'. Consistent with Hambrick et al. (1996), TMT functional diversity was computed using a variation of the Herfindahl–Hirschman Index (HHI): $H = 1 - \Sigma S_i^2$, where S*i* represented the proportion of a TMT in the *i*th functional background category (e.g., production-operations, R&D and engineering, accounting and finance, management and administration, marketing and sales, law, personnel and labour relations, and other).

We also controlled for several CEO characteristics, including 'age' and 'power'. Following prior studies (Haynes and Hillman, 2010; Tang et al., 2011), we measured CEO power using three indicators: 'CEO tenure', 'CEO duality', and 'CEO ownership'. Tenure was measured as the number of years the CEO has held the title in its current firm (Darouichi et al., 2021). CEO duality was measured as a dummy variable equal to '1' if the CEO also serves as board chairman and '0' otherwise (Connelly et al., 2017). CEO ownership was measured as the percentage of firm shares held by the CEO (Wiersema and Zhang, 2011).

In addition, we controlled for 'analyst coverage' because the number of analysts may inhibit firms from taking risky strategic actions (Chen et al., 2015). We measured analyst coverage as the number of analysts providing research reports for a specific firm in a given year. We also controlled for 'analyst consensus' because greater variation in analyst assessments may lead to more uncertainty or hesitation in formulating strategic actions. We calculated this consensus as the standard deviation across analyst recommendations of a firm in a given year. Following Wiersema and Zhang (2011), we multiplied that number by −1 and weighted it by the number of analysts per year providing coverage.

At the industry level, we accounted for three industry characteristics: *dynamism*, *munificence*, and *concentration*, because these factors influence a firm's competitive actions (Chen et al., 2010; Ferrier, 2001). Industry dynamism, which refers to the unpredictability of change, was measured using a standardized index based on variations in the industry value of shipments (Dess and Beard, 1984; Nadkarni and Chen, 2014). Specifically, we regressed total industrial sales over five years against time and computed the dynamism score as the ratio of the standard error of the time variable divided by the 5-year average of total sales. Industry munificence was calculated as the rate of sales growth (Connelly et al., 2017). Industry concentration was measured as the Herfindahl–Hirschman Index (HHI), summing the squares of the market shares of firms for each four-digit SIC industry (Ferrier, 2001). We also added an industry dummy to control for industry effects. The dummy was coded as '1' if the firm is in manufacturing industries (SIC codes: 2000–3999), and '0' otherwise (Ling et al., 2008).

Analytical approach. To account for unobserved firm heterogeneity in our longitudinal data and capture between-firm effects, we used the Generalized Estimating Equation (GEE) approach (Ballinger, 2004; Liang and Zeger, 1986). This method produces unbiased

estimates when unobserved firm-specific effects are not independent of other predictors (Krause et al., 2016). Moreover, by specifying the covariance matrix and link functions, the GEE method is flexible and robust to error. As a result, the GEE approach is widely used to analyse panel data (Hallen and Pahnke, 2016). Because one of our dependent variables – strategic action intensity – is a count variable, we specified a GEE model with a negative binomial distribution and a log link function when assessing the effect of sell recommendations and CEO time horizons on action intensity. Because strategic action irregularity is continuous and normally distributed, we specified an identity link function and a Gaussian distribution when assessing the effect of sell recommendations and CEO time horizons on action irregularity.

RESULTS

Table I presents descriptive statistics and correlations. Tables II and III report the results of the GEE models. We used stepwise hierarchical regressions to test moderation effects. In Model 1, we included controls only. In Model 2, we tested main effects. We included our independent variable and the moderator in Model 3. In Model 4, we added the interaction term.

H1 proposed that negative analyst recommendations would be negatively related to strategic action intensity. Model 2 of Table II shows that the percentage of sell recommendations related negatively to strategic action intensity ($b = -0.059$; $p = 0.000$), thereby supporting H1. H2 hypothesized that negative analyst recommendations would be positively related to strategic action irregularity. Model 2 of Table III confirms that the percentage of sell recommendations was positively related to strategic action irregularity ($b = 1.594$; $p = 0.012$), thus supporting H2.

H3a posited that the effect of negative analyst recommendations on strategic action intensity would be stronger when CEOs have short time horizons. Model 4 of Table II shows that the interaction term was significant ($b = 0.004$; $p = 0.031$). We graphed an interaction plot using one standard deviation above and below the mean to capture long and short CEO time horizons (Figure 1). Finally, consistent with Busenbark et al. (2022), we calculated the marginal effects over the different values of CEO time horizons. Negative analyst recommendations were negatively related to strategic action intensity ($b = -0.021$; $p = 0.000$) when CEOs have short time horizons. However, when CEOs have long time horizons, the effect was insignificant ($b = -0.003$; $p = 0.585$). Therefore, H3a was supported.

