© *Academy of Management Journal*
2015, Vol. 58, No. 3, 658–679.
http://dx.doi.org/10.5465/amj.2013.1105

WHEN THE LEADER FOLLOWS: AVOIDING DETHRONEMENT THROUGH IMITATION

JAN-MICHAEL ROSS*
Imperial College Business School

DMITRY SHARAPOV*
Imperial College Business School

When is imitation of follower actions an effective competitive strategy for a leader? Building on prior work in competitive dynamics from the Austrian School perspective, we propose that imitation can be an effective means of staying ahead, even in the absence of mimetic social pressures. This is because the leader's imitation of follower actions represents equilibrating moves to maintain the status quo in reaction to the disequilibrating actions that the follower undertakes to catch up with the leader. Furthermore, reduction of difference in competitive positioning between leader and follower serves the same purpose, and both imitation strategies are complementary. These effects of "action imitation" and "positioning imitation," we argue, are moderated by the degree of environmental uncertainty, by the extent of the leader's initial advantage, and by the difference between leader and follower capabilities. Our theoretical arguments are supported by an analysis of data on head-to-head boat races from the America's Cup World Series. By developing mechanisms that take endogenous and exogenous contingencies of competitive interactions into account, this paper advances competitive dynamics as a predictive theory of performance outcomes.

Winning the battle for market leadership is at the heart of competitive strategy. Overtaking the market leader has often been termed "dethronement" in prior literature and is considered a key managerial objective (Ferrier, Smith, & Grimm, 1999; Smith, Ferrier, & Grimm, 2001a). Management scholars across different fields have shown that imitating leaders can be an effective way for followers to catch up with and surpass the leader (Posen, Lee, & Yi, 2013). However, less attention has been given to the possibility of leaders imitating competitor moves and to the performance consequences of such a strategy. This is surprising, since leading firms do leverage imitation strategies in attempts to defend their leadership. For example, Apple, the market leader in smartphones for a number of years, imitated the moves made by Samsung in offering larger screens for iPhones two years after Apple's chief executive officer (CEO) publicly stated that phones with larger screens would not sell (Ziegler, 2010).

Competitive dynamics research would suggest that Apple's reaction to Samsung's move was a strategic response to the threat of dethronement. Prior research in this stream of literature promotes the dissimilarity hypothesis, which suggests that pursuing different opportunities from those pursued by competitors can prevent dethronement (Ferrier et al., 1999). Apple, by contrast, decided to launch very similar products to those of its competitors. In other words, while Samsung initiated

* Both authors contributed equally to this paper. Please direct correspondence to Jan-Michael Ross, jan.ross@imperial.ac.uk

We are grateful for the insights and valuable advice of associate editor Martine Haas and three anonymous reviewers. For their feedback on earlier versions of the paper, we would like to thank Gautam Ahuja, Gerry George, Sam MacAulay, and Yuri Mishina. The participants of the Innovation and Entrepreneurship (I&E) Paper Development Workshop and the Organization and Management (O&M) seminar at Imperial College Business School, the Strategy and Management seminar at the Norwegian School of Economics (NHH), and those attending our sessions at Academy of Management 2013, DRUID 2013, and the Copenhagen Conference on I&E 2014 also provided valuable suggestions that helped the paper's development. We would also like to thank Iain Murray, Stan Honey, and Andy Hindley of the 34th America's Cup Event Authority for helping us to resolve queries about the data. Dmitry Sharapov is grateful for financial support from the British Academy.

new actions to catch up with the market leader, Apple followed Samsung's decision in order to neutralize that move.

In this study, we bring attention to the imitation strategies of leaders and investigate whether, and under what conditions, imitating a follower's actions can be an effective competitive strategy. Imitation decisions are crucial for market leaders, because imitative response can lower the durability of the first-mover advantages of an attacking rival (Boyd & Bresser, 2008; Lee, Smith, Grimm, & Schomburg, 2000). Therefore it is important to theorize and empirically test how to manage these threats and sustain an advantage over competitors. Our central argument suggests that a "follow the follower" strategy, a reversal of "follow the leader," can be a viable means of avoiding dethronement. This is because the leader's imitation behavior represents equilibrating actions to maintain the status quo in reaction to the disequilibrating actions that the follower undertakes to create opportunities and catch up with the leader. We predict that two types of complementary imitation strategy can be effective: imitation of follower actions ("action imitation"), and imitation of follower positioning ("positioning imitation"). While the former can be considered to be imitation of the follower's tactical moves, the latter can broadly be thought of as imitation of the follower's competitive strategy. Apple's imitation of Samsung's introduction of larger-screened smartphones is therefore an example of action imitation, while a hypothetical decision to alter Apple's entire product portfolio to more closely resemble Samsung's would be an example of positioning imitation. Since market disequilibria, and therefore opportunities for dethronement, not only arise from competitive interactions, but also depend on (endogenous) organizational factors and exogenous changes in the environment (Roberts & Eisenhardt, 2003), we predict that the effectiveness of both imitation strategies increases when the initial advantage of the leader is high and when the competitive environment is more uncertain, and is lower when the follower has a capability advantage over the leader.

There are three alternative explanations from existing theory for Apple's behavior that lie outside the competitive dynamics literature. First, firms often have to ensure that their actions are sufficiently similar to those of rivals (Basdeo, Smith, Grimm, Rindova, & Derfus, 2006), because visible market actions send signals to stakeholders and build firm reputations. Therefore conforming to industry norms and gaining legitimacy for actions could serve as motivation for the leading firm to imitate. However, in the case of Apple, which fought several lawsuits against rivals for imitating its products, its reputation as market leader could have suffered from this imitative move. Indeed, despite positive reviews, a number of influential technology journalists called the larger-screened iPhone 5 "boring" for not having radically innovative features (e.g., Honan, 2012; Vascellaro, 2012), and some even went as far as to affirm that Apple was now "doing a lot of the imitating" in the smartphone market (Gillmor, 2012). Additionally, recent findings show that, even under low external social pressure, firms respond to the moves of their rivals when facing a high level of competitive activity (Pacheco & Dean, 2014).

Second, the literature on mimetic isomorphism suggests that imitation could also be driven by actions of high-status peers (Rao, Greve, & Davis, 2001). However, both Apple and Samsung were already operating in smartphone markets; since Apple had a strong position in the market and Samsung was seeking to increase its market share, the literature on status decisions does not appear to explain this example.

Finally, information-superiority signals sent by a competitor's actions, which lower the uncertainty that the leading firm is facing and indicate a market's attractiveness, may drive imitation (Anand, Mesquita, & Vassolo, 2009; Semadeni & Anderson, 2010). However, low innovativeness of the imitated feature and high visibility of competitor actions suggests that it is unlikely that Apple's decision was driven by information asymmetry.

In order to isolate the mechanisms of interest from alternative explanations, we selected an empirical context in which the influence of social pressures on competitive interaction, such as competition for stakeholder attention, is minimal. Head-to-head sailing competitions (that is, match races) from the America's Cup World Series (ACWS) 2011–12 provided an ideal setting, because we could study imitation strategies in a competitive process with observable competitor moves and performance consequences in the absence of reputational effects. We would also have access to detailed data on time-variant exogenous environmental conditions (that is, wind direction) that impact on race outcomes.

Our hypotheses are supported by our findings. The theoretical insights from the study provide new explanations for imitative behavior, and our findings extend the literature by showing that imitation strategies can actually neutralize the potential competitive gains sought by followers. In other

words, what seems to be a phenomenon that effectively exploits opportunities (that is, leaders follow because they believe that follower actions signal the existence of attractive opportunities) may, in some settings, in fact be a phenomenon that destroys follower opportunities to catch up. What can at first appear to be a ferocious battle for market leadership may be better understood as the active maintenance of a stable equilibrium by the leader, who wishes to avoid dethronement.

AVOIDING DETHRONEMENT THROUGH IMITATION

Competitive dynamics offers a valuable perspective for studying imitative response (Chen & MacMillan, 1992). Competitive action (and response) is defined as an "externally directed, specific, and observable competitive move initiated by a firm to enhance its relative competitive position" (Smith, Ferrier, & Ndofor, 2001b: 321). In this sense, imitation, or a matched competitive action, is a response to a rival's move, taken in order to defend or enhance relative performance. Several studies examine the performance consequences of a leader's reaction to challenger moves (e.g., Smith, Grimm, Gannon, & Chen, 1991), and show that early responders perform better than late responders (Chen & MacMillan, 1992), or that leaders who make fewer moves or who act slower than challengers are more likely to be dethroned (Ferrier et al., 1999).

Following the Austrian School (Jacobson, 1992; Kirzner, 1973), competition is defined as a dynamic market process in which competitive actions challenge the existing status quo. The distinction from static market conditions is based on the idea that this process is characterized by market movements toward and away from equilibrium. Accordingly, disequilibrium states provide opportunities that arise and dissipate, with limited temporal windows for their exploitation (e.g., D'Aveni, Dagnino, & Smith, 2010; Jacobson, 1992). While entrepreneurial activity upsets the status quo (Ferrier et al., 1999; Smith & Di Gregorio, 2002), imitators lead to a new equilibrium being established (Kirzner, 1973: 128). Roberts and Eisenhardt (2003) point out that disequilibrium is driven by endogenous actions of managers and exogenous changes (such as changes in consumer preferences), because sensing and exploiting opportunities in the competitive process depends on real-time learning at the firm level, while undertaking competitive actions under uncertainty at the market level. They proceed to suggest that the Austrian School perspective can be advanced by focusing on the intersection between the strategy and organization literatures.

Prior work acknowledges the role of organizational and environmental factors as antecedents of performance outcomes (for a review, see Smith et al., 2001b). However, these factors are often studied from distinct perspectives within the field of strategic management, and different (for example micro and macro) perspectives have yet to be integrated (Chen & Miller, 2012). Recent work emphasizes the importance of environmental conditions for the effectiveness of firm actions. In particular, increasing volatility of hypercompetitive environments enhances the positive effect of action aggressiveness on firm performance (Chen, Lin, & Michel, 2010). In established markets, which are characterized as being stable, market leaders are rarely dethroned, while in new markets, by contrast, entrepreneurial firms can perform well, since (in the language of fitness landscapes) peaks are moving, unpredictable, and hard to defend (Katila, Chen, & Piezunka, 2012). Because these unpredictable environments create disequilibrium (Kirzner, 1997; Roberts & Eisenhardt, 2003) and provide opportunities to catch up with the leader, under what conditions are equilibrating actions taken by the leader to avoid dethronement more effective?

