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# Motivation and Ability: Unpacking Underperforming Firms' Risk Taking

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**Abstract.** Do firms take more or less risk in response to performance shortfalls? Although the behavioral theory of the firm (BTOF) has been a guiding framework in this area, empirical evidence remains inconclusive. Moreover, empirical work has largely failed to distinguish between firms' motivation to take risks and their ability to do so. In this study, recognizing the distinct roles played by these two components, we specifically focus on risk-taking motivation. Drawing on March and Shapira's shifting-focus-of-attention model, we highlight that firms' motivation to take risks is contingent on their chosen reference points and the shifts between them. We propose that, on average, risk-taking motivation exhibits a positive monotonic relationship with performance shortfalls, a sequence involving an initial increase, subsequent leveling off, and then a renewed increase. To advance the theory of risk-taking motivation, we extend our inquiry to consider the moderating effect of concern for firm survival and subsequently explore factors influencing this concern. Furthermore, we investigate a critical implication of differentiating risk-taking motivation and ability. Because of the mismatch between motivation and ability, underperforming firms take the greatest risks when their performance is moderately below aspirations, with motivation and ability being at moderate levels, leading to an inverted U-shaped relationship between performance shortfalls and risk taking. Empirical evidence derived from experiments and archival data supports our theoretical predictions. This study contributes to the BTOF literature by demonstrating that underperforming firms' risk-taking behavior is jointly determined by their motivation, ability, focus of attention, and concern for survival.

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## Introduction

Whether underperforming firms take more or less risk has been an important topic in organizational theory and strategy (Bromiley 1991, Greve 1998, Posen et al. 2018). The behavioral theory of the firm (BTOF; Cyert and March 1963) has guided much recent research on this topic. It predicts that managers assess their firm's performance by comparing it to an aspiration level, and performance below this aspiration level triggers problemistic search that can lead to increased risk taking. Accordingly, many empirical studies have evidenced a positive relationship between the performance shortfall relative to the firm's aspiration (hereafter referred to as *performance shortfall*) and risk taking (Bromiley 1991, Greve 2003, Miller and Chen 2004, Baum et al. 2005). However, there are also some empirical studies suggesting a negative relationship between performance shortfall and risk taking, pointing to an empirical inconsistency (Shinkle 2012, Posen et al. 2018, Kotiloglu et al. 2019).

Moreover, although the BTOF argues that a performance shortfall has a *motivational* influence on firms' risk taking, most empirical work in the BTOF tradition has overlooked the distinction between the *motivation* to take risks and the *ability* to do so when examining the implications of performance shortfalls for risk-taking behavior (Eggers and Kaul 2018, Xu et al. 2019). This oversight may obscure our understanding of the intrinsic nature of firm risk-taking behavior. Indeed, risk taking can be affected by both the motivation and the ability to take risks.

In this study, as we acknowledge the distinct roles of underperforming firms' risk-taking motivation and ability, our particular focus is on forwarding theory

about risk-taking motivation. This choice is prompted by the lack of consensus in the literature regarding the relationship between performance shortfalls and risk-taking motivation, especially in the cases of substantial performance shortfalls. Whereas some scholars have argued that enlarged performance shortfalls increase motivation to take risks, presumably as an effort to repair performance gaps, others have suggested that performance shortfalls lead firms to manifest rigidity and risk aversion, stemming from their interpretation of performance shortfalls as steps toward organizational failure (Cyert and March 1963, Staw et al. 1981, March and Shapira 1992, Hu et al. 2011). Because of these divergent perspectives and our specific emphasis on the psychological foundation of firm risk taking, our goal is to advance theory around risk-taking motivation. Then, leveraging our theory on risk-taking motivation and adopting the established position on risk-taking ability from existing literature, which posits that risk-taking ability decreases in tandem with performance declines due to reduced resource stock (Bromiley 1991, Kuusela et al. 2017, Eggers and Kaul 2018, Xu et al. 2019), we seek to understand the joint effects of motivation and ability on underperforming firms' risk-taking behavior.

Our theory on risk-taking motivation is grounded in the shifting-focus-of-attention model of March and Shapira (1992), which centers on the motivation to take risks. This model suggests that firms and their managers can attend to one of two reference points: an aspiration level (i.e., a level of performance deemed as satisfactory) and a survival point at which resources are exhausted. This dynamic in focus of attention leads to diverse patterns in how performance shortfalls influence risk-taking motivation. In essence, the model of March and Shapira (1992) underscores that firms' motivation to take risks hinges on their chosen reference points and the shifts between these reference points.