H3b hypothesized that CEO time horizons would moderate the relationship between negative analyst recommendations and strategic action irregularity. Model 4 of Table III shows that the interaction term was significant ($b = -0.142$; $p = 0.015$). Again, we plotted the interaction (Figure 2). Finally, marginal effects indicated that the percentage of sell recommendations was positively related to strategic action irregularity ($b = 3.016$; $p = 0.000$) when CEOs have short time horizons. However, when CEOs have long time horizons, the effect was insignificant ($b = 0.039$; $p = 0.965$). Thus, H3b was supported.

Table I. Descriptive statistics

Variables		*Mean*	*SD*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*
(1)	Percentage of sell recommendations	0.057	0.100	1.000										
(2)	Strategic action intensity_$t+1$	18.874	36.068	−−0.060	1.000									
(3)	Strategic action irregularity_$t+1$	3.570	2.404	0.096	−−0.263	1.000								
(4)	CEO time horizon	7.904	10.351	−−0.003	0.026	−−0.080	1.000							
(5)	Firm size	9.465	1.573	−−0.017	0.352	−−0.242	0.205	1.000						
(6)	Firm age	32.055	18.082	0.046	0.117	−−0.057	0.262	0.405	1.000					
(7)	ROS_$t-1$	0.093	0.158	−−0.108	0.105	−−0.031	0.022	−−0.013	0.015	1.000				
(8)	R&D intensity	0.086	0.125	−−0.024	0.125	−−0.116	−−0.054	−−0.190	−−0.112	−−0.256	1.000			
(9)	Organizational slack	2.141	1.293	−−0.035	−−0.028	0.034	−−0.131	−−0.382	−−0.171	0.004	0.289	1.000		
(10)	Board size	11.293	2.924	−−0.031	0.185	−−0.094	0.204	0.509	0.401	0.062	−−0.059	−−0.256	1.000	
(11)	Board independence	0.785	0.116	−−0.021	0.076	−−0.025	0.035	0.045	0.146	−−0.003	0.036	−−0.084	0.102	1.000
(12)	Outside director ownership	0.051	0.177	0.018	−−0.044	0.008	−−0.019	−−0.035	−−0.018	−−0.003	−−0.010	−−0.037	−−0.039	0.074
(13)	TMT size	5.600	1.202	0.069	0.001	−−0.010	0.007	0.135	0.142	−−0.034	0.004	−−0.054	0.162	0.022
(14)	TMT average age	53.398	4.835	0.026	−−0.015	0.034	0.145	0.163	0.278	0.030	−−0.042	−−0.106	0.264	−−0.034
(15)	TMT diversity	0.751	0.070	0.037	0.019	0.008	−−0.031	−−0.053	0.027	−−0.025	−−0.005	−−0.054	0.102	0.007
(16)	CEO age	56.072	6.905	0.032	−−0.044	0.067	0.066	0.088	0.178	0.011	−−0.052	−−0.097	0.118	−−0.039
(17)	CEO tenure	9.001	6.583	−−0.051	−−0.029	0.043	−−0.002	−−0.113	−−0.060	−−0.018	0.071	0.125	−−0.206	−−0.108
(18)	CEO duality	0.619	0.486	−−0.002	−−0.036	0.056	0.081	0.177	0.180	0.040	−−0.132	−−0.155	0.160	0.095
(19)	CEO ownership	0.020	0.049	0.004	−−0.057	0.043	−−0.079	−−0.142	−−0.164	−−0.043	−−0.004	0.060	−−0.184	−−0.106
(20)	Analyst coverage	11.012	6.122	−−0.120	0.317	−−0.244	0.002	0.240	−−0.089	0.151	0.093	−−0.054	0.159	0.066
(21)	Analyst consensus	−−0.465	0.288	−−0.026	−−0.207	0.164	−−0.038	−−0.219	−−0.008	−−0.111	0.007	0.068	−−0.131	−−0.085

(Continues)

Table I. (Continued)

	Variables	*Mean*	*SD*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*
(22)	Industry dynamism	0.024	0.022	0.048	−−0.111	0.070	0.034	−−0.150	0.032	−−0.017	0.005	0.099	−−0.009	0.070
(23)	Industry munificence	0.066	0.150	−−0.056	0.036	−−0.070	0.021	−−0.006	−−0.051	−−0.016	0.021	−−0.008	0.027	0.028
(24)	Industry concentration	0.188	0.135	−−0.001	−−0.030	0.004	0.018	0.077	−−0.007	−−0.085	−−0.087	0.107	0.006	−−0.001
(25)	Industry dummy	0.602	0.490	−−0.086	−−0.095	0.046	−−0.002	0.002	−−0.366	0.069	−−0.173	−−0.327	−−0.102	−−0.140