Our theoretical framework will argue that two distinct types of imitation strategy are related to equilibrating actions and determine the likelihood of the leader staying ahead. The first imitation strategy is about imitating competitor actions. "Action imitation" can therefore be thought of as imitation of the follower's tactical moves. The second strategy is about imitating the competitor's positioning. In a business context, competitive positioning has frequently been operationalized as firm position in either geographical (e.g., Seamans & Zhu, 2014) or product (e.g., Wang & Shaver, 2014) space relative to competitors, but it can also more broadly be thought of as imitation of the competitive strategy of the follower. Strategic actions and tactical actions in a competitive process are distinct from each other, since the level of commitment or resources, difficulty of implementation, and irreversibility are higher for the former than they are for the latter (Smith et al., 1991). We develop a theoretical framework that suggests that these two distinct constructs affect the likely difference between leader and follower performance outcomes, are complementary imitation strategies, and therefore influence the likelihood of the leader remaining in the lead (Hypotheses 1 and 2). We

further argue that the performance outcomes of decisions to imitate follower actions and positioning are contingent on three different factors: environmental uncertainty, the extent of the leader's initial advantage, and the difference in capabilities between leader and follower (Hypotheses 3, 4, and 5).

Direct Effects of Action Imitation and Positioning Imitation

In leader–follower competition, the leader's main objective will be to stay ahead (Lieberman & Asaba, 2006). Competitive dynamics of action and response can enable a follower to catch up with a leader (Ferrier et al., 1999). If the leader can easily observe and accurately imitate the actions of the follower, an action imitation strategy will match, and therefore equilibrate, the follower's disrupting moves, and will result in similarity between leader and follower competitive trajectories. Assuming identical capabilities in implementing an action, similar competitive trajectories will yield similar performance, and a leader accurately imitating the actions of its follower is likely to remain in the lead because it neutralizes performance differences arising as a consequence of (aggressive) follower moves.

By contrast, a leader taking the decision not to imitate the actions of the follower will have a competitive trajectory that differs significantly from that of the follower. A leader may not respond to follower actions because it is blind to opportunities discovered by the rival (Smith et al., 2001a), owing to constraints in evaluating rival moves, such as bounded rationality. The leader may also decide to wait and see whether the follower's action has a disequilibrating effect on the market (Ferrier et al., 1999) before choosing a response, or may simply decide to pursue its own perceived opportunities regardless of the actions of the follower. Since different competitive trajectories are likely to result in different performance owing to follower opportunities created by disrupting the status quo (Ferrier et al., 1999), favoring one action sequence over the other, the leader in this case runs the risk of the follower's set of actions outperforming its own. If this performance difference is large enough, the lead will be lost:

Hypothesis 1a. The likelihood of the leader staying ahead of the follower increases with the extent to which the leader imitates the follower's actions.

A second aspect of competitive interaction that also affects performance outcomes is the difference between leader and follower competitive positioning. In contrast to the extent of imitation of follower actions, which captures similarity between the sequences of leader and follower actions over time, this "positioning imitation" captures the similarity between leader and follower competitive positions. Hence competitors can follow an action imitation strategy and also have the same competitive positioning, or they can imitate actions while positioning themselves differently and vice versa.

Competitors may begin the competitive process in different competitive positions, because fast followers decided to attack the leader by undertaking entrepreneurial actions to create disequilibrium (Ferrier et al., 1999), or if the competitor entered much later, different environmental conditions might have motivated the follower to choose a different competitive position. A leader may stick to the original competitive position because changing requires alterations to numerous interdependent organizational attributes and thus generates significant switching costs, which are often irreversible (Chen & MacMillan, 1992). If the competitive positions of the rivals differ and the leader decides not to imitate, it will be risking dethronement as a result of being asymmetrically exposed to longer-term environmental changes vis-à-vis the follower. Alternatively, if the leader decides to match the follower's competitive position—a high degree of positioning imitation—both leader and follower will similarly benefit (or suffer) from longer-term environmental changes that change the relative advantages of different positions. The greater the imitation of follower positioning by the leader, the higher the likelihood of the leader staying ahead of the follower, as a result of a lower likely difference between leader and follower performance outcomes:

Hypothesis 1b. The likelihood of the leader staying ahead of the follower increases with the extent to which the leader imitates the follower's positioning.

Interaction Effect between Action Imitation and Positioning Imitation

The leader is able to choose the extent to which it imitates both the actions and the positioning of the follower. Strategic actions are typically fine-tuned by tactical actions (Smith et al., 1991). The effect of a given sequence of competitive actions will differ

across different competitive positions; therefore the effect of action imitation on the performance differences between the leader and the follower is contingent on the similarity of competitive positions between the rivals. The likely difference between performance outcomes of the leader and the follower is minimized when the rivals have both identical competitive trajectories and the same positioning over the course of the competition. An increase in action imitation when positioning imitation increases will therefore reduce the likely performance difference between competitors by more than the same increase in action imitation when positioning imitation does not increase:

Hypothesis 2. The greater the extent of positioning imitation, the greater is the effect of action imitation on the likelihood of the leader staying ahead of the follower.

Moderating Effect of Environmental Uncertainty

The environmental context in which competition takes place influences the effect of competitive behavior on performance (Chen et al., 2010). Recent work has argued that high-velocity environments provide opportunities to achieve superior performance (e.g., Davis, Eisenhardt, & Bingham, 2009; Thomas & D'Aveni, 2009). Particularly, the unpredictability of the environment has high relevance for performance outcomes in competitive interactions taking place in high-velocity environments (Baum & Wally, 2003).

"Unpredictability" can be defined as "the amount of disorder or turbulence in the flow of opportunities such that there is less consistent similarity or pattern" (Davis et al., 2009: 424). The management literature often uses the term "uncertainty" to refer to the unpredictability of environmental contingencies affecting performance (Miller, 1992). Uncertainty of this kind is common to all competitors, because it arises from exogenous sources (Sutcliffe & Zaheer, 1998). The exploitation of market inefficiencies through the competitive process in uncertain environments provides opportunities for profits and growth: Firms that are prepared to act in the face of uncertainty may be rewarded with entrepreneurial rents (Knight, 1921; Rumelt, 1987).

The Austrian School perspective suggests that firms should seek out environmental uncertainty instead of avoiding it (Kirzner, 1997; Roberts & Eisenhardt, 2003). Although competitors may prefer to wait for uncertainty to resolve before making any decision, to avoid standing still while other competitors take action (Derfus, Maggitti, Grimm, & Smith, 2008), they have to choose a trajectory that they believe will be beneficial.

Competitive interactions can result in footholds that create growth options, which can be exercised if future environmental conditions turn favorable (Upson, Ketchen, Connelly, & Ranft, 2012). Therefore a follower that undertakes new actions in an uncertain environment creates upside opportunities that increase its chances of catching up with the leader. Competitive actions in uncertain environments can be used to neutralize the upside opportunities of the follower. In particular, in order to maintain competitive parity in uncertain environments, a leader may decide to follow a strategy that includes holding shared growth options, which provide the same upside opportunities to competitors based on future industry conditions (Kester, 1984; Maritan & Alessandri, 2007). Imitating follower moves provides the leader with similar options. As a consequence, putting identical bets on the future under unpredictable environments can lead to identical large positive or negative outcomes for all competitors (Lieberman & Asaba, 2006). In an uncertain environment, a leader who decides not to imitate the follower's actions increases the risk of being overtaken. This is because a greater degree of uncertainty about the payoff in following any given competitive trajectory will increase the range of possible differences in performance between trajectories chosen by the leader and the follower for all trajectory pairs, apart from those that are identical—that is, those arising from perfect imitation of follower actions by the leader or vice versa. The less similar the leader and follower competitive trajectories, the greater the increase in the range of possible performance differences resulting from greater environmental uncertainty is likely to be.

Therefore, in environments of greater uncertainty, a greater degree of action imitation is likely to reduce performance differences between competitors by a larger extent than it would in less uncertain environments, and the greater the degree of environmental uncertainty, the greater is the increase in likelihood of the leader remaining ahead owing to an increase in the extent of leader imitation of follower actions.

This moderating effect of environmental uncertainty also applies to the effect of positioning imitation on the likelihood of the leader staying ahead. With a high degree of uncertainty, a smaller difference in competitive positioning reduces the

probability of different performance outcomes resulting from different exposures to volatile environments by more than when uncertainty is low, which therefore increases the likelihood of staying ahead to a greater extent:

Hypothesis 3a. The greater the degree of environmental uncertainty, the greater the effect of action imitation on the likelihood of the leader staying ahead of the follower.

Hypothesis 3b. The greater the degree of environmental uncertainty, the greater the effect of positioning imitation on the likelihood of the leader staying ahead of the follower.

Moderating Effect of Leader's Initial Advantage

A leader is less likely to be threatened by follower actions if the follower holds a more distant second place (Ferrier et al., 1999). A leader with a strong initial advantage, such as high market share, may become isolated in competitive interactions and enjoy the use of its established routines (Derfus et al., 2008). Large market leaders tend to maintain their dominance, to compete based on conservative moves, and to evolve their strategic peaks (Katila et al., 2012). As a consequence, an entrepreneurial firm that challenges the status quo with dissimilar moves can dethrone the leader by taking advantage of opportunities arising in a changing environment if the leader fails to respond.

As action imitation increases the similarity between leader and follower competitive trajectories, and therefore performance outcomes, a given increase in the extent to which the leader imitates the actions of the follower will reduce the maximum likely difference in performance outcomes between leader and follower by a given amount. Whether or not this reduction in performance difference materially affects the likelihood of the leader staying ahead depends on the initial performance advantage of the leader over the follower.

Suppose that the leader's initial advantage over the follower is minuscule, so that nearly any superiority in follower performance is likely to be sufficient for the lead to change hands. Then, even near-perfect imitation of follower actions, while maintaining very similar competitive positions, may be unable to preclude the possibility of the follower outperforming the leader and seizing first place. In this case, an increase in action imitation or positioning imitation to anything but the highest level possible is unlikely to have much effect on the likelihood of the leader staying ahead. By contrast, given a large initial advantage, an increase in the extent of the leader's imitation of follower actions or an increase in positioning imitation from most base values will act as an effective means of reducing the risk of a performance difference that is sufficiently large for the lead to change hands:

Hypothesis 4a. The greater the initial advantage, the greater the effect of action imitation on the likelihood of the leader staying ahead of the follower.

Hypothesis 4b. The greater the initial advantage, the greater the effect of positioning imitation on the likelihood of the leader staying ahead of the follower.

Moderating Effect of Follower's Capability Advantage

The Austrian School emphasizes that invisible assets, such as information or skills, determine firm activity (Young, Smith, & Grimm, 1996), and are key success factors when adapting to a changing environment and exploiting opportunities (Jacobson, 1992). This perspective implies that firms have to uncover opportunities that are not observable *ex ante*—an activity to which real-time learning during the process of competing in uncertain environments contributes (Roberts & Eisenhardt, 2003).