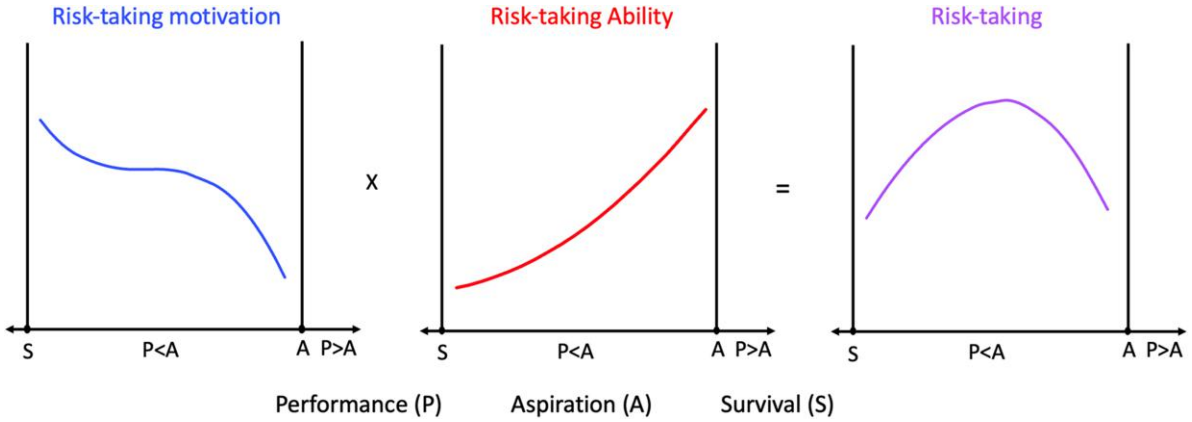
Considering the complex interplay and the resulting diverse patterns of motivation to take risks in response to performance shortfalls across firms, we first propose that, on average, risk-taking motivation exhibits a positive monotonic relationship with performance shortfalls.[1] Specifically, in the neighborhood of the aspiration level, risk-taking motivation increases with performance declines; within the range of moderate to substantial performance shortfalls, the motivation levels off; and in proximity to the survival point, where the firm's elimination is imminent without significant action, the motivation increases yet again with performance declines. Next, to advance the theory of risk-taking motivation, we extend our inquiry to consider the moderating effect of managers' concern for firm survival on the relationship between performance shortfalls and risk-taking motivation. Additionally, we explore several factors influencing such a concern. Specifically, we propose that performance shortfall and performance momentum (i.e., several years of consistent failure or success in meeting the firm's aspirations) influence managers' confidence, which in turn affects their concern for firm survival.

Furthermore, we explore a critical implication of differentiating risk-taking motivation and ability. Because firms' motivation, on average, follows a positive monotonic function of performance shortfalls, whereas their ability to take risks generally decreases with performance shortfalls, a mismatch exists between the motivation and ability to take risks. Such a mismatch leads underperforming firms to take the most significant risks when they face a moderate performance shortfall—a situation in which motivation and ability are at a moderate level—leading to an inverted U-shaped relationship between performance shortfall and risk taking. Figure 1 graphically presents the mismatch claim.

We use multiple research methods to test our theoretical arguments. Specifically, we test our predictions on risk-taking motivation through a series of experiments. An experimental design allows us to gain insight into the intricacies of the decision-making process and uncover the underlying psychological underpinnings. Subsequently, we proceed to test the inverted U-shaped relationship between performance shortfall and risk taking using firms' foreign market entry data from 1999 to 2009. These data enable us to explore the intricate interplay between the variables of interest within a large-scale context. These analysis results provide suggestive evidence supporting our theory.

Our study makes two main contributions to the BTOF literature. First, it develops a theory centered on risk-taking motivation. Drawing insights from the shifting-focus-of-attention model of March and Shapira (1992), we highlight that firms' motivation to take risks varies based on their chosen reference points and the shifts between them. Acknowledging such idiosyncrasies across firms and extending March and Shapira's model, we theorize and empirically demonstrate that, on average, risk-taking motivation exhibits a positive monotonic pattern with performance shortfalls: In the neighborhood of the aspiration level, it increases with performance declines, within the range of moderate to substantial performance shortfalls, it levels off, and in proximity to the survival point, it increases yet again. Furthermore, our theory delves deeper into the mechanisms of the model of March and Shapira (1992) by demonstrating the moderating role of managers' concern for firm survival on the relationship between performance shortfall and risk-taking motivation and subsequently identifying several factors influencing managers' concern for firm survival. Notably, our study marks the first direct examination of these underlying mechanisms. To our knowledge, this study also stands as one of the initial endeavors to directly

**Figure 1.** (Color online) Mismatch Between Motivation and Ability to Take Risk




*Notes.* This figure depicts the relationship between performance shortfalls and risk-taking motivation using a positive monotonic function aligning with our theory. Meanwhile, it provides a conceptual representation of the relationship between performance shortfall and risk-taking ability using a negative monotonic linear function. To showcase that risk taking is jointly determined by risk-taking motivation and ability, we present it as a multiplicative function (i.e., risk taking = motivation × ability), acknowledging that the combined effects could be determined through alternative functions or a combination of multiple functions. Although these relationships may not capture all nuances with absolute precision, they effectively highlight the mismatch between motivation and ability to take risk.

theorize and empirically test the antecedents of risk-taking motivation. In so doing, it contributes to the development of a comprehensive theory on risk-taking motivation.

Second, our research contributes to the existing knowledge of firm risk-taking behavior. Prior literature in the behavioral tradition has often overlooked the distinction between a firm's motivation to take risks and its ability to do so, with only a handful of studies theorizing on the separate effects (Greve 1998, Eggers and Kaul 2018, Xu et al. 2019). Disentangling risk-taking motivation from ability is crucial to advancing our understanding of firm risk-taking behavior. In this regard, we (re)emphasize an underexplored mechanism underlying the complicated relationship between performance shortfall and risk-taking—the mismatch between motivation and ability. Our investigation complements prior studies (Lehman et al. 2011, Ref and Shapira 2017) supporting the nonlinear relationship between performance shortfall and risk taking, providing an additional explanation for the empirical inconsistency in the performance feedback literature.