	Variables	*(12)*	*(13)*	*(14)*	*(15)*	*(16)*	*(17)*	*(18)*	*(19)*	*(20)*	*(21)*	*(22)*	*(23)*	*(24)*	*(25)*
(12)	Outside director ownership	1.000													
(13)	TMT size	0.013	1.000												
(14)	TMT average age	−−0.001	−−0.005	1.000											
(15)	TMT diversity	−−0.022	0.085	−−0.037	1.000										
(16)	CEO age	0.014	0.025	0.663	−−0.048	1.000									
(17)	CEO tenure	0.012	−−0.074	0.238	−−0.191	0.424	1.000								
(18)	CEO duality	−−0.013	0.072	0.191	−−0.037	0.249	0.155	1.000							
(19)	CEO ownership	−−0.035	−−0.018	0.058	−−0.058	0.192	0.306	0.032	1.000						
(20)	Analyst coverage	0.024	0.103	−−0.135	0.033	−−0.125	−−0.104	0.017	−−0.111	1.000					
(21)	Analyst consensus	−−0.021	−−0.062	0.081	−−0.061	0.063	0.093	−−0.083	0.103	−−0.610	1.000				
(22)	Industry dynamism	−−0.006	0.027	0.110	0.031	0.103	0.035	0.065	−−0.017	0.020	−−0.050	1.000			
(23)	Industry munificence	−−0.024	−−0.004	0.033	0.021	0.001	0.013	0.027	0.030	0.125	−−0.116	0.113	1.000		

(Continues)

Table I. (Continued)

Variables		*(12)*	*(13)*	*(14)*	*(15)*	*(16)*	*(17)*	*(18)*	*(19)*	*(20)*	*(21)*	*(22)*	*(23)*	*(24)*	*(25)*
(24)	Industry concentration	0.016	0.059	0.054	−−0.003	0.046	0.020	−−0.047	0.034	−−0.059	0.015	0.193	0.036	1.000	
(25)	Industry dummy	0.002	−−0.027	−−0.127	−−0.027	−−0.094	0.021	−−0.025	0.054	0.061	−−0.023	−−0.088	−−0.026	−−0.192	1.000

Note: N = 1325. Correlations with an absolute value >0.054 are significant at $p < 0.05$.

Table II. GEE model results (DV: Strategic action intensity)

	Strategic action intensity											
	Model 1			*Model 2*			*Model 3*			*Model 4*		
Variables	*Coeff.*	*SE*	*p*	*Coeff.*	*SE*	*p*	*Coeff.*	*SE*	*p*	*Coeff.*	*SE*	*p*
Firm size	0.032	(0.001)	[0.000]	0.032	(0.001)	[0.000]	0.032	(0.001)	[0.000]	0.032	(0.001)	[0.000]
Firm age	−0.000	(0.000)	[0.071]	−0.000	(0.000)	[0.020]	−0.000	(0.000)	[0.670]	−0.000	(0.000)	[0.627]
ROS_*t*−1	0.041	(0.007)	[0.000]	0.034	(0.005)	[0.000]	0.050	(0.006)	[0.000]	0.052	(0.006)	[0.000]
R&D intensity	0.271	(0.012)	[0.000]	0.311	(0.014)	[0.000]	0.266	(0.012)	[0.000]	0.265	(0.012)	[0.000]
Organizational slack	0.001	(0.001)	[0.229]	0.000	(0.001)	[0.952]	−0.000	(0.001)	[0.753]	−0.000	(0.001)	[0.981]
Board size	−0.001	(0.001)	[0.215]	−0.000	(0.000)	[0.592]	0.000	(0.000)	[0.889]	−0.000	(0.000)	[0.734]
Board independence	0.163	(0.015)	[0.000]	0.100	(0.012)	[0.000]	0.156	(0.016)	[0.000]	0.152	(0.016)	[0.000]
Outside director ownership	0.005	(0.007)	[0.481]	0.005	(0.007)	[0.438]	0.005	(0.006)	[0.440]	0.005	(0.006)	[0.444]
TMT size	−0.003	(0.001)	[0.010]	−0.002	(0.001)	[0.029]	−0.001	(0.001)	[0.394]	−0.001	(0.001)	[0.550]
TMT average age	0.002	(0.000)	[0.000]	0.001	(0.000)	[0.002]	0.000	(0.000)	[0.358]	0.000	(0.000)	[0.611]
TMT diversity	0.113	(0.023)	[0.000]	0.150	(0.021)	[0.000]	0.042	(0.027)	[0.118]	0.034	(0.027)	[0.215]
CEO age	−0.001	(0.000)	[0.012]	−0.001	(0.000)	[0.000]	−0.001	(0.000)	[0.009]	−0.000	(0.000)	[0.081]
CEO tenure	0.000	(0.000)	[0.143]	−0.000	(0.000)	[0.049]	0.001	(0.000)	[0.031]	0.000	(0.000)	[0.087]
CEO duality	−0.023	(0.003)	[0.000]	−0.023	(0.002)	[0.000]	−0.028	(0.002)	[0.000]	−0.029	(0.002)	[0.000]
CEO ownership	−0.163	(0.052)	[0.002]	−0.010	(0.033)	[0.767]	−0.151	(0.043)	[0.000]	−0.137	(0.042)	[0.001]
Analyst coverage	0.002	(0.000)	[0.000]	0.001	(0.000)	[0.000]	0.002	(0.000)	[0.000]	0.002	(0.000)	[0.000]
Analyst consensus	0.001	(0.004)	[0.755]	−0.007	(0.003)	[0.041]	−0.019	(0.005)	[0.000]	−0.013	(0.004)	[0.004]
Industry dynamism	−0.414	(0.105)	[0.000]	−0.172	(0.087)	[0.049]	−0.238	(0.087)	[0.006]	−0.247	(0.085)	[0.003]
Industry munificence	0.066	(0.012)	[0.000]	0.035	(0.009)	[0.000]	0.016	(0.011)	[0.159]	0.015	(0.011)	[0.180]
Industry concentration	−0.027	(0.006)	[0.000]	−0.014	(0.005)	[0.006]	−0.032	(0.006)	[0.000]	−0.032	(0.006)	[0.000]
Industry dummy	−0.008	(0.003)	[0.003]	−0.019	(0.002)	[0.000]	−0.016	(0.003)	[0.000]	−0.015	(0.003)	[0.000]