Performing a coordinated set of individual tasks (that is, the execution of a capability) depends on environmental cues (Helfat & Peteraf, 2003 ; Nelson & Winter, 1982: 88). Therefore competitive interactions can provide the information necessary to leverage organizational capabilities more effectively. Furthermore, since equilibrating actions diffuse knowledge among market participants and reduce confusion about potential opportunities (Smith & Di Gregorio, 2002), the leader's imitation strategies could backfire once followers effectively leverage the released information.

Prior research shows that imitation increases similarity among competitors and therefore increases the availability of useful information (Baum, Li, & Usher, 2000; Greve, 1998). In particular, the leader's action imitation strategy releases information that enables the follower to leverage its capabilities more efficiently, because by observing the effectiveness of similar leader actions in the given environmental conditions the follower is better able to coordinate the performance of routines underlying the relevant

competitive capabilities. In other words, imitation of follower actions by the leader provides information that allows the follower to reduce the number of decisions that need to be made in the process of searching for the best configuration in given environmental conditions—the configuration that maximizes the utilization of the follower's capabilities (Rivkin, 2000: 843).

A follower with a capability advantage over the leader will gain more from the information provided by the leader's action imitation strategy than would a follower with inferior capabilities. In the former case, the information gained may allow the follower's execution of its capabilities to outperform that of the leader even if the leader fully leverages its capabilities. In the latter case, by contrast, a leader is likely to maintain a performance advantage even if the follower utilizes its inferior capabilities to their full potential. Facing a follower with superior capabilities, a leader who decides to imitate the follower will benefit less from such a strategy. This is because the follower can execute its competitive strategy better than the leader can, meaning that the leader's performance resulting from choosing an identical competitive position and action trajectory to the follower will be inferior to that of the follower. Therefore the greater the degree of follower capability advantage, the smaller is the increase in the likelihood that the leader remains ahead, owing to an increase in the extent of leader action and positioning imitation:

Hypothesis 5a. The greater the capability advantages of the follower, the lower the effect of action imitation on the likelihood of the leader staying ahead of the follower.

Hypothesis 5b. The greater the capability advantages of the follower, the lower the effect of positioning imitation on the likelihood of the leader staying ahead of the follower.

DATA AND METHODS

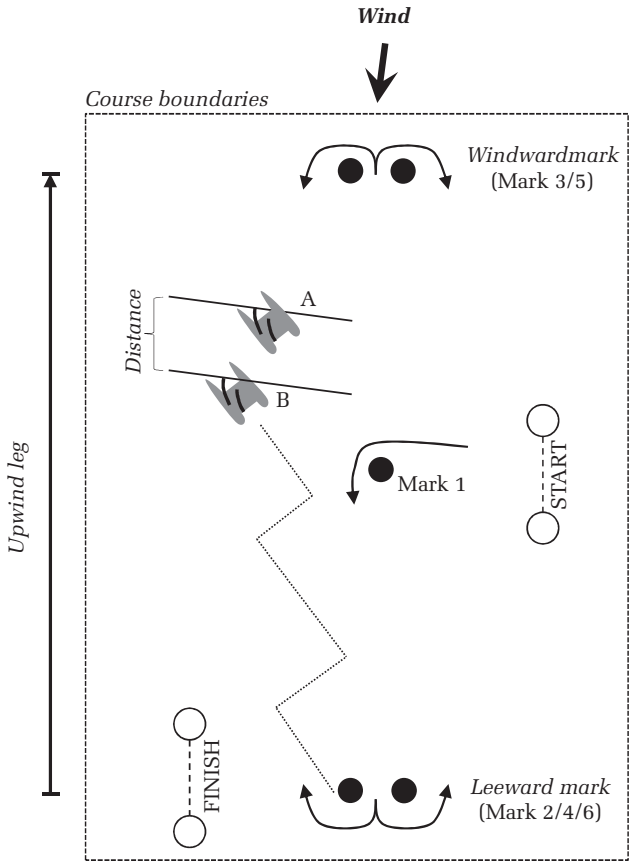
Study Context

We test our hypotheses using data from head-to-head sailing competitions (that is, match races) during the America's Cup World Series (ACWS) 2011–12. There are several reasons why match racing is an appropriate context in which to test our theory. First, competitors in match races are of similar size and have similar resources. The competitors sail on one-design boats, with a fixed crew size and a maximum per person crew weight. The ACWS therefore offers a setting in which performance differences are based on the team's ability to handle the technology in a dynamic environment and on the decisions made during the race.

Second, upwind legs in sailboat racing often involve a reversed "follow the leader" strategy. The beginning of the upwind leg and the relative position between competitors is defined once they round the leeward mark, and the leg ends when the boats reach the windward mark (see Figure 1). Since a sailing boat cannot sail straight in the direction from which the wind is blowing (the windward mark is positioned into the wind direction from the leeward mark), it has to sail a zigzag pattern. "Tacking" is a maneuver during which the front of a boat turns through the wind until the wind blows from the opposite side of the boat to the one from which it was blowing before, and the trajectory sailed by a boat is influenced by where and how often it performs tacking maneuvers. The decision to tack is influenced by the competitor's position: The leading sailboat can copy the moves of the following boat (that is, tack when the follower tacks). If a competitor decides to reverse the last change in heading, it can subsequently tack back. However, during each tacking maneuver, a boat loses speed; hence the decision to tack is costly and not completely reversible. Detailed positional data allow us to observe the pattern of multiple competitive moves of the leader relative to the follower over time and to evaluate its performance consequences.

Third, our theoretical model emphasizes the contingencies that influence the outcomes of imitation strategies. The improvements in relative performances in sailboat races are strongly influenced by changes in wind direction, in combination with the positioning of the boats on the course (Perry, 1984: 182; Willis & Doerr, 1993: 111). Volatility in wind direction can lead to uncertainty over the future wind directions (Cripps & Dunsmuir, 2003; Walker, 1991). Wind shifts (changes in wind direction that are sustained over time) will influence the success of the strategy chosen by the leader. The wind direction is independent of the decisions being made and works as an exogenous source of uncertainty in our setting. Each competitor has the same "real-time information" about the environment, with no time lag between occurrence and reporting (Eisenhardt, 1989), and can easily observe the positioning and actions of its rival. Our context facilitates the measurement of the environmental dynamics and helps us to address the problem of objectively assessing environmental uncertainty in testing rivalry-based imitation theories (Lieberman & Asaba, 2006).

FIGURE 1
Race Course, Boundaries, and Example Trajectory of Competitor B



Finally, as with other sports, match racing has predefined boundary conditions and rules that are enforced immediately after an incident occurs. Sports offer the advantage of being a controlled "living laboratory" when studying relative advantage between competitors (Day, Gordon, & Fink, 2012). Such a setting reduces the role of differences in institutional environments as influencing factors on performance outcomes and ensures the availability of decision options between rivals over time (Holcomb, Holmes, & Connelly, 2009). The analogy of sailing upwind has already been used as metaphor to explain the theoretical contribution of empirical studies in strategic management (Boumgarden, Nickerson, & Zenger, 2012) and to illustrate the benefits of imitating the follower in competitive environments (Dixit & Nalebuff, 1991: 10).

Data

The data we use to test our hypotheses come from the match race pairings during the ACWS. The 2011–12 Series was a professional sailing circuit taking place at six different international venues. It was sailed on one-design, 45ft-long catamarans, and it was launched in order to gain experience with multihulls for the 34th America's Cup.

Each of the six events of the ACWS consisted of a (two-boat) match race competition and a fleet race competition (that is, more than two boats racing against each other at the same time). The results of the fleet races were used for seeding the pairings for the match race qualifiers that lead into the subsequent finals. To triumph in a match, a team had to win a certain number of races in a single pairing. After succeeding in the final, the winner was the match race champion of the event. The overall match race champion of the ACWS was decided by the cumulative match race scores over all six events taking place in Cascais (Portugal), Plymouth (United Kingdom), San Diego (United States), Naples (Italy), Venice (Italy), and Newport (United States).

A match race of the ACWS usually lasted about 15–20 minutes. The distance between the marks around which the boats have to sail depends on the strength of the wind, with the race committee defining the positioning of the marks and the boundaries of the course, depending on the wind direction, the wind speed, and the shorelines. Once the boats have started, they sail a short sprint to mark 1 before the upwind and downwind legs begin (see Figure 1). The boats have to sail around the marks in order, but can choose their way between marks. The leeward mark (marks 2 and 4) and the windward mark (marks 3 and 5) both take the form of a gate between two buoys, so that the boats can sail left or right once entering the gate, thus choosing their course toward the next mark. The boats have to remain within the boundaries of the course at all times during the race, with time penalties given to boats that fail to do so.

The America's Cup Race Management supplied streamed data of the ACWS sailing races in a publically accessible format. The Internet platform offered the opportunity to download the data and also to watch the live races, as well as past races, via virtual spectator software. The data consist of various instrument readings from boats, as well as live race information. Three types of information are included: first, Global Positioning System (GPS) data of the sailing boats, the position of the marks that define the course to be sailed, and the boundaries that define the maximum area to be sailed in; second, information about the wind direction and the wind speed; and third, files that offer information on the boats sailing against each other, the start

timing, the mark rounding order and time (including the seconds behind the leader), and the umpire decisions (including penalties). For our purposes, we reduced the GPS and wind data format from five data points to one per second. These per second data are used to calculate measures of imitation and uncertainty for each upwind leg, with the upwind leg being our unit of analysis.

Over a total of six events, there were 79 match races between pairings of the 11 teams participating in the competition. Of these, we drop from our data two races that were abandoned during the match and restarted, and one more in which one of the competitors withdrew from the race owing to technical problems. Two more races are excluded from our sample because data on boat GPS coordinates and wind direction for these races are not available from the America's Cup website. The total number of races in our sample is therefore 74. Each race contained between one and three upwind legs, resulting in a total of 151 observations. Three of these observations are excluded as a result of implausible wind data, which prevent us from constructing the necessary variables, leaving us with 148 observations in our final sample.

Dependent Variable

Leadership defended. Our dependent variable (*leadership defended*) is whether or not the boat that was ahead at the start of the upwind leg is the first to round the windward mark, thus remaining in the lead at the end of the leg. We operationalize this measure as a binary variable equal to 1 if the boat leading at the start of the upwind leg was the first to round the windward mark, and equal to 0 if the follower rounded the windward mark first.