## Theory Development and Hypotheses

### Distinguishing Risk-Taking Motivation from Risk-Taking Ability

Although much work in the BTOF tradition has sought to understand the empirical inconsistency in the relationship between performance shortfalls and risk taking, it has often failed to distinguish between underperforming firms' motivation to take risks and their ability to do so when examining the implications of performance shortfalls for risk-taking behavior, with a few notable exceptions (Greve 1998, Eggers and Kaul 2018, Xu et al. 2019). This is an unfortunate oversight. As emphasized by Gavetti et al. (2007), motivation underlies all the foundational works of the Carnegie School, particularly Cyert and March (1963). This underscores the imperative need for a more explicit focus on risk-taking motivation to align with the original conceptualization by Cyert and March (1963). Furthermore, the mixed treatment of risk-taking motivation and ability is at odds with existing management and strategy theories, as firms differ widely in their motivations and abilities, leading to different strategies and behaviors (Chen 1996). The separate theorizing of risk-taking motivation and ability has the potential to further reconcile the empirical inconsistency in the relationship between performance shortfalls and risk taking.

Regarding the ability to take risks, previous research has predominantly examined it from the resource perspective and generally concluded that a firm's risk-taking ability decreases monotonically as its performance declines (Bromiley 1991, Kuusela et al. 2017, Ref and Shapira 2017, Titus et al. 2022). The underlying assumption is that firms accumulate resources as their performance improves, and higher resource levels can better absorb potential losses from risk-taking, whereas the opposite is true for firms with lower performance. Given the well-established nature of this position, our study adopts this perspective without explicitly formulating a formal hypothesis regarding this effect.

Regarding the motivation to take risks, there exists a divergence of viewpoints. Although the BTOF suggests that a firm's performance shortfall relative to its aspiration level motivates problemistic search and risk taking,

implying an increase in the motivation to take risks as performance shortfall grows (Cyert and March 1963, Greve 2003, Baum et al. 2005), other research has proposed that performance declines induce firms to manifest rigidity and risk aversion, indicating a decrease in their motivation to take risks as performance declines (Staw et al. 1981). Because of these divergent perspectives and our aim to continue the conversation begun by March and Shapira (1987, 1992) while establishing a more robust psychological foundation for the research on aspiration and risk taking, our study focuses on developing a theory centered around risk-taking motivation.

## Key Insights from March and Shapira's Shifting-Focus-of-Attention Model

The shifting-focus-of-attention model of March and Shapira (1992) offers profound insights regarding risk-taking motivations. The model highlights that organizational decision makers focus on one of two reference points: the aspiration level and the survival point. It further suggests that organizational decision makers can shift their focus of attention between the two reference points as the degree of performance shortfalls varies; this focus of attention then determines firms' response to performance shortfalls. Specifically, when decision makers focus on the aspiration level, they perceive performance shortfalls as repairable gaps, and accordingly their motivation to take risks increases as performance shortfalls grow. Conversely, when decision makers focus on the survival point, they consider increased performance shortfalls as a step closer to bankruptcy, discouraging them from taking actions that might lead to ruinous results, and thus their motivation to take risks decreases with performance declines.

Building upon this foundation, March and Shapira (1992) first delineated two distinct behavioral patterns exhibited by decision makers who focus on either the survival point or the aspiration level without shifting their focus between these reference points as performance falls below aspiration. To elaborate, Pattern 1 characterizes decision makers who focus exclusively on the survival point, resulting in a decrease in their risk-taking motivation as performance shortfalls enlarge. Pattern 2 characterizes decision makers who focus exclusively on the aspiration level, leading to an increase in their risk-taking motivation as performance declines. March and Shapira (1992) subsequently introduced the concept that decision makers can shift their focus of attention between the survival point and the aspiration level. A dominant pattern describing this behavior is Pattern 3, which characterizes decision makers who focus on the aspirational level when they are confronted with slight performance shortfalls and shift their focus to the survival point as performance shortfalls pass a certain threshold. Consequently, their motivation to take risks initially increases and then decreases with performance declines, suggesting an inverted U-shaped relationship between performance shortfalls and risk-taking motivation.

It is worth emphasizing that March and Shapira (1992) did not preclude the existence of alternative patterns in how performance shortfalls influence risk-taking motivation. This foundational notion forms the basis for our development of a theory on risk-taking motivation.

## Theory on Risk-Taking Motivation

To advance our understanding of the relationship between performance shortfalls and risk-taking motivation *at the population level*, we classify the spectrum of performance shortfalls into three distinct zones, encompassing the entire range of performance shortfalls. Zone 1 refers to the situation of slight performance shortfalls, that is, in the neighborhood of the aspiration level. In this situation, managers who behave according to Pattern 1 focus on the survival point, whereas those aligning with Pattern 2 focus on the aspiration level. Similarly, those adhering to Pattern 3 focus on the aspiration level, primarily due to its proximity to their current status (March and Shapira 1992, Gaba and Greve 2019). Although we refrain from making assumptions about the distribution across various patterns, empirical research consistently shows that, in the case of slight performance shortfalls, most managers focus on the aspiration level and view risk taking as a means to address performance gaps (Greve 2003, Baum et al. 2005, Xu et al. 2019, Hu et al. 2022). Indeed, the inconsistent prediction between the BTOF (Cyert and March 1963) and threat rigidity theory (Staw et al. 1981) primarily arises in situations involving substantial (as opposed to slight) performance shortfalls. Consequently, we expect that a majority of managers in Zone 1 focus on the aspiration level. Thus, we predict that, in the neighborhood of the aspiration level, as performance shortfalls enlarge, on average, managers' motivation to take risks increases.

Zone 2 refers to the situation of moderate to substantial performance shortfalls. In this situation, managers who behave according to Pattern 1 continue to focus on the survival point, whereas those conforming to Pattern 2 continue to focus on the aspiration level. Conversely, managers following Pattern 3 vary in their focus, with some focusing on the aspiration level and others on the survival point, contingent on their perception of their distance from these reference points. Given that in this situation some managers tend to escalate risks while others opt for risk mitigation, we expect that, on average, the motivation to take risks will display a modest increase or potentially plateau as performance declines. This expectation is also aligned with the suggested evidence of Shapira (1995, p. 67) that in response to risks "I

would have taken" as a function of performance shortfalls, most managers display a modest increase or no increase at all as performance declines in this area.