(Continues)

Table II. (Continued)

	Strategic action intensity											
	Model 1			*Model 2*			*Model 3*			*Model 4*		
Variables	*Coeff.*	*SE*	*p*	*Coeff.*	*SE*	*p*	*Coeff.*	*SE*	*p*	*Coeff.*	*SE*	*p*
Percentage of sell recommendations				−0.059	(0.016)	[0.000]	−0.060	(0.017)	[0.000]	−0.081	(0.021)	[0.000]
CEO time horizons							−0.000	(0.000)	[0.041]	−0.000	(0.000)	[0.005]
Percentage of sell recommendations × CEO time horizons										0.004	(0.002)	[0.031]
Years dummies	Included			Included			Included			Included		
Observations (CEO–Years)	1325			1325			1325			1325		

Table III. GEE model results (DV: Strategic action irregularity)

	Strategic action irregularity											
	Model 1			*Model 2*			*Model 3*			*Model 4*		
Variables	*Coeff.*	*SE*	*p*	*Coeff.*	*SE*	*p*	*Coeff.*	*SE*	*p*	*Coeff.*	*SE*	*p*
Firm size	−0.408	(0.055)	[0.000]	−0.409	(0.055)	[0.000]	−0.404	(0.055)	[0.000]	−0.402	(0.055)	[0.000]
Firm age	−0.001	(0.005)	[0.805]	−0.001	(0.005)	[0.830]	0.001	(0.005)	[0.904]	0.000	(0.005)	[0.954]
ROS_*t*−1	−0.890	(0.425)	[0.036]	−0.792	(0.425)	[0.063]	−0.779	(0.425)	[0.067]	−0.769	(0.424)	[0.070]
R&D intensity	−2.846	(0.569)	[0.000]	−2.795	(0.568)	[0.000]	−2.771	(0.567)	[0.000]	−2.792	(0.566)	[0.000]
Organizational slack	0.018	(0.059)	[0.762]	0.026	(0.059)	[0.656]	0.023	(0.059)	[0.695]	0.026	(0.059)	[0.664]
Board size	0.036	(0.027)	[0.189]	0.040	(0.027)	[0.146]	0.043	(0.027)	[0.114]	0.042	(0.027)	[0.122]
Board independence	0.043	(0.563)	[0.939]	0.089	(0.562)	[0.874]	0.088	(0.561)	[0.875]	0.141	(0.561)	[0.802]
Outside director ownership	−0.008	(0.353)	[0.982]	−0.016	(0.352)	[0.964]	−0.024	(0.351)	[0.945]	−0.018	(0.351)	[0.960]
TMT size	0.058	(0.054)	[0.276]	0.048	(0.054)	[0.375]	0.043	(0.054)	[0.425]	0.044	(0.053)	[0.407]
TMT average age	0.002	(0.019)	[0.929]	0.002	(0.019)	[0.918]	0.004	(0.019)	[0.837]	0.002	(0.019)	[0.927]
TMT diversity	−0.299	(0.934)	[0.749]	−0.311	(0.932)	[0.738]	−0.371	(0.931)	[0.691]	−0.381	(0.929)	[0.682]
CEO age	0.020	(0.014)	[0.149]	0.018	(0.014)	[0.176]	0.017	(0.014)	[0.199]	0.018	(0.014)	[0.179]
CEO tenure	−0.006	(0.011)	[0.609]	−0.004	(0.011)	[0.713]	−0.003	(0.011)	[0.759]	−0.004	(0.011)	[0.748]
CEO duality	0.358	(0.138)	[0.009]	0.365	(0.137)	[0.008]	0.367	(0.137)	[0.007]	0.354	(0.137)	[0.010]
CEO ownership	−1.004	(1.353)	[0.458]	−1.012	(1.350)	[0.453]	−1.093	(1.348)	[0.418]	−1.057	(1.346)	[0.432]
Analyst coverage	−0.060	(0.014)	[0.000]	−0.055	(0.014)	[0.000]	−0.055	(0.014)	[0.000]	−0.056	(0.014)	[0.000]
Analyst consensus	0.082	(0.276)	[0.767]	0.169	(0.278)	[0.543]	0.160	(0.277)	[0.563]	0.178	(0.277)	[0.521]
Industry dynamism	4.286	(3.148)	[0.173]	3.844	(3.146)	[0.222]	4.017	(3.142)	[0.201]	4.006	(3.135)	[0.201]
Industry munificence	−1.052	(0.449)	[0.019]	−0.993	(0.448)	[0.027]	−0.966	(0.448)	[0.031]	−0.993	(0.447)	[0.026]