Independent Variables

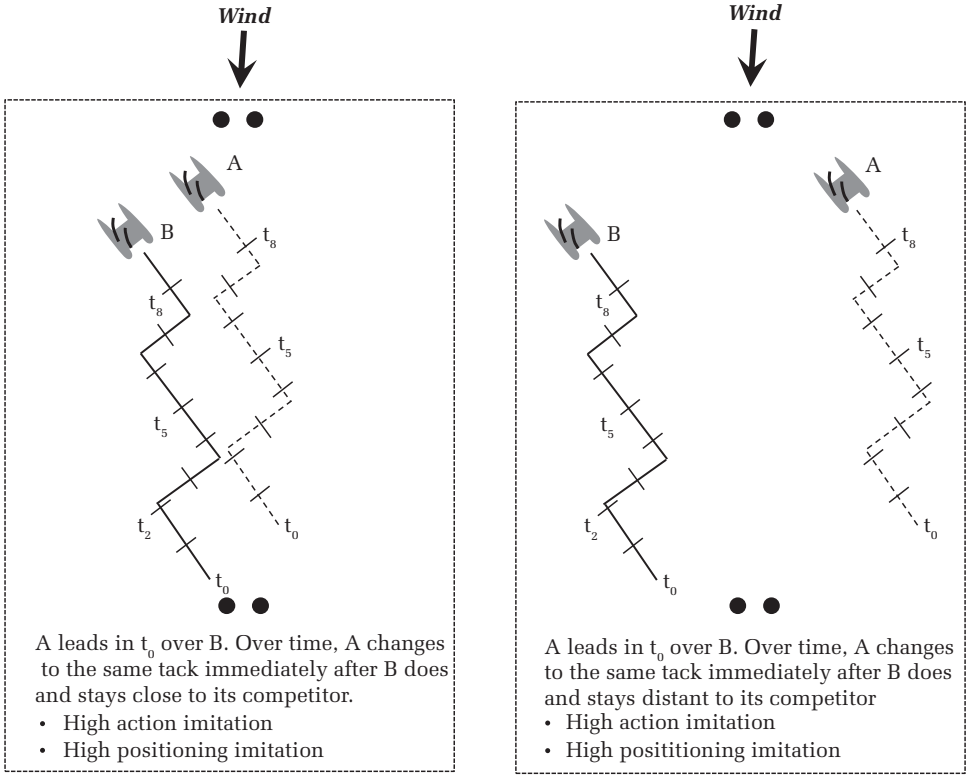
Action imitation. We operationalize *action imitation* as correlation between the compass headings of the leading and following boats, with the heading of the leading boat being lagged by 1 second to leave sufficient time for the leader to observe follower actions and react to them. While 1 second may seem like a very short time for a competitive reaction to take place, in our context follower actions are easily observable and are a major focus of the leading team helmsman's attention, while both leader and follower teams consist of highly experienced sailors able to execute the full range of competitive moves. This variable takes the value of 1 if the leader's lagged changes in heading over the upwind leg match exactly those of the follower, a value of –1 if they are opposite, and a value of 0 if there is no relationship between them.

Positioning imitation. To measure the difference between leader and follower positioning during the upwind leg, we take the absolute value of the difference between their average positions with respect to course boundaries over the leg. To capture the average positioning on the course of the leader relative to the follower, we first calculate the average distance of each rival from both sides of the course using data on the GPS positions of the boats and of the course boundaries. For each boat, we then calculate the difference between its average distance to the boundary on its right and left sides. Finally, we subtract the average position of the follower from that of the leader to produce a measure of their relative positioning, and take the negative of the absolute value of this measure. This variable (*positioning imitation*) then takes a value of 0 if both boats have the same average course position during the upwind leg, and decreases with any difference in average positioning.

Figures 2 and 3 illustrate the differences between the constructs of action imitation and positioning imitation in our context. Figure 2 shows that, when choosing a high action imitation strategy, leading boat A can maintain either a low or a high degree of positioning imitation of boat B. Meanwhile, Figure 3 presents possible trajectories for leading boat A when it chooses a low extent of action imitation, with positioning imitation being very high in the left-hand panel, while being low in the right-hand panel.

Environmental uncertainty. We follow prior work on the effects of *environmental uncertainty* (e.g., Folta & O'Brien, 2004; Oriani & Sobrero, 2008) by using a generalized autoregressive conditional heteroscedasticity (GARCH) model (Bollerslev, 1986) to generate a measure of uncertainty regarding wind direction that takes into account trends and cyclical patterns in the data. Specifically, we estimate a GARCH (1,1) model, which provides a good fit for the behavior of many asset prices (Folta & O'Brien, 2004). Similar models have also been used in weather forecasting to predict wind fluctuations (Cripps & Dunsmuir, 2003). Following Oriani and Sobrero (2008), we additionally include an autoregressive dependent variable term capturing wind direction in the previous second in our specification to improve model fit and convergence. Our uncertainty measure is calculated as the absolute percentage difference between the forecast of wind direction at a given point in time produced by the

FIGURE 2
High Action Imitation and Different Levels of Positioning Imitation



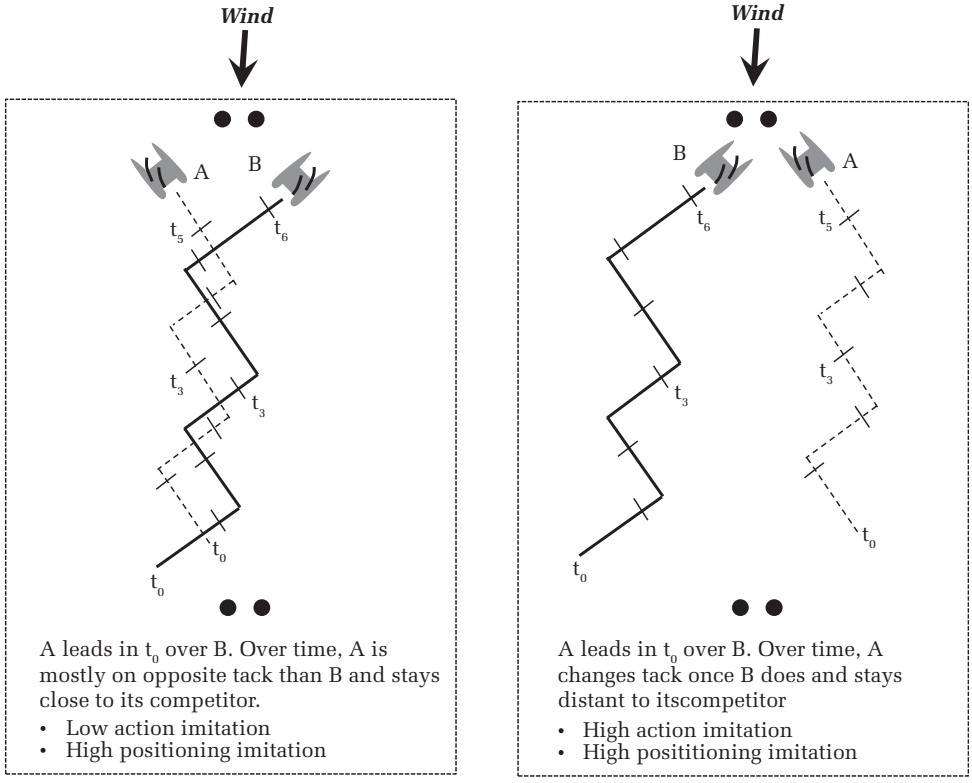
model and the true wind direction, similar to the measure used by Oriani and Sobrero (2008). However, because we have observations on wind direction for every second of each upwind leg, the uncertainty measure that we use in the analysis is the average value over the leg of the forecast error described above. We multiply this value by 1,000 for all observations in order to make its range comparable to that of other explanatory variables.

Leader initial advantage. We take the distance that the leader is ahead of the follower when the follower has rounded the leeward mark as our measure of *leader initial advantage*. Because the effective distance that a boat needs to sail to the next mark is highly dependent on wind direction, this distance measure is calculated as the distance between the rival boats with respect to the direction from which the wind is blowing (see Figure 1).[1]

[1] Owing to this advantage distance being calculated with respect to wind direction, there are a small number of cases in which the leading boat had a negative initial advantage at the start of the upwind leg.

Follower capability advantage. An important capability in sailing upwind is the ability to sail fast in the windward direction. This is achieved by skillfully configuring the rudder, mainsail, and foresail in each moment of the upwind leg (Boumgarden et al., 2012). Because sailboats cannot sail directly toward windward, they have to sail a certain degree (such as 45°) off wind. The closer to the wind the helmsman chooses to sail, the more directly he or she sails toward the windward mark, but the slower the boat will be. The higher the angle, the faster the boat, but the further the boat has to sail to windward. In order to achieve a high speed to the windward mark, the helmsman has to continuously find the best sailing angle while wind direction, wind strengths and wave patterns change. In parallel, the crew searches for sail adjustments that best fit the chosen angle in order to keep momentum high. These activities—the choice of sailing angle by the helmsman and the continual adjustments to the boat's sails made by the crew—require a great degree of skill and coordination, and therefore the ability to effectively perform them is a key capability for match racing teams.

FIGURE 3
Low Action Imitation and Different Levels of Positioning Imitation



The boat's speed in the direction of the windward mark is called "velocity made good" (VMG). For our measure of *follower capability advantage*, we calculated the difference in average VMG normalized by the wind speed of both competitors over all previous upwind legs of events in which both participated.[2] An increase in this efficiency score indicates an increase of capability advantage of the follower over the leader, while a negative score indicates that it is the leading boat that has a capability advantage over the follower.

Control Variables

Difference in number of actions. Prior work in competitive dynamics has shown that leaders who make fewer moves than challengers are more likely to be dethroned (e.g., Ferrier et al., 1999). To control for this effect, we include a variable (*difference in number of actions*) that measures the difference between the number of tacks made by leader and follower. This variable is positive (negative) if the leader makes more (fewer) tacks than the follower during the upwind leg, and is equal to 0 if the leader and follower make the same number of tacks.

Difference in action timing. Increasing time between the competitive actions of challengers and the leader's response has also been shown to increase the likelihood of dethronement (e.g., Ferrier et al., 1999). We include a variable (*difference in action timing*) that measures the mean absolute difference between leader and follower actions over the upwind leg to control for this effect. This variable takes on a value of 0 if leader and follower make tacks simultaneously, and increases with increasing dissimilarity in the timing of leader and follower tacks.

Environmental trend. Alongside the degree of uncertainty present in the environment, consistent trends in environmental changes may also affect the outcome of competition between rivals. To control for this effect, we include a variable (*environmental trend*) equal to the estimated coefficient on the autoregressive term in the GARCH model (if it is significant at the 10% level) minus 1. This variable is positive (negative)

[2] This includes both upwind legs in which they raced against other competitors and upwind legs in which they raced against their current opponent.

if the wind direction is, on average, increasing (decreasing) over the course of the upwind leg, and is 0 if there is no apparent significant trend in wind direction. In a business setting, such a trend could correspond to, for example, the degree of environmental munificence (e.g., Dess & Beard, 1984).