Zone 3 refers to the situation of being in close proximity to the survival point, where firms face imminent elimination threat unless significant actions are undertaken. In this situation, we posit that unique and distinct patterns will emerge. This proposition is rooted in the premise that firms or managers on the brink of extinction are inclined to undertake substantial risks, essentially adopting an "all or nothing" approach. For instance, Sobrepere i Profitós et al. (2022) examined four-down decisions in the U.S. National Football League (NFL) games, where the fourth down is the last chance to advance 10 yards and keep the ball. Teams face a choice between the conservative option (i.e., punting the ball to maximize the distance from which the opposing team begins its attack) or the risky choice (i.e., going for it, which entails attempting to gain the necessary yards for a new first down). Their research revealed that when an NFL game reaches its end (in our framework, proximity to the survival point), football teams tend to engage in high-risk behavior, as they focus on winning the game (in our framework, they focus on the aspiration level). Indeed, under the prevailing circumstances, opting for risky options could be the only viable path to secure victory. Similarly, Walker et al. (2018) studied end-of-game decisions in the U.S. National Basketball Association (NBA) games. When trailing by two points, NBA teams face a choice between a conservative move (i.e., a two-point shot to tie the game) and a risky move (i.e., a three-point shot for an immediate win). They found that as the game clock nears zero, indicating proximity to the survival point in our theorizing, more teams focus on the aspiration level (i.e., winning the game) and opt for the risky option of attempting the three-pointer.

Accordingly, we expect that a substantial portion of managers will take the "all or nothing" approach when their firms are in close proximity to the survival point. Specifically, among those managers who have followed Pattern 1 and focused on the survival point in Zones 1 and 2, a substantial portion may shift their focus to the aspiration level in Zone 3. Among those who have followed Pattern 3 and shifted their focus from the aspirational level to the survival point in Zone 2, many may revert their focus back to the aspiration level. These suggest the emergence of new patterns that were not directly discussed by March and Shapira (1992). Among those managers who have followed Pattern 2 and focused on the aspiration level in Zones 1 and 2, we expect that the majority of them will continue to focus on the aspiration level in Zone 3. Given that managers focusing on the aspiration level tend to take maximum risks when approaching the survival point, we propose that, on average, the motivation to take risks increases as performance declines in Zone 3. This perspective is also corroborated by the findings of Shapira (1995) that in response to the question "How much risk would you take if you fell significantly below your goal?," a greater number of managers expressed a willingness to take maximum risks than those who indicated they would opt for minimum risks in such a situation. Synthesizing these arguments, we predict the following.

**Hypothesis 1.** *Firms' risk-taking motivation exhibits a positive monotonic relationship with performance shortfalls. Specifically, in the neighborhood of aspiration, risk-taking motivation increases with performance declines, within the range of moderate to substantial performance shortfalls, it levels off, and in proximity to the survival point, it increases yet again.*

Furthermore, drawing on the model of March and Shapira (1992), we argue that managers' concern for firm survival modifies the effects of performance shortfall on risk-taking motivation. The perception of threat to survival is not solely determined by an "objective" measure of performance, but also influenced by the application of mental models that define which levels of poor performance or external events constitute a threat to the organization (Ocasio 1995). Put differently, just like any reference point, the perception of threat to survival is subjective and can be influenced by contextual factors (Tversky and Kahneman 1981). For example, Shimizu (2007) suggested that high environmental ambiguity may elevate the concern for survival, as it makes managers overweigh the probability of future loss.

Integrating this perspective with the arguments underpinning the first hypothesis, we expect managers' concern for firm survival to moderate the positive monotonic relationship between performance shortfall and risk-taking motivation. Specifically, across the broad spectrum of performance shortfalls (i.e., Zones 1 and 2), managers characterized by lower concern for firm survival are more inclined to either consistently focus on the aspiration level or shift their attention from the aspiration level to the survival point at a lower performance level. Consequently, the positive relationship between firms' performance shortfalls and risk-taking motivation is amplified. Conversely, managers with higher concern for firm survival are more likely to either consistently focus on the survival point or shift their attention from the aspiration level to the survival point at a higher performance level. This results in a dampening effect on the positive relationship between firms' performance shortfalls and risk-taking motivation across a wide range of performance shortfalls. In Zone 3, where firms confront the imminent threat of elimination without substantial actions, managers inherently experience an exceedingly high level of concern for firm survival. Thus, there may not be a

substantial moderating influence of managers' concern for firm survival in this situation. Combining these arguments, and particularly Zones 1 and 2 covering the broad spectrum of performance shortfalls, we hypothesize the following.

**Hypothesis 2.** *Managers' concern for firm survival weakens the positive monotonic relationship between performance shortfall and risk-taking motivation.*

To delve deeper into the understanding of risk-taking motivation, we extend our exploration to factors that influence managers' concern for firm survival, with the aim of advancing the development of a theory of risk-taking motivation. Considering that the concern for survival can be influenced by contextual factors (Tversky and Kahneman 1981, Shimizu 2007), we concentrate on two significant situational factors that can impact managers' concern for firm survival: (1) the extent of firm performance shortfall in a given time period and (2) the firm's performance momentum over multiple time periods, defined as a sustained and systematic trajectory of success or failure relative to aspirations over multiple time periods (Lehman and Hahn 2013). Building on March and Shapira (1992), we propose that managerial confidence acts as a central mechanism that mediates the effect of these situational factors on managers' concern for firm survival.