(Continues)

Table III. (Continued)

	Strategic action irregularity											
	Model 1			*Model 2*			*Model 3*			*Model 4*		
Variables	*Coeff.*	*SE*	*p*	*Coeff.*	*SE*	*p*	*Coeff.*	*SE*	*p*	*Coeff.*	*SE*	*p*
Industry concentration	0.023	(0.494)	[0.963]	0.084	(0.494)	[0.864]	0.115	(0.493)	[0.816]	0.088	(0.492)	[0.859]
Industry dummy	0.262	(0.158)	[0.096]	0.299	(0.158)	[0.058]	0.323	(0.158)	[0.041]	0.311	(0.158)	[0.049]
Percentage of sell recommendations				1.594	(0.636)	[0.012]	1.594	(0.635)	[0.012]	2.591	(0.755)	[0.001]
CEO time horizons							−0.012	(0.006)	[0.054]	−0.003	(0.007)	[0.715]
Percentage of sell recommendations × CEO time horizons										−0.142	(0.058)	[0.015]
Years dummies	Included			Included			Included			Included		
Observations (CEO–Years)	1325			1325			1325			1325		

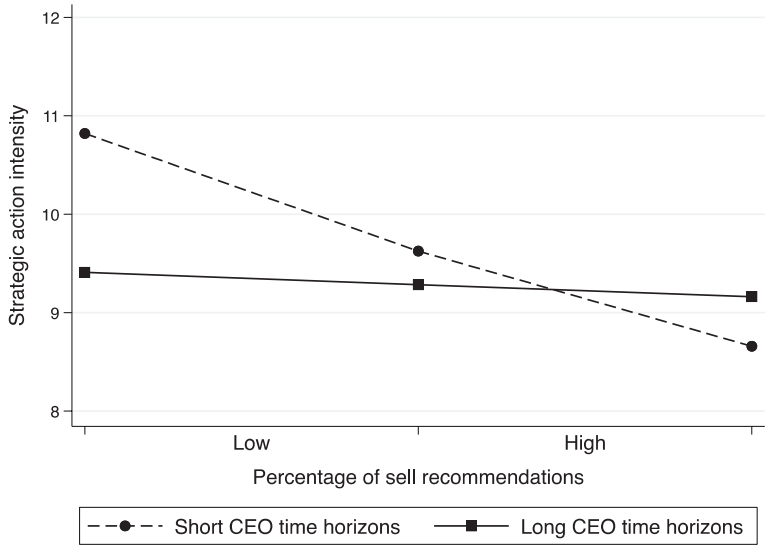

Figure 1. The moderating effect of CEO time horizon in the relationship between percentage of sell recommendations on strategic action intensity