Environmental inconsistency. A further relevant dimension of the environment in which rivals compete is the degree to which the environment can be consistently characterized over the course of the competition. Specifically, we control for changes in the distribution of environmental realizations over time by including a variable (*environmental inconsistency*) that measures the standard deviation of the conditional variance of the wind direction over the upwind leg, estimated from the GARCH model. This measure can be thought of as capturing the variability of the environment's velocity (e.g., Davis et al., 2009) during the upwind leg. Environmental inconsistency is 0 if the estimated conditional variance of wind direction is constant over the course of the leg, and increases with its standard deviation.

Leader penalty. Either competitor in the race may be penalized for sailing beyond the course boundaries, or for a number of other rule violations. If penalized, the boat in question must slow down and allow the competitor to gain a distance of two boat lengths. Because the issuing of a penalty provides a clear advantage to the competing boat, we control for instances in which the leading boat was penalized during the course of the upwind leg. This variable (*leader penalty*) takes a value of 1 if the leading boat received a penalty during the course of the leg, and a value of 0 if it did not.[3]

Same initial positioning. Once the follower arrives at the leeward gate (see Figure 1), it can decide to follow the path of the leading boat by choosing to round the same mark, or it can decide to split from the leader and choose to round the opposite mark. This early decision to split could potentially influence the success of the leading boat because it results in different initial exposures to changes in wind direction. We control for whether or not the leader and follower had the same initial positioning at the start of the upwind leg using a binary variable (*same initial positioning*) that takes a value of 1 if both leader and follower decided to round the leeward mark in the same direction, and a value of 0 if they did not.

[3] We do not include follower penalties in our analysis, because the leader successfully defended its lead in all four upwind legs in which the follower was penalized.

Difference in America's Cup (AC) experience. The experience of the rival helmsmen in previous America's Cup tournaments is likely to be related to their ability to take appropriate competitive actions during the race, as well as to serve as a proxy for differences in the status of the helmsmen. To account for this, we first create a dummy variable (*difference in AC experience*) to capture each helmsman's experience of racing in prior America's Cup competitions. This variable is equal to 1 if the helmsman had previously participated in at least one prior America's Cup series, and 0 otherwise. We then take the difference between the value of this variable for the helmsmen of the leading and following boats, resulting in a variable that takes on a value of 1 if the helmsman of the leading boat had prior America's Cup experience, but his or her rival did not, a value of −1 if the reverse is the case, and a value of 0 if there is no difference in the prior America's Cup experience of the competing helmsmen.

Difference in performance to date. Because racing teams are likely to learn from their prior races and results in the competition, we include a measure capturing the difference between leader and follower performance to date in our analysis. For each of the boats, this measure is equal to the number of match races won as a proportion of the races in which the boat had participated during the ACWS before the current race. This variable (*difference in performance to date*) takes on a positive (negative) value if the performance to date of the leader has been superior (inferior) to that of the follower.

Last upwind leg of race. It has been argued that competitive behavior in the final competitive interaction of a series might differ significantly from that practiced at other points in the course of the competition (e.g., Lehman, Hahn, Ramanujam, & Alge, 2011). We therefore include a binary variable taking on the value of 1 if the current upwind leg is the *last upwind leg of a race*, and 0 otherwise.

Race number. We control for potential learning of teams from observation of others racing prior to them by including a variable (*race number*) that captures the position of the race in that day's racing order.

Event number. Finally, we control for the effects of team learning over the course of the series by using a variable (*event number*) that captures the position of the event in the series in our empirical model.

RESULTS

Descriptive Statistics

The summary statistics of the variables used in our analysis are presented in Table 1. The boat that

is leading at the start of the upwind leg wins the leg 91% of the time. The extent of action imitation and positioning imitation varies significantly between observations. This is also true for environmental uncertainty, leader initial advantage, and follower competitive advantage.

The correlations between our variables are presented in Table 2. Because very few variables have a correlation greater than 0.2, it seems that multicollinearity is not a major concern in our estimation.

Regression Results

To test our hypotheses, we estimate probit regression models with heteroscedasticity-robust standard errors clustered by leader–follower dyad. The estimation results are presented in Table 3.

We first estimate a model including only our control variables. Model 2 then tests Hypotheses 1a and 1b by adding action imitation and positioning imitation to the set of explanatory variables. The estimated coefficients on both action imitation and positioning imitation are positive and significant, and remain so throughout all specifications, providing strong support for Hypotheses 1a and 1b.[4] In order to evaluate the substantive effects of imitation and difference in positioning on the likelihood of the leader staying ahead, we plot the marginal effects of these variables across a range of their possible values in Figures 4a and 4b. The marginal effects presented are estimates of the average marginal effect from Model 3, in which both direct effects and their interaction terms are included, with values of other covariates allowed to take on their sample values for all observations. The lines above and below the estimated marginal effects in Figure 4 represent 95% confidence intervals.

Figure 4a shows that the marginal effect of action imitation is significant across the majority of the range of its values, but appears to be larger at lower base values than at higher ones. The marginal effect of positioning imitation is significant regardless of its base value, as can be seen in Figure 4b. The size of the marginal effect first increases somewhat as the base value of positioning imitation becomes larger, before shrinking with an increasing base value.

To test Hypothesis 2, we add the interaction between action imitation and positioning imitation in Model 3. The estimated coefficient is positive and significant, as predicted, and remains so in all other model specifications. Figure 5 presents a plot of the interaction effect between action imitation and positioning imitation, showing how the marginal effect of action imitation varies when positioning imitation takes on low (1*SD* below the mean), mean, and high (1*SD* above the mean) values. The figure suggests that increasing action imitation from a low base value has a higher impact on the likelihood of staying ahead when positioning imitation is high than when it is low, in line with our expectations. In fact, the estimated marginal effects of action imitation when positioning imitation is low are nonsignificant. However, it appears that an increase in action imitation from a high base value is more effective when the positioning imitation is at its mean value than when it is high, although this difference is much smaller than the difference in marginal effects when imitation is increased from a low base value. Overall, the figure appears to support our hypothesis, although it raises the possibility that action imitation and positioning imitation are complements in reducing the likelihood of dethronement when action imitation is relatively low, while being substitutes for one another when action imitation is relatively high.

Model 4 tests the moderation effects of environmental uncertainty proposed in Hypotheses 3a and 3b. While both of the moderating effects are significant, only the interaction with action imitation carries the expected sign. Hypothesis 3a is therefore supported, but Hypothesis 3b is not. Figure 4c confirms that the marginal effect of increasing action imitation is higher in more uncertain environments for all but the lowest base values. The suggestion in this model that the moderating effect of environmental uncertainty on positioning imitation may be opposite in sign to our predictions is rather puzzling and we discuss it in more detail below.

Hypotheses 4a and 4b, proposing that the effects of action imitation and positioning imitation are moderated by the extent of the leader's initial advantage, are supported by the results of Model 5, because the interaction effects are significant and of the predicted sign. Figures 4d and 4e illustrate the marginal effects of action imitation and positioning imitation when initial advantage is low, at the

[4] In results available on request from the authors, we test whether it is positioning imitation or same initial positioning that drives these results. Because neither the direct effect of same initial positioning, nor the interaction between positioning imitation and same initial positioning, are significant while the coefficient on positioning imitation remains positive and significant, we consider this to be further support for Hypothesis 1b.

TABLE 1
Summary Statistics

	Variable	Obs.	Mean	*SD*	Min.	Max.
1	Leadership defended	148	0.905	0.294	0	1
2	Action imitation	148	0.123	0.524	−0.945	0.978
3	Positioning imitation	148	−0.161	0.162	−0.741	−0.000
4	Environmental uncertainty	148	0.901	1.210	0.179	12.935
5	Leader initial advantage	148	68.946	74.678	−20	609
6	Follower capability advantage	148	−0.006	0.067	−0.245	0.277
7	Difference in number of actions	148	0.432	1.638	−5	7
8	Difference in action timing	148	3.683	1.364	0	7.702
9	Environmental trend	148	−0.001	0.005	−0.023	0.012
10	Environmental inconsistency	148	0.112	0.226	0.005	2.167
11	Leader penalty	148	0.014	0.116	0	1
12	Same initial positioning	148	0.358	0.481	0	1
13	Difference in AC experience	148	0.081	0.601	−1	1
14	Difference in performance to date	148	0.017	0.391	−0.75	1
15	Last upwind leg of race	148	0.486	0.502	0	1
16	Race number	148	3.581	2.353	1	10
17	Event number	148	3.358	1.662	1	6

sample mean, and high. When initial advantage is low, the marginal effects of action imitation and positioning imitation are significantly different from 0 only at a 5% level of significance for high base values, as argued in our hypotheses. However, these marginal effects are significant over a larger range of base values at moderate or high levels of initial advantage, being greatest when initial advantage is high and the base values of action imitation and positioning imitation are low.

Finally, the results of Model 6 provide support for Hypothesis 5a, because the interaction effect between action imitation and follower capability advantage is estimated to be negative and significant, but the results do not support Hypothesis 5b. Figure 4f plots the marginal effects of an increase in action imitation when follower capability advantage is 1*SD* lower than the mean value, is at the mean value, and is 1*SD* higher than its mean. This marginal effect is larger when follower capability advantage is at its mean value or is low, and is highest for low base values in situations in which the leader has a capability advantage over the follower.

DISCUSSION

This paper has sought to answer the question of whether, and under what conditions, imitation of follower actions can be an effective competitive strategy for a leader. Unlike most prior perspectives on imitation, which have focused on imitation of leaders by followers (for a review, see Posen et al., 2013), we argue that "follow the follower," a reversal of a "follow the leader" strategy, can be an effective competitive strategy for a leader. Building on the perspective of the Austrian School, which describes the competitive process as movement toward and away from market equilibrium (Jacobson, 1992; Kirzner, 1973), our aim was to understand the imitation–performance relationship, and, in particular, how imitation of follower actions and competitive positioning can be used as equilibrating actions under different endogenous and exogenous conditions to maintain the status quo and to defend leadership.