Drawing on the relevant literature (Hayward and Hambrick 1997, Baum et al. 2005), we first argue that an increase in firm performance shortfall results in a reduction in managerial confidence, which refers to managers' belief in their own abilities and/or in their firms' abilities to achieve desired targets (Gamache et al. 2019). Although high firm performance can lead executives to develop positive expectations about their own ability and that of their firms, low firm performance can systematically diminish their confidence. This reduction in confidence can be attributed to various factors, including decreased top management power, reduced compensation, and stigmatization of underperforming managers (Hayward and Hambrick 1997, Finkelstein et al. 2009).

We also posit that managers' confidence can be influenced by their firms' performance momentum. Unlike performance shortfalls, performance momentum allows for the integration of temporal dynamics into the behavioral theory (Greve 2003, Shinkle 2012). Performance momentum can manifest as either outperformance momentum or underperformance momentum, referring to persistent outperformance or underperformance relative to the firm's aspiration over multiple time periods without counteracting outcomes. Outperformance momentum signifies the appropriateness of current strategies and actions, bolstering managerial confidence. Conversely, underperformance momentum undermines managers' belief in their own abilities, leading to lower confidence levels. Persistent underperformance signals not only the inappropriateness of current strategies (Haleblian and Rajagopalan 2005) but also the consistent failure of managers' past search efforts to uncover satisfactory solutions (Iyer et al. 2019). Consequently, managers experiencing underperformance momentum tend to exhibit lower levels of confidence compared with those experiencing outperformance momentum.

Moreover, we posit that managers with high confidence have a lower level of concern for firm survival compared with managers with low confidence. First, managers with high confidence are more likely to interpret any particular level of underperformance as a repairable gap rather than a threat to survival than managers with low confidence. High confidence, sometimes referred to as overconfidence, induces "better-than-average" or "overestimation" effects (Moore and Healy 2008), leading managers with high confidence to believe in their superior skills, capabilities, and endowments compared with their peers. Consequently, they tend to be overly optimistic about reaching the firm's aspiration level, distorting the expected future performance of their firm positively and overestimating their firm's distance from the survival level (Schumacher et al. 2020). An illustrative example from prior research demonstrates that managers with high confidence tend to overestimate "their ability to extract acquisition benefits" in acquisition decisions (Hayward and Hambrick 1997, p. 106). Such high confidence in their managerial skills and their belief in achieving a particular level of firm performance can bias managers' reactions to performance shortfalls and reduce their concerns for firm survival (Schumacher et al. 2020).

Second, highly confident managers tend to overestimate the accuracy of their predictions or actions (Grinblatt and Keloharju 2009). When facing adverse outcomes, they experience cognitive dissonance (Festinger 1957) due to inconsistencies between their high certainty about their predictions or actions and the actual evidence indicating substantial inaccuracy. To cope with this cognitive discomfort, they resort to "denial of responsibility" (Gosling et al. 2006) and manifest a strong self-attribution bias (Chen et al. 2015), attributing unfavorable outcomes to external factors or bad luck (Ross 1977). Consequently, they are more likely to seek explanations that focus on adverse events, and less likely to interpret the performance shortfall as a problem or survival threat. Overall, managerial confidence exhibits a negative relationship with managers' concern for firm survival.

In summary, larger performance shortfalls and underperformance momentum (compared with outperformance momentum) reduce managers' confidence, which in turn increases their concern for firm survival. Taking all these arguments together, we hypothesize the following.

**Hypothesis 3.** *As firms' performance shortfall increases, managerial confidence decreases, which in turn leads to higher levels of concern for survival.*

**Hypothesis 4.** *Managers in firms with underperformance momentum have lower confidence levels than those in firms with outperformance momentum, which in turn leads to higher levels of concern for survival.*

### Critical Implication of Differentiating Risk-Taking Motivation and Ability

Based on our theory of risk-taking motivation, which proposes that firms' risk-taking motivation follows a positive monotonic relationship with performance shortfalls, and adopting the established position from existing literature suggesting that firms' risk-taking ability monotonically decreases with performance shortfalls, we observe a mismatch between motivation and ability in determining firm risk taking, echoing the perspective of Eggers and Kaul (2018). Specifically, as depicted in Figure 1, when firms experience a slight performance shortfall, their risk-taking is less constrained by ability but more limited by their relatively low motivation. In contrast, when firms experience a significant performance shortfall, their risk-taking is more constrained by ability but less limited by motivation. Thus, underperforming firms take the most significant risks when their performance is moderately below their aspirations, with motivation and ability being at moderate levels, leading to an inverted U-shaped relationship between performance shortfall and risk-taking. Indeed, some prior studies have explored the potential nonlinear relationship between performance shortfall and several risk-taking activities, such as new market entry (Ref and Shapira 2017) and risk taking in national football games (Lehman et al. 2011). Thus, we predict the following.

**Hypothesis 5.** *There is an inverted U-shaped relationship between the magnitude of performance shortfall and the level of risk-taking, such that the level of risk-taking is highest under a moderate performance shortfall but comparatively lower when the performance shortfall is slight or substantial.*

In the following sections, we empirically test Hypotheses 1–4 on our theory of risk-taking motivation using experiments to elucidate the intricate psychological processes underlying managers' risk-taking behavior. Additionally, we examine Hypothesis 5 on the joint effects of risk-taking motivation and ability by analyzing archival data.