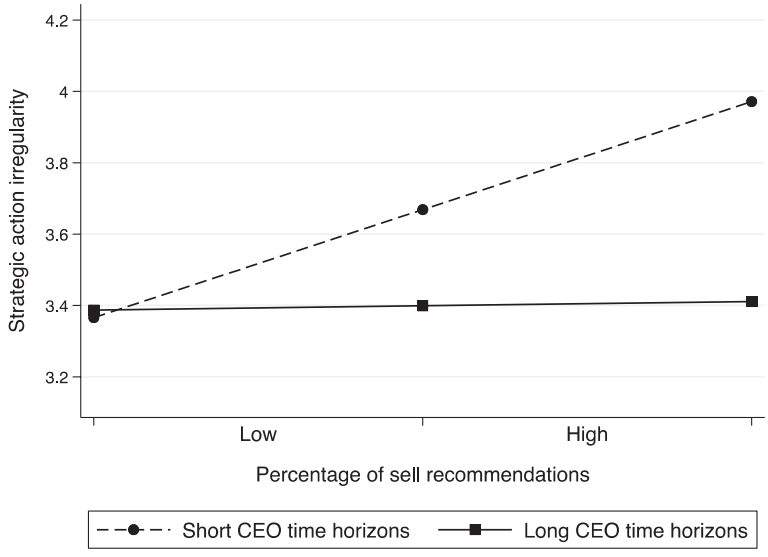

Figure 2. The moderating effect of CEO time horizon in the relationship between percentage of sell recommendations and strategic action irregularity

Robustness Checks

We checked the robustness of our results. First, our results could have been dependent on the specific measure selected. Thus, we assessed negative stock recommendations using an alternative measure: 'average analyst recommendation'. This was measured as

the mean analyst recommendation for all investment analysts who covered a firm in a one-year period (Wiersema and Zhang, 2011). Because the number of analysts varied over time, we calculated the weighted average of the monthly mean recommendation over one-year. Thus, a higher score implies a more *negative* analyst recommendation. The results remain consistent.

Second, individual temporal characteristics (e.g., CEO time horizon) may be subject to the influence of significant events, such as financial crises (Shipp et al., 2009). To remove this potentially confounding effect, we dropped 278 observations for crisis years (e.g., 2008 and 2009). Results remained consistent with those from our original sample.

Third, CEOs' time horizons might be similar within an industry and such an industry effect may bias our results. Thus, we standardized time horizons based on industry. Again, results indicated that CEO time horizon moderated the effects of negative analyst recommendations on strategic action intensity ($b = 0.028$; $p = 0.015$), and action irregularity ($b = -1.634$; $p = 0.014$).

Fourth, new product introductions and business expansions (business-level actions) are different from M&A and strategic alliances (corporate-level actions). The effect of analyst recommendations and CEO time horizon may vary, depending on the types of competitive actions. Thus, we separated business-level actions from corporate-level actions. Because one-year time windows are not long enough to capture a firm's strategic action irregularity over time, we calculated corporate-level strategic action irregularity based on a three-year rolling window. Results remained consistent.

Finally, in the main analysis, because strategic action intensity is a count variable, we specified the negative binomial distribution in running the GEE model. To check the robustness of our results, we log-transformed the variable of strategic action intensity. The results were consistent with the main results.

Endogeneity Correction

Analysts normally accumulate industry and firm information to derive their reports (Washburn and Bromiley, 2014). Thus, it is possible that past competitive actions may influence analyst recommendations, resulting in an issue of dynamic endogeneity (Li et al., 2021). In addition, unobserved variables such as actions from other stakeholders (e.g., employees, customers) or other kinds of information may bias our results. To address these concerns, we adopted an instrumental variable approach (Semadeni et al., 2014). As suggested by Li et al. (2021, p. 355), 'the instrumental variables approach … is powerful and effective in dealing with most sources of endogeneity, including dynamic endogeneity'.

We selected two instrument variables: analyst portfolio complexity (measured by the number of firms covered by an analyst in a given year) and analyst affiliated brokerage house size (measured by the number of analysts employed). We chose these variables because they represent either analysts' or their brokerage houses' prestige (Clement, 1999; Jacob et al., 1999). Analysts with a complex portfolio working for a major house are more apt to issue sell recommendations as they are less vulnerable to management retaliation (Westphal and Clement, 2008). Such status relates to analyst ratings, but not to firm competitive actions.

We further assessed the relevance and exogeneity of our instruments. First, we tested whether the instrument – analyst portfolio complexity and analyst affiliated brokerage house size – were weak using an *F* test. The *F*-test was highly significant ($F = 17.961$; $p = 0.000$), indicating that our two instruments (analyst portfolio complexity, analyst affiliated brokerage house size) were strong. The *F* value also exceeded the recommended threshold of 11.59. Second, the significant result of Durbin–Wu–Hausman test for strategic action intensity ($F = 5.535$; $p = 0.019$) and for strategic action irregularity ($F = 4.216$; $p = 0.040$) suggested that the percentage of sell recommendations is an endogenous variable.