Our findings suggest that, in the context of head-to-head competition, a leader who imitates the follower's actions is more likely to stay ahead. Imitation of competitive positioning is also important, because the likely difference between leader and follower performance appears to be smallest when the rivals not only take the same actions, but also share the same competitive position. We identify three key contingencies that support (or constrain) the effectiveness of the imitation strategies. In particular, we find that the imitation–performance relationship is positively moderated by the extent of the leader's initial advantage, that the strategy to imitate the actions of the follower is less effective when the follower has a capability advantage, and that environmental uncertainty has a positive effect on the relationship between action imitation and performance outcomes, while it has a negative effect on the imitation–performance relationship for positioning

TABLE 2
Correlations

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Leadership defended	1															
2	Action imitation	0.283	1														
3	Positioning imitation	0.317	0.298	1													
4	Environmental uncertainty	0.057	0.041	0.041	1												
5	Leader initial advantage	0.151	0.061	0.059	0.018	1											
6	Follower capability advantage	−0.005	−0.101	−0.144	0.145	−0.113	1										
7	Difference in number of actions	0.001	0.058	−0.007	−0.099	0.060	0.093	1									
8	Difference in action timing	0.067	−0.036	−0.034	−0.028	−0.031	0.079	0.066	1								
9	Environmental trend	−0.003	0.166	−0.056	−0.593	−0.220	−0.066	0.018	0.170	1							
10	Environmental inconsistency	0.074	−0.032	−0.035	0.365	−0.050	0.065	−0.060	−0.012	−0.173	1						
11	Leader penalty	−0.162	−0.073	0.056	0.005	−0.053	−0.035	0.220	0.011	0.020	0.064	1					
12	Same initial positioning	0.097	0.481	0.342	−0.082	−0.015	−0.115	−0.008	−0.192	0.098	0.010	0.157	1				
13	Difference in AC experience	0.198	0.111	0.313	−0.062	0.054	−0.196	−0.043	−0.197	−0.085	−0.116	−0.016	0.181	1			
14	Difference in performance to date	0.247	0.183	0.240	−0.117	0.054	−0.236	0.068	−0.097	−0.013	−0.102	−0.042	0.099	0.372	1		
15	Race number	−0.018	0.204	0.083	−0.137	0.028	−0.026	−0.039	−0.095	0.043	−0.101	−0.129	0.043	0.154	0.099	1	
16	Last upwind leg of race	0.130	0.029	0.046	0.000	0.435	0.083	0.015	0.005	−0.009	−0.009	−0.114	−0.163	−0.019	0.033	−0.016	1
17	Event number	0.098	−0.094	−0.057	0.152	−0.281	0.324	−0.125	0.095	−0.092	0.026	−0.025	−0.128	0.025	−0.159	0.133	0.083

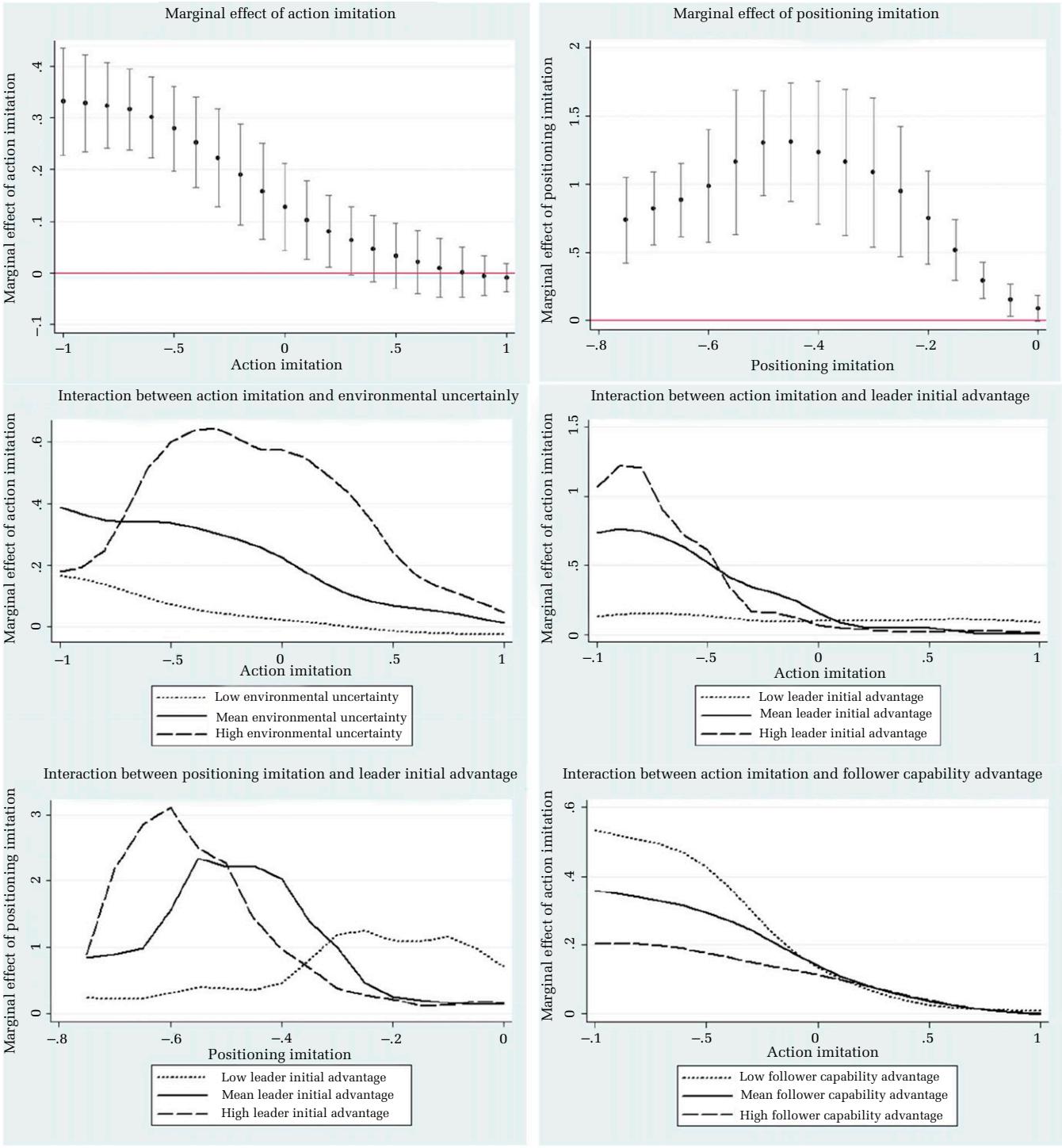
TABLE 3
Regression Results

DV: Leadership defended	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Leader penalty	−4.642***	−4.787***	−6.402***	−7.667**	−6.889**	−6.824*
	(1.147)	(1.351)	(1.880)	(2.361)	(2.302)	(2.755)
Same initial positioning	0.612	−0.989	−1.919*	−2.732**	−3.470*	−2.166*
	(0.453)	(0.664)	(0.920)	(0.907)	(1.425)	(0.879)
Difference in AC experience	0.510	0.641	0.702	0.987	1.371†	0.935†
	(0.375)	(0.430)	(0.486)	(0.605)	(0.817)	(0.547)
Difference in performance to date	1.559***	1.484*	1.973*	2.814*	3.165**	2.384**
	(0.441)	(0.594)	(0.860)	(1.286)	(1.134)	(0.922)
Race number	−0.101†	−0.304**	−0.478***	−0.697***	−0.887**	−0.477**
	(0.060)	(0.105)	(0.142)	(0.187)	(0.317)	(0.174)
Last upwind leg of race	−0.472	−1.095*	−1.730*	−2.587*	−2.535**	−1.784*
	(0.466)	(0.538)	(0.702)	(1.021)	(0.937)	(0.815)
Event number	0.379**	0.583***	0.971***	1.436***	1.251**	1.007**
	(0.126)	(0.142)	(0.247)	(0.413)	(0.405)	(0.346)
Difference in number of actions	0.123	0.211*	0.202	0.211	0.459*	0.290+
	(0.096)	(0.099)	(0.143)	(0.132)	(0.204)	(0.176)
Difference in action timing	0.131	0.115	0.201	0.193	0.026	0.271
	(0.145)	(0.214)	(0.231)	(0.258)	(0.323)	(0.260)
Environmental trend	40.592	75.252	105.572†	138.483**	159.935*	136.215*
	(56.580)	(49.204)	(57.689)	(47.978)	(65.509)	(57.594)
Environmental inconsistency	12.658*	12.040**	19.121*	28.200*	15.838**	19.534*
	(5.025)	(4.605)	(8.280)	(11.388)	(5.035)	(8.639)
Environmental uncertainty	−0.239	−0.145	−0.474	−3.054**	−0.408	−0.411
	(0.269)	(0.279)	(0.373)	(1.066)	(0.496)	(0.354)
Leader initial advantage	0.013**	0.016**	0.026***	0.038**	0.094**	0.028**
	(0.005)	(0.005)	(0.008)	(0.012)	(0.030)	(0.009)
Follower capability advantage	0.819	1.418	0.796	1.001	−4.239	−16.700
	(2.232)	(2.095)	(2.296)	(2.504)	(3.733)	(15.795)
Action imitation		1.653**	4.465***	4.305***	4.465**	4.732***
		(0.528)	(1.117)	(1.288)	(1.562)	(1.211)
Positioning imitation		3.870**	8.747***	15.953***	9.737**	9.811**
		(1.183)	(2.243)	(3.613)	(3.558)	(3.279)
Action imitation × Positioning imitation			11.891*	14.592**	16.686**	11.437*
			(4.853)	(5.438)	(5.449)	(5.063)
Action imitation × Environmental uncertainty				2.131**		
				(0.807)		
Positioning imitation × Environmental uncertainty				−7.293**		
				(2.394)		
Action imitation × Leader initial advantage					0.079**	
					(0.027)	
Positioning imitation × Leader initial advantage					0.138**	
					(0.048)	
Action imitation × Follower capability advantage						−18.375*
						(7.473)
Positioning imitation × Follower capability advantage						−41.283
						(48.077)
Intercept	−0.930†	0.780	1.069	2.826†	3.148	1.110
	(0.511)	(1.039)	(1.426)	(1.636)	(2.186)	(1.354)
Log pseudo-likelihood	−27.96	−21.41	−18.58	−15.76	−14.21	−17.26
McFadden's pseudo-R^2	0.40	0.54	0.60	0.66	0.69	0.63
n	148	148	148	148	148	148

Note: All models are estimated using probit regression with heteroscedasticity-robust standard errors clustered by leader–follower dyad, which are reported in parentheses.

† $p < .1$
* $p < .05$
** $p < .01$
*** $p < .001$

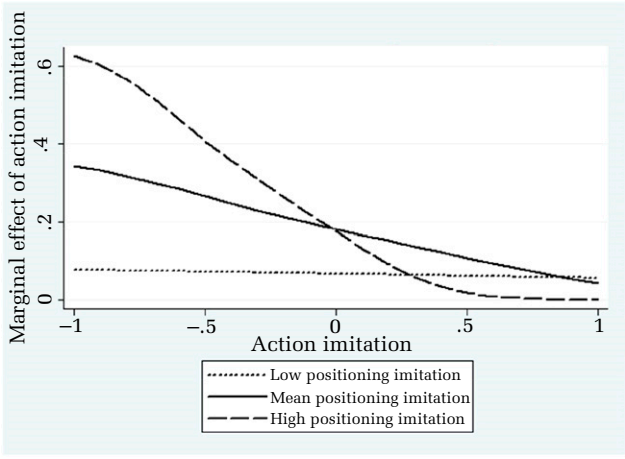
FIGURE 4
Plots of Marginal Effects on Likelihood of the Leadership Being Defended



imitation. These insights have several implications for the study of competitive dynamics.