## Testing Risk-Taking Motivation Arguments Through Experiments

To test Hypotheses 1–4, we conducted six experiments simulating decisions made by individual decision makers (i.e., firm CEOs or top managers): three as main experiments and the other three as supplementary ones reported in Online Appendix 1. Complementing other empirical approaches, experiments offer unique benefits, such as causality identification, mechanism discovery, and ease of study replication, among others (see Schilke et al. (2019) for more details). The focus on individual decision makers seems warranted given that more than 90% of all firms are small enough that decisions are made by an individual (Aldrich 1999). This approach is very similar to the decision-making perspective that forms the basis of the BTOF (Cyert and March 1963). In our experiments, participants were instructed to assume the role of firm managers and allocate the stock of resources available to their firm among several options—some more risky and others less so. In all experiments, we recruited participants with managerial experience and/or business education, so they would be able to understand and deal with the business issues presented in the experimental scenario.

In Experiment 1, we examined the effect of *performance shortfall* on decision makers' motivation to take risks (Hypothesis 1). In Experiment 2, we examined the moderating effect of managers' *concern for firm survival* (Hypothesis 2) on the relationship between performance shortfall and risk-taking motivation. In Experiment 3, we examined the influence of two situational factors: *performance shortfall* and *performance momentum* on concern for survival (Hypotheses 3 and 4).

### Experiment 1

Experiment 1 examined the effect of performance shortfall on the motivation to take risks (Hypothesis 1). Following March and Shapira (1992), we set a specific amount of resource stock as the firm's aspiration level. Participants were informed that their firm had not met its target, and their task was to allocate all remaining firm resource stock between two different investment options, one risky and the other conservative. Then, participants were asked to indicate the extent to which their decision was driven by their concern for firm survival.

**Sample.** A total of 445 management undergraduate students from a major business school (199 male and 245 female, $M_{age}$ = 26.51, $SD_{age}$ = 8.09) participated in Experiment 1 for course credits. The collected sample provided 80% power to detect an effect size of $d$ = 0.42 in a one-tailed linear contrast with 80% power, given $p$ = 0.05 (G*Power calculator; Faul et al. 2007).

**Dependent Variable.** A firm's *motivation to take risks* was operationalized in relative terms, as firms had different amounts of remaining resource stock under various underperforming situations. Specifically, we calculated the motivation to take risks as the proportion

of a firm's resource stock allocated to the risky option (i.e., entering a new market with a 50% chance of decreasing the resource stock by the bet size and a 50% chance of increasing the resource stock by the bet size) versus the conservative option (i.e., saving the money in the bank with an annual interest rate of 2%). Although the existing literature (Eggers and Kaul 2018) has typically measured risk-taking behavior as a single unified construct without separately measuring risk-taking motivation and ability, primarily due to data limitations, the experimental approach provides a unique opportunity. It allows us to control for a firm's ability to take risk (i.e., resource stock) by calculating the proportion of the resource stock the decision maker allocates to the risky option. Essentially, this approach empowers us to effectively isolate the motivation to take risk from the ability to do so.

**Independent Variable.** Participants were randomly assigned to one of the following performance shortfall conditions in a between-subject design: \$15K, \$100K, \$300K, \$500K, or \$585K below the aspirational level, which was \$600K. Accordingly, the remaining resource stocks in each condition were \$585K, \$500K, \$300K, \$100K, and \$15K, respectively.

**Procedure.** Participants performed an online task programmed in Qualtrics. They were instructed to assume the role of the firm manager responsible for the firm's wealth. Specifically, participants were told that their firm had been operating in the metals industry for four years, with a sales turnover of \$3 million and a resource stock of \$600K. They were told that in each round of the task (each round representing one year) they needed to allocate the remaining resource stock between two different investment options and could continue the task as long as they had positive cash reserves. They were informed that, as firm managers, they had two main goals: (1) meet the aspiration level (i.e., preserve the \$600K in cash reserves) and (2) avoid bankruptcy (i.e., depleted cash reserves).[2] They were also informed that, beyond their base pay for participating, they had an opportunity to earn a monetary bonus to be determined based on the proximity of their decisions to those of an expert panel.

Next, participants performed one round of the task in which they were informed that in the current year their firm had lost \$15K, \$100K, \$300K, \$500K, or \$585K. That is, their firm was \$15K, \$100K, \$300K, \$500K, or \$585K below the aspiration level. They were asked to allocate the remaining resource stock between the two options mentioned earlier. Before participants could proceed to the decision stage, they needed to answer four questions correctly to ensure that they had fully understood the instructions (e.g., "Suppose that your firm invested \$585K [\$1] in entering the new market and failed [succeeded]. What would be the firm's remaining reserves?"). Participants then indicated the amount of stock they would allocate to the two options. Finally, participants were asked to indicate the weight they gave to the concern for firm survival in their investment decisions on a six-point scale (1 = significantly more weight to preserving the aspiration level and 6 = significantly more weight to avoiding bankruptcy).