Finally, we tested the overidentifying restrictions of the two-stage model using the Sargan test. The tests for both strategic action intensity and irregularity were not significant ($\chi^2 = 0.160$; $p = 0.689$; $\chi^2 = 1.273$; $p = 0.259$), suggesting that these two instruments are valid. The results after endogeneity correction were consistent with our main results.

DISCUSSION

Our study investigates the role of CEO time horizons in the relationship between negative analyst recommendations and temporal patterns of strategic actions: intensity and irregularity. We found that negative recommendations were inversely related to strategic action intensity but positively related to strategic action irregularity, and that CEO time horizon attenuated these relationships. Our study has several theoretical implications.

Prior research has examined the direct effect of negative analyst reports on competitive actions (Zhang and Gimeno, 2010, 2016). It rests on the agency premise that some CEOs are motivated by self-interest to pursue short-term outcomes. Our research conditions this assumption by highlighting the moderating role of CEO time horizon. This finding complements upper echelons studies that have gone beyond original agency assumptions to consider CEO characteristics such as early life experiences (e.g., O'Sullivan et al., 2021), regulatory focus (e.g., Mount and Baer, 2021), political ideologies (e.g., Chin et al., 2021), self-determination and social identity (e.g., Andrus et al., 2019; Boivie et al., 2012), and performance attributions (Park et al., 2021). Our study extends this research by examining how CEO's time horizons may impact their motivation and capability to act in the face of analyst pressure, and specifically the number and rhythm of strategic actions under such pressure. CEOs with long time horizons continue to build and temporally orchestrate their actions, improving product lines, developing markets, and broaching new strategic alliances.

Moreover, in adopting the AMC model as a central framework, prior research in competitive dynamics has suggested that awareness, motivation, and capability relate to characteristics such as firm size (Chen et al., 2007; Chen and Miller, 1994) and demographic features such as top management team diversity (Ferrier, 2001; Ndofor et al., 2011; Smith et al., 1991). Our study extends this research by highlighting CEO time horizon as a critical factor in shaping a firm's awareness, motivation, and capability to take competitive actions, especially when CEOs are experiencing significant analyst pressure. This is especially meaningful given the work underscoring executive temporality as a critical

driver of competitive actions (Andrevski et al., 2021; Andrevski and Miller, 2022; Chen and Miller, 2015; Nadkarni et al., 2016). Our study takes a step further, showing how CEO time horizon can alleviate analyst pressure, allowing firms to maintain composure in initiating competitive actions.

Finally, our research extends competitive dynamics research by examining the effects of analysts' negative evaluations on temporal patterns of strategic actions. It shows that such external pressure can interrupt a firm's developmental strategic trajectories in a counterproductive way, reducing strategic action intensity and increasing action irregularity. Accordingly, our study provides a more holistic understanding of how CEO time horizons moderate the effect of analyst pressure on a firm's competitive posture.

Our introduction of strategic action rhythm may have significant implications for competitive dynamics research. Although not currently studied by scholars of competitive dynamics, strategy scholars have shown that the rhythm of activities such as new product introductions, strategic change, and international expansion impact firm performance (Brown and Eisenhardt, 1997; Gersick, 1994; Klarner and Raisch, 2013; Laamanen and Keil, 2008; Shi and Prescott, 2012). However, the relevance of rhythm for competition has been ignored. Scholars of competitive dynamics have examined the antecedents and consequences of strategic action intensity, complexity, nonconformity, and forbearance (Andrevski and Miller, 2022; Miller and Chen, 1996b; Ndofor et al., 2011). In this paper, we introduce the notion of rhythm to that domain. Distinct from other dimensions, strategic action rhythm reflects how a firm distributes its strategic actions over time. As one of the first studies to examine its antecedents, our study shows that negative recommendations can interrupt rhythm and increase strategic action irregularity. Future studies could examine other competitive implications of action rhythm and different potential antecedents.

Our findings suggest opportunities for future research. For example, recent years have witnessed increased public concern with environmental crises, and the acknowledged need for businesses to make long-term investments for the benefit of the planet. It would be interesting to discover whether executives of public firms with longer time horizons are better able, through maintaining competitive intensity and rhythm, to resist pressures from analysts and short-term investors to make such ecologically beneficial commitments (Bansal and DesJardine, 2014; DesJardine and Bansal, 2019). Future research could also explore additional CEO temporal attributes that shape motivation, such as time urgency – the feeling of being chronically hurried (Chen and Nadkarni, 2017). For example, a time-urgent CEO may be motivated to address financial analyst pressures more quickly than one who is more relaxed or more willing to forbear strategically (Andrevski and Miller, 2022). Other possible temporal effects to explore are their relationships to CEO stock options (Martin et al., 2016) and compensation packages (Pepper and Gore, 2015), and the resulting implications for firm actions.