From the perspective of Austrian economics, entrepreneurial activities in a competitive process are undertaken by leaders, while "imitators" are those who follow the leader (Kirzner, 1973: 128). This idea has been used to study relative performance outcomes of competitive dynamics, arguing that

FIGURE 5
Interaction between Action Imitation and Positioning Imitation



a market leader can avoid dethronement if "carrying out actions that differ from those of the competition" (Ferrier et al., 1999: 376). Our findings provide new arguments as to why the leader may, under certain conditions, have a better chance of staying ahead if it imitates the follower. This is because the leader's imitation behavior represents equilibrating actions to maintain the status quo in reaction to the disequilibrating actions that the follower undertakes to create opportunities and catch up with the leader. By taking different contingencies into account, we also provide insights into the boundary conditions of this strategy.

Our first contingency relates to the degree of environmental uncertainty, which is exogenous and identical for both competitors. Research on observational learning and information-based imitation predicts a negative relationship between environmental uncertainty, which is identical for each competitor, and the motivation to imitate (Anand et al., 2009; Gaba & Terlaak, 2013; Semadeni & Anderson, 2010). Our insights suggest that imitation of follower actions can support strategies to maintain the status quo under volatile exogenous environmental conditions and therefore provides new arguments on why imitation behavior in uncertain environments could be effective. Our arguments extend the literature on competition and entrepreneurship (e.g., Jacobson, 1992; Kirzner, 1973), by pointing out that action imitation can help to mitigate (or even to negate) the upside opportunities of the follower and thus may be an equilibrating action in uncertain environments, helping to maintain competitive parity.

Contrary to our hypothesis, the interaction effect between positioning imitation and uncertainty on performance outcomes is significant, but shows a negative, rather than a positive, sign. A potential explanation that is consistent with our findings is that, in uncertain environments, the cost of changing positions becomes highly irreversible (Dixit & Pindyck, 1994: 8). As a consequence for the leader, on the one hand, there are benefits involved in waiting to invest the switching cost and in hesitating to imitate follower moves; on the other, strategic decision speed is a critical mediator between environmental uncertainty and performance (Baum & Wally, 2003). Because prior research has also shown that strategic actions are less reversible than tactical actions and take longer to respond to (Smith et al., 1991), an explanation for this unexpected finding may be that the response delay inherent in imitating the follower's position in the face of uncertainty provides an opportunity to the follower to catch up with the leader. In highly uncertain situations, the leader may even be completely deterred from switching positions.

Our second contingency builds on differences in capabilities between rivals. Seminal research in competitive dynamics focuses on the relationship between a rival's capability and competitive response (Chen, 1996), but it is unclear how these capabilities relate to performance outcomes. A capability-based perspective would suggest that a follower's sustained capability advantages would lead to the follower overtaking the leader no matter what the leader does (Teece, Pisano, & Shuen, 1997). However, our findings do not support a direct effect; instead, we find that the performance effect depends on both the strategic moves of the competitors and the capability differences. This view merges capability-based advantages with competitive dynamics. In particular, we argue that imitating follower actions releases information that helps the follower to leverage capability advantages. Our results suggest that action imitation is less likely to be effective if the follower has a capability advantage. We do not find a significant interaction effect between positioning imitation and follower capability advantage. This may result from changes in strategic positioning being more complex than tactical actions, and therefore more difficult for the leader to imitate accurately and for the follower to learn from (Rivkin, 2000). We thus complement prior work that suggests combining organizational factors with competitive moves when explaining performance outcomes (Roberts & Eisenhardt, 2003).

This opens avenues for future studies that seek to better understand the effect of capabilities on firm performance.

Finally, in addition to previous studies that emphasize that an initial advantage at the start of a competitive interaction increases the likelihood of staying ahead (Ferrier et al., 1999; Miller & Chen, 1994), we show that an initial advantage is also an important contingency for the effectiveness of leader–follower imitation, because this is more likely to be successful if the leader has a larger initial advantage. However, because imitation has its costs, which increase with the follower's capability advantage, as discussed above, a leader faces a tradeoff: On the one hand, the leader seeks to effectively imitate follower actions based on a high initial advantage; on the other, the leader faces the risk that a capable follower will benefit from the imitation strategy of the leader, and reduce the distance between leader and follower. In results available on request from the authors, we ran additional models with our focal variables regressed on absolute performance (as measured by the leader's VMG, normalized by wind speed for the focal upwind leg) and found that imitating follower actions lowers the absolute performance of the leader. This finding further supports the argument that leaders face a tradeoff when making imitation decisions.

Interestingly, it appears that the consequences of Apple's introduction of a larger screen for the iPhone 5 were consistent with this line of thinking. While it broke sales records and resulted in Apple being the world's leading smartphone seller in the fourth quarter of 2012 (Hong, 2013), its release precipitated a drop in Apple's share price, leading to an estimated US$60 billion loss in Apple's market capitalization in the space of three weeks (Madrigal, 2012).

Managerial Implications

In terms of managerial implications for market leaders, the results suggest that imitating follower moves can be an effective way of preventing followers from catching up, especially in uncertain environments and with the leader having a strong head start over competitors. However, if followers possess (or build) superior capabilities and can benefit from information spillovers, the strategy to imitate the follower can backfire. Hence imitating follower actions has its benefits and costs: It helps to defend against dethronement, but risks lower absolute performance. From a follower's perspective, this insight suggests that a leader imitating follower actions may, in some cases, be beneficial for the follower, because the information released by the leader can support the unfolding of the follower's capability advantages. This benefit has to be carefully balanced with the general insight from our study and others (Ferrier et al., 1999; Smith et al., 2001a) that disequilibrating actions by followers help to interrupt the status quo and increase the chances of catching up with the leader. These insights are also important for managers who face resistance to imitation strategies from internal and external stakeholders. Organizational inertia to these strategies is often rooted in the negative image of being a "copycat." Our implications provide new arguments that managers can use to illustrate the benefits of imitation strategies. Using the analogy from head-to-head sailing races, such as the America's Cup, can help them to translate the message and convince others in decision-making situations.

Limitations and Further Research

Our empirical setting provides a context in which to test our arguments using fine-grained data, allowing us to calculate detailed measures of our constructs. However, the generalizability of our results and their applicability to business settings need to be validated. Although the distribution of performance in sports competitions, such as winning in sailing races, has been identified as being indistinguishable from winning in business contexts (Powell, 2003), and research on competitive dynamics focuses on pairwise comparison of rivals (Chen & Miller, 2012), our theory needs also to be tested in conditions with more than two rivals.

A common problem in imitation studies is disentangling imitation from shared reactions to an environmental shock (Lieberman & Asaba, 2006). We used a lagged correlation for our imitation measure in order to circumvent this issue to some extent, but future work should make use of a more fine-grained approach. Another limitation comes from the aerodynamics in our context. Very close covering of the following boat can provide it with "dirty air," which slows down the follower. However, the cone of dirty air is much smaller in high-speed catamaran races than in typical yachting match races, making this less of a concern in our setting. Similarly, proximity can motivate a boat to play the "right of way" rule, which can determine

whether a leader decides to imitate or to stay independent. Since these rules can be enforced only when boats are on a collision course, we ran robustness tests that either excluded upwind legs in which both boats were very close to one another and sailed on opposite tacks, or included a dummy variable identifying such legs. The results of these models were consistent with our findings and are available on request from the authors.

The use of unpredictability and changes in environmental conditions to gain or maintain an advantage in competitive interaction could be further explored in other settings. Our theoretical framework suggests that the decision making must be made based on information about exogenous factors in relation to which there is a low time lag between occurrence and reporting (Eisenhardt, 1989). Such situations can be found in businesses that are influenced, for example, by movements in oil prices, foreign exchange rates, and stock or commodity prices. Decision makers running airlines, or traders, may typically be exposed to such conditions, and advances in information and communication technologies have made access to real-time information more widespread.

CONCLUSION

Volatile environments are challenging contexts in which to compete, because rivals must take both the strategies of their competitors and possible performance-altering changes in the environment into account. Throughout this paper, we have argued that "follow the follower," a reversal of "follow the leader," strategy can be an effective means for a leader of staying ahead. The findings of this study support our arguments. Our research reveals two distinct, but complementary, imitation strategies that enable leaders to defend their relative advantage successfully, and it identifies important boundary conditions. We look forward to future work that develops further insights on the importance of endogenous and exogenous contingencies in competitive interactions.

REFERENCES

Anand, J., Mesquita, L. F., & Vassolo, R. S. 2009. The dynamics of multimarket competition in exploration and exploitation activities. ***Academy of Management Journal***, 52: 802–821.

Basdeo, D. K., Smith, K. G., Grimm, C. M., Rindova, V. P., & Derfus, P. J. 2006. The impact of market actions on firm reputation. ***Strategic Management Journal***, 27: 1205–1219.

Baum, J. R., & Wally, S. 2003. Strategic decision speed and firm performance. ***Strategic Management Journal***, 24: 1107–1129.

Baum, J. A. C., Li, S. X., & Usher, J. M. 2000. Making the next move: How experiential and vicarious learning shape the locations of chains' acquisitions. ***Administrative Science Quarterly***, 45: 766–801.

Bollerslev, T. 1986. Generalized autoregressive conditional heteroscedasticity. ***Journal of Econometrics***, 31: 307–327.

Boumgarden, P., Nickerson, J., & Zenger, T. R. 2012. Sailing into the wind: Exploring the relationships among ambidexterity, vacillation, and organizational performance. ***Strategic Management Journal***, 33: 587–610.

Boyd, J. L., & Bresser, R. K. F. 2008. Performance implications of delayed competitive responses: Evidence from the U.S. retail industry. ***Strategic Management Journal***, 29: 1077–1096.

Chen, M.-J. 1996. Competitive analysis and interfirm rivalry: Toward a theoretical integration. ***Academy of Management Review***, 21: 100–134.

Chen, M.-J., & MacMillan, I. C. 1992. Nonresponse and delayed response to competitive moves: The roles of competitor dependence and action irreversibility. ***Academy of Management Journal***, 35: 539–570.

Chen, M.-J., & Miller, D. 2012. Competitive dynamics: Themes, trends, and a prospective research platform. ***The Academy of Management Annals***, 1: 1–76.

Chen, M.-J., Lin, H.-C., & Michel, J. G. 2010. Navigating in a hypercomepetitive environment: The roles of action aggressiveness and TMT integration. ***Strategic Management Journal***, 31: 1410–1430.