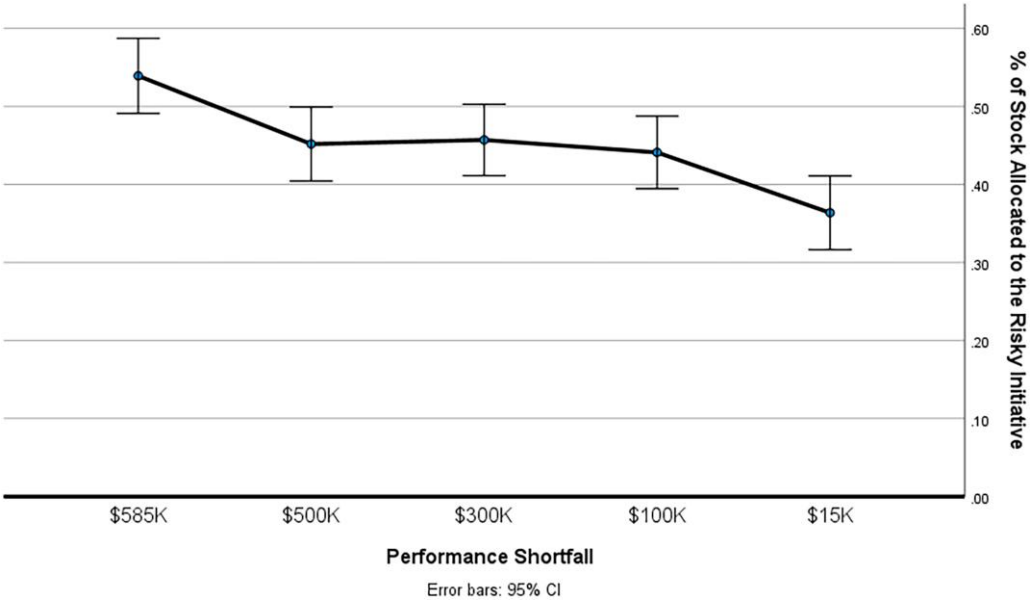
**Results and Discussion.** To test Hypothesis 1, we first ran a linear contrast comparing the proportion of resource stock allocated to the risky option across all five levels of performance shortfall: \$15K, \$100K, \$300K, \$500K, and \$585K. In line with Hypothesis 1, this analysis revealed a significantly positive linear contrast between performance shortfall and risk-taking motivation: $t(440) = 4.73$, $p < 0.001$. Next, we ran a repeated contrast to perform planned pairwise comparisons between the adjacent levels of performance shortfall. These analyses showed a significant increase in the motivation to take risks in the neighborhood of the aspiration level, that is, between the first level (\$15K below aspiration) and the second level (\$100K below aspiration), $C_1 = 0.08$, $t(177) = 2.26$, $p = 0.022$. They showed a leveling off or plateau within the range of moderate to substantial performance shortfalls, that is, between the second and the third level (\$300K below aspiration), $C_2 = 0.02$, $t(183) = 0.48$, and $p = 0.630$, as well as between the third and the fourth level (\$500K below aspiration), $C_3 = 0.01$, $t(179) = 0.15$, and $p = 0.876$. These analyses also revealed a significant increase in the motivation to take risks in the proximity of the survival point, that is, between the fourth and the fifth level of performance shortfall (\$550K below aspiration), $C_4 = 0.09$, $t(170) = 2.56$, and $p = 0.011$. These results (Figure 2) provide support for Hypothesis 1, which posits that firms' motivation to take risks exhibits a positive monotonic relationship with performance shortfalls, indicating a sequence involving an initial increase, a subsequent leveling off, and then a renewed increase.[3]

Finally, we tested the effect of performance shortfall on managers' concern for firm survival. We ran a linear contrast comparing the proportion of resource stock allocated to the risky option across the five levels of performance shortfall. This analysis revealed a significantly positive linear contrast between performance shortfall and concern for firm survival, $t(440) = 2.81$, $p = 0.005$, suggesting that larger performance shortfalls increase concern for survival. We explored this effect further in Experiment 3.

## Experiment 2

Experiment 2 examined whether managers' concern for firm survival weakens the positive monotonic relationship between performance shortfall and risk-taking

**Figure 2.** Effect of Performance Shortfall on Risk-Taking Motivation (Measured as the Percentage of Stock Allocated to the Risky Initiative; Experiment 1)




motivation (Hypothesis 2). The methods, hypotheses, and analysis plans of Experiment 2 were preregistered on the Open Science Framework, increasing the replicability of our research (Nosek et al. 2022).[4]

**Sample.** A total of 263 management undergraduate students from a major business school (125 male and 138 female, $M_{age}$ = 26.27, $SD_{age}$ = 6.17) participated in Experiment 2 for course credits. The collected sample provided 80% power to detect an effect size of $d$ = 0.63 in a one-tailed interaction contrast with 80% power, given $p$ = 0.05 (G*Power calculator; Faul et al. 2007).

**Dependent Variable.** A firm's *motivation to take risks* was calculated the same as in Experiment 1.

**Independent Variables.** *Concern for firm survival* was manipulated orthogonally to *performance shortfall* yielding a 2 × 3 between-participant design: *concern for firm survival* (low versus high) × *performance shortfall* ($100K versus $300K versus $500K below aspiration). Participants were randomly assigned to one of the six conditions.

**Procedure.** The procedure for Experiment 2 was similar to that in Experiment 1, except for the following modifications. First, to manipulate participants' levels of concern for firm survival, they were informed of only one goal. Specifically, in the condition of low concern for firm survival, participants were told that their goal was to preserve cash reserves at $600K. Thereby, their attention was diverted away from the firm's survival. In the condition of high concern for firm survival, participants were instructed that their goal was to prevent bankruptcy. Thereby, their focus was centered on the firm's survival. Second, we reduced the number of performance shortfall conditions from five to three ($100K, $300K, $500K) to decrease the required sample size. Finally, at the debriefing stage, we asked participants to rate the importance of both goals on a seven-point scale (1 = not at all and 7 = very much) to serve as manipulation checks.