Limitations

Our study has several limitations, some of which suggest promising opportunities for future research. First, because we wished to test the joint effects of financial analysts and

CEO time horizons on competitive actions, we focused on large publicly traded firms. Thus, our results may not generalize to small and medium-sized enterprises (SMEs). It would be fruitful to examine how CEO temporal orientations influence the reaction of the latter to external pressure in SMEs.

Second, because we focused on large publicly traded firms, we collected archival data and employed content analysis to measure CEO time horizons. However, we cannot rule out possible biases using secondary data. Future studies could use a survey approach to measure CEO time horizons to strengthen the robustness of our findings.

Third, we relied on CEO quotes from letters to shareholders and earnings conference calls to derive scores for CEO time horizons. This may be problematic because CEO answers in Q&A sessions are prompted by analyst questions. However, as with public interviews, such answers are first-order assertions that reflect CEOs' characteristics (Peterson et al., 2003). As indicated by DeşJardine and Shi (2021, p. 273), 'conversations during earnings calls were more spontaneous than in other corporate disclosures, and therefore less likely to be influenced by staged preparation'. In addition, we made use of multiple archival sources that include letters to shareholders and CEO remarks in earnings conference calls; thus answers during Q&A sessions represent only a small proportion of each CEO's narrative. Therefore, we believe that using CEO quotes from Q&A section is unlikely to bias our results and interpretations.

Finally, our findings suggest that long CEO time horizons are especially useful in the context of negative analyst recommendations. However, these can have downsides. For example, they may overcommit executives to long-term goals and thereby reduce flexibility (Nadkarni et al., 2016). Therefore, we recommend future studies to explore contexts where long CEO time horizons can be detrimental.

Practical Implications

Our results help to enlighten executives about potentially fruitful, alternative ways of managing the pressures imposed by negative financial analyst reports. Such reports may generate excessive or precipitous reactions from executives that erode shareholder returns and even executive reputations. Those reactions may also prevent executives from making socially and environmentally beneficial long-term investments. Our results suggest that CEOs with long time horizons can better resist such pressures and remain resolved and coherent in shaping firm strategic actions. Thus, temporality may serve as a critical selection criterion in evaluating prospective CEO candidates.

CONCLUSION

In conclusion, this study underscores the essential role of CEO time horizons in the relationship between negative analyst recommendations and firm competitive actions. It shows that CEO time horizon attenuates the negative effect of negative analyst recommendations on strategic action intensity; it also reduces the positive effect of negative analyst recommendations on strategic action irregularity. We hope that the promising results of this study will stimulate additional research on CEO temporal orientations and competitive actions.

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APPENDIX A
Competitive Action Category and Examples

Action category	*Company*	*Example*
New production introduction	Intel Corporation	Intel announces Intel® connected logistics platform
M&A transaction announcements	Walmart Inc.; Art.com Inc.	Walmart Inc. agreed to acquire Art.com Inc.
Strategic alliances	Microsoft Corporation; PCL Constructors Inc.	PCL construction and microsoft join forces to fuel joint innovation and development of smart building implementations
Business expansion	Amazon.com, Inc.	Amazon expands Toronto Tech Hub

APPENDIX B
Dictionary of Words for Time Horizons

Future temporal cues	*Dictionary of words*	*Examples*	*Numeric time frame (in years)*
Specific calendar-time points:	2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025	'…we expect annual revenue streams to total between $400 million and $500 million by fiscal 2015'. – *from* Disney's 2011 earnings conference calls.	4
Numerical time frames:	Next month, next three months, next six months, next year, next three years, next five years, next 10 years, a decade, two decades, century, centuries	'…over the next five years, we expect the strategic actions we have' taken will help us drive our total company presence in emerging markets at a double-digit compound annual growth rate'. – *from* Abbott Laboratories' 2010 LTS	5
Non-numeric temporal descriptors:	*Proximal time cues*: now, today, current, currently, soon, quickly, immediately, immediate future, shortly, short-term, short term, short run. *Distal time cues*: long-term, long term, distant future, long run, long time from now. *Medium-term time cues*: sometime from now, medium term, medium-term, in the coming years.	'Because opportunities like these continue to far outweigh our challenges, I remain incredibly optimistic about our future prospects and about the long-term health of 3M'.– *from* 3M's 2010 LTS	10 (assigned based on the longest time frame identified from calendar-time points and numeric time spans in the same document)