Cripps, E., & Dunsmuir, W. T. M. 2003. Modeling the variability of Sydney Harbor wind measurements. ***Journal of Applied Meteorology***, 42: 1131–1138.

D'Aveni, R. A., Dagnino, G. B., & Smith, K. G. 2010. The age of temporary advantage. ***Strategic Management Journal***, 31: 1371–1385.

Davis, J. P., Eisenhardt, K. M., & Bingham, C. B. 2009. Optimal structure, market dynamism, and the strategy of simple rules. ***Administrative Science Quarterly***, 54: 413–452.

Day, D. V., Gordon, S., & Fink, C. 2012. The sporting life: Exploring organizations through the lens of sport. ***The Academy of Management Annals***, 6: 397–433.

Derfus, P. J., Maggitti, P. G., Grimm, C. M., & Smith, K. G. 2008. The Red Queen effect: Competitive actions and firm performance. ***Academy of Management Journal***, 51: 61–80.

Dess, G. G., & Beard, D. W. 1984. Dimensions of organizational task environments. ***Administrative Science Quarterly***, 29: 52–73.

Dixit, A. K., & Nalebuff, B. 1991. ***Thinking strategically: The competitive edge in business, politics, and everyday life***. New York: W. W. Norton.

Dixit, A. K., & Pindyck, R. S. 1994. ***Investment under uncertainty***. Princeton, NJ: Princeton University Press.

Eisenhardt, K. M. 1989. Making fast strategic decisions in high-velocity environments. ***Academy of Management Journal***, 32: 543–576.

Ferrier, W. J., Smith, K. G., & Grimm, C. M. 1999. The role of competitive action in market share erosion and industry dethronement: A study of industry leaders and challengers. ***Academy of Management Journal***, 42: 372–388.

Folta, T. B., & O'Brien, J. P. 2004. Entry in the presence of dueling options. ***Strategic Management Journal***, 25: 121–138.

Gaba, V., & Terlaak, A. 2013. Decomposing uncertainty and its effects on imitation in firm exit decisions. ***Organization Science***, 24: 1847–1869.

Gillmor, D. 2012. Apple's iPhone 5 is brilliant—but not best in class. ***The Guardian***, September 13. Available online at http://www.theguardian.com/commentisfree/2012/sep/13/apple-iphone5-brilliant-but-not-best. Accessed on June 20, 2014.

Greve, H. R. 1998. Managerial cognition and the mimetic adoption of market positions: What you see is what you do. ***Strategic Management Journal***, 19: 967–988.

Helfat, C. E., & Peteraf, M. A. 2003. The dynamic resource-based view: Capability lifecycles. ***Strategic Management Journal***, 24: 997–1010.

Holcomb, T. R., Holmes, R. M., Jr, & Connelly, B. L. 2009. Making the most of what you have: Managerial ability as a source of resource value creation. ***Strategic Management Journal***, 30: 457–485.

Honan, M. 2012. The iPhone 5 is completely amazing and utterly boring. ***Wired***, September 12. Available online at http://www.wired.com/2012/09/the-iphone-5-is-boring-and-amazing/. Accessed on June 20, 2014.

Hong, K. 2013. Samsung ranks first for smartphone sales in Q1 2013, but Apple leads of profit: Strategy analytics. ***The Next Web***, May 28. Available online at http://thenextweb.com/asia/2013/05/28/samsung-ranks-first-for-smartphones-sales-in-q1-2013-but-apple-leads-on-profit-strategy-analytics/. Accessed on June 26, 2014.

Jacobson, R. 1992. The "Austrian" school of strategy. ***Academy of Management Review***, 17: 782–807.

Katila, R., Chen, E. L., & Piezunka, H. 2012. All the right moves: How entrepreneurial firms compete effectively. ***Strategic Entrepreneurship Journal***, 6: 116–132.

Kester, W. C. 1984. Today's options for tomorrow's growth. ***Harvard Business Review***, 62: 153–160.

Kirzner, I. M. 1973. ***Competition and entrepreneurship***. Chicago, IL: University of Chicago Press.

Kirzner, I. M. 1997. Entrepreneurial discovery and the competitive market process: An Austrian approach. ***Journal of Economic Literature***, 35: 60–85.

Knight, F. H. 1921. ***Risk, uncertainty, and profit***. New York: Houghton Mifflin. Reprinted 1985. Chicago, IL: University of Chicago Press.

Lee, H., Smith, K. G., Grimm, C. M., & Schomburg, A. 2000. Timing, order and durability of new product advantages with imitation. ***Strategic Management Journal***, 21: 23–30.

Lehman, D. W., Hahn, J., Ramanujam, R., & Alge, B. J. 2011. The dynamics of the performance-risk relationship within a performance period: The moderating role of deadline proximity. ***Organization Science***, 22: 1613–1630.

Lieberman, M. B., & Asaba, S. 2006. Why do firms imitate each other? ***Academy of Management Journal***, 31: 366–385.

Madrigal, A. C. 2012. Chart: Apple's share price since the iPhone 5 came out. ***The Atlantic***, October 10. Available online at http://www.theatlantic.com/technology/archive/2012/10/chart-apples-share-price-since-the-iphone-5-came-out/263458/. Accessed on June 26, 2014.

Maritan, C. A., & Alessandri, T. M. 2007. Capabilities, real options, and the resource allocation process. ***Advances in Strategic Management***, 24: 307–332.

Miller, D., & Chen, M.-J. 1994. Sources and consequences of competitive inertia: A study of the U.S. airline industry. ***Administrative Science Quarterly***, 39: 1–23.

Miller, K. D. 1992. A framework for integrated risk management in international business. ***Journal of International Business Studies***, 23: 311–331.

Nelson, R. R., & Winter, S. G. 1982. ***An evolutionary theory of economic change***. Cambridge, MA: Harvard University Press.

Oriani, R., & Sobrero, M. 2008. Uncertainty and the market valuation of R&D within a real option logic. ***Strategic Management Journal***, 29: 343–361.

Pacheco, D. F., & Dean, T. J. 2014. Firm responses to social movement pressures: A competitive dynamics perspective. ***Strategic Management Journal***, Advance online publication [DOI: 10.1002/smj.2273].

Perry, D. 1984. ***Winning in one-designs***. London: Adlard Coles Nautical.

Posen, H. E., Lee, J., & Yi, S. 2013. The power of imperfect imitation. ***Strategic Management Journal***, 34: 149–164.

Powell, T. C. 2003. Varieties of competitive parity. ***Strategic Management Journal***, 24: 61–86.

Rao, H., Greve, H. R., & Davis, G. F. 2001. Fool's gold: Social proof in the initiation and abandonment of coverage by Wall Street analysts. ***Administrative Science Quarterly***, 46: 502–526.

Rivkin, J. W. 2000. Imitation of complex strategies. ***Management Science***, 46: 824–844.

Roberts, P. W., & Eisenhardt, K. M. 2003. Austrian insights on strategic organization: From market insights to implications for firms. ***Strategic Organization***, 1: 345–352.

Rumelt, R. P. 1987. Theory, strategy and entrepreneurship. In D. J. Teece (Ed.), ***The competitive challenge: Strategies for industrial innovation and renewal***: 137–158. New York: Harper & Row.

Seamans, R., & Zhu, F. 2014. Responses to entry in multi-sided markets: The impact of Craigslist on local newspapers. ***Management Science***, 60: 476–493.

Semadeni, M., & Anderson, B. S. 2010. The follower's dilemma: Innovation and imitation in the professional service industry. ***Academy of Management Journal***, 53: 1175–1193.

Smith, K. G., & Di Gregorio, D. 2002. Bisociation, discovery, and entrepreneurial action. In M. Hitt, D. Ireland, M. Camp & D. Sexton (Eds.), ***Strategic entrepreneurship: Creating an integrated mindset***: 129–150. Oxford: Blackwell.

Smith, K. G., Ferrier, W. J., & Grimm, C. M. 2001a. King of the hill: Dethroning the industry leader. ***The Academy of Management Executive***, 15: 59–70.

Smith, K. G., Ferrier, W. J., & Ndofor, H. 2001b. Competitive dynamics research: Critique and future directions. In M. Hitt, R. E. Freeman & J. Harrison (Eds.), ***Handbook of strategic management***: 315–361. Oxford: Blackwell.

Smith, K. G., Grimm, C. M., Gannon, M. J., & Chen, M.-J. 1991. Organizational information processing, competitive response, and performance in the U.S. domestic airline industry. ***Academy of Management Journal***, 34: 60–85.

Sutcliffe, K. M., & Zaheer, A. 1998. Uncertainty in the transaction environment: An empirical test. ***Strategic Management Journal***, 19: 1–23.

Teece, D. J., Pisano, G., & Shuen, A. 1997. Dynamic capabilities and strategic management. ***Strategic Management Journal***, 18: 509–533.

Thomas, L. G., & D'Aveni, R. 2009. The changing nature of competition in the U.S. manufacturing sector, 1950–2002. ***Strategic Organization***, 7: 387–431.

Upson, J. W., Ketchen, D. J., Connelly, B. L., & Ranft, A. L. 2012. Competitor analysis and foothold moves. ***Academy of Management Journal***, 55: 93–110.

Vascellaro, J. E. 2012. Is Apple's iPhone 5 boring? ***Wall Street Journal***, September 13. Available online at http://online.wsj.com/news/articles/SB10000872396390443696604577647752214727774. Accessed on June 20, 2014.

Walker, S. H. 1991. ***Positioning: The logic of sailboat racing***. New York: W. W. Norton.

Wang, R. D., & Shaver, J. M. 2014. Competition-driven repositioning. ***Strategic Management Journal***, 35: 1585–1604.

Willis, B., & Doerr, J. 1993. ***Match racing***. London: Adlards Coles Nautical.

Young, G., Smith, K. G., & Grimm, C. M. 1996. "Austrian" and industrial organization perspectives on firm-level competitive activity and performance. ***Organization Science***, 7: 243–254.

Ziegler, C. 2010. Apple's Steve Jobs: "No one's going to buy" a big phone. ***engadgetUK***, July 16. Available online at http://www.engadget.com/2010/07/16/jobs-no-ones-going-to-buy-a-big-phone/. Accessed on October 18, 2013.

Jan-Michael Ross (jan.ross@imperial.ac.uk) is an assistant professor in the Management Department of Imperial College Business School. He received his PhD from the University of Augsburg. His current research examines how firms make decisions under uncertainty and how they can succeed in dynamic environments.

Dmitry Sharapov (dmitry.sharapov@imperial.ac.uk) is a British Academy postdoctoral research fellow in the Innovation and Entrepreneurship Department of Imperial College Business School. He received his PhD from the University of Cambridge. His current research examines competitive dynamics under uncertainty and competition, and innovation within and between business ecosystems.