**Results and Discussion.** We conducted one manipulation check before performing the main analysis. To check whether the manipulation of concern for firm survival was effective, we ran an analysis of variance (ANOVA) on the importance of survival with two levels of concern for survival (low versus high) and three levels of performance shortfall ($100K versus $300K versus $500K below aspiration). The results showed that the main effect of concern for firm survival was significant: $F(1, 257) = 14.84$, $p < 0.001$, $\eta_p^2 = 0.06$. That is, participants in situations with high concern for survival reported higher importance of the survival goal than those in situations with low concern for survival ($M_{high}$ = 6.46, $SD$ = 1.12 versus $M_{low}$ = 5.78, $SD$ = 1.71). Neither the main effect of performance shortfall, $F(2, 257) = 0.73$, $p = 0.483$, $\eta_p^2 = 0.006$, nor the interaction, $F(2, 257) = 1.32$, $p = 0.269$, $\eta_p^2 = 0.01$, was significant. Thus, the manipulation of concern for survival was effective.

To test Hypothesis 2, we ran an ANOVA on the proportion of resource stock allocated to the risky option with the two levels of concern for firm survival and the three levels of performance shortfall. This analysis showed a significant main effect of performance shortfall, indicating that as performance fell below the aspirational level, the motivation to take risks increased, $F(2, 257) = 3.33$, $p = 0.037$, $\eta_p^2 = 0.03$. This result is consistent with that from Experiment 1. The main effect of concern for firm survival was not significant, $F(1, 257) = 0.48$, $p = 0.826$, $\eta_p^2 < 0.01$. That is, on average, across the levels of performance shortfall, concern for survival did not affect the motivation to take risks. Importantly, in support of H2, the interaction effect was significant, $F(2, 257) = 4.76$, $p = 0.009$, $\eta_p^2 = 0.04$, indicating that managers' concern for firm survival weakened the positive effect of performance shortfall on risk-taking motivation (Figure 3). Specifically, when concern for firm survival was low, the linear contrast of performance shortfall was positive and significant, $t(126) = 2.76$, $p < 0.001$, whereas when concern for firm survival was high, the linear contrast of performance shortfall was not significant, $t(131) = 0.27$, $p = 0.930$.

## Experiment 3

Experiment 3 was designed to test Hypothesis 3 stating that an enlarged performance shortfall for the firm reduces managerial confidence, which in turn increases managers' concern for firm survival. It was also designed to test Hypothesis 4 positing that managers of firms with underperformance momentum have lower confidence levels than managers of firms with outperformance momentum, which in turn leads to higher levels of concern for firm survival. These hypotheses were preregistered.[5]

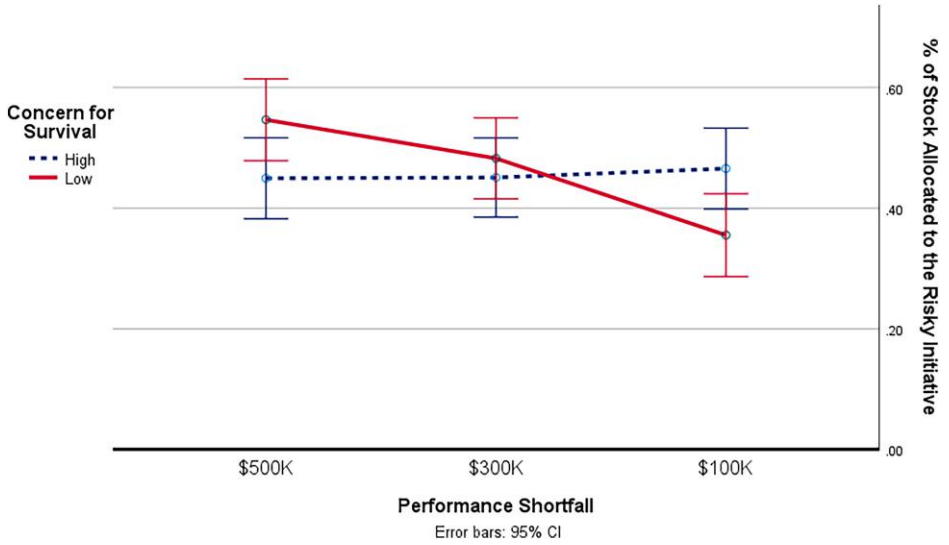
**Sample.** We recruited 245 participants with management experience on the online platform Prolific Academic (115 male and 129 female, $M_{age} = 45.47$, $SD_{age} = 12.75$). The collected sample provided 80% power to detect an effect size of $d = 0.32$ in a one-tailed independent $t$ test with 80% power, given $p = 0.05$ (G*Power calculator; Faul et al. 2007).

**Dependent Variables.** The two main dependent variables were measured on a seven-point scale: *managerial confidence* (1 = extremely low and 7 = extremely high) and *concern for firm survival* (1 = not at all and 7 = very much).

**Independent Variables.** *Performance momentum* was manipulated orthogonally to *performance shortfall*, yielding a 2×3 mixed design: performance momentum (underperformance versus outperformance relative to aspiration) × performance shortfall ($100K versus $300K versus $500K below aspiration). The first factor was manipulated between participants, and the second factor was manipulated within participants. The order of the performance shortfall conditions was counterbalanced across participants.

**Procedure.** The procedure for Experiment 3 was similar to that for Experiment 1 except for the following modifications. First, firms' performance momentum was manipulated. This was done by framing the scenario as: "For the past several years, your firm has failed (succeeded) to meet cash reserve targets." The

**Figure 3.** (Color online) Interaction Effects of Performance Shortfall and Concern for Survival on Risk-Taking Motivation (Measured as the Percentage of Stock Allocated to the Risky Initiative; Experiment 2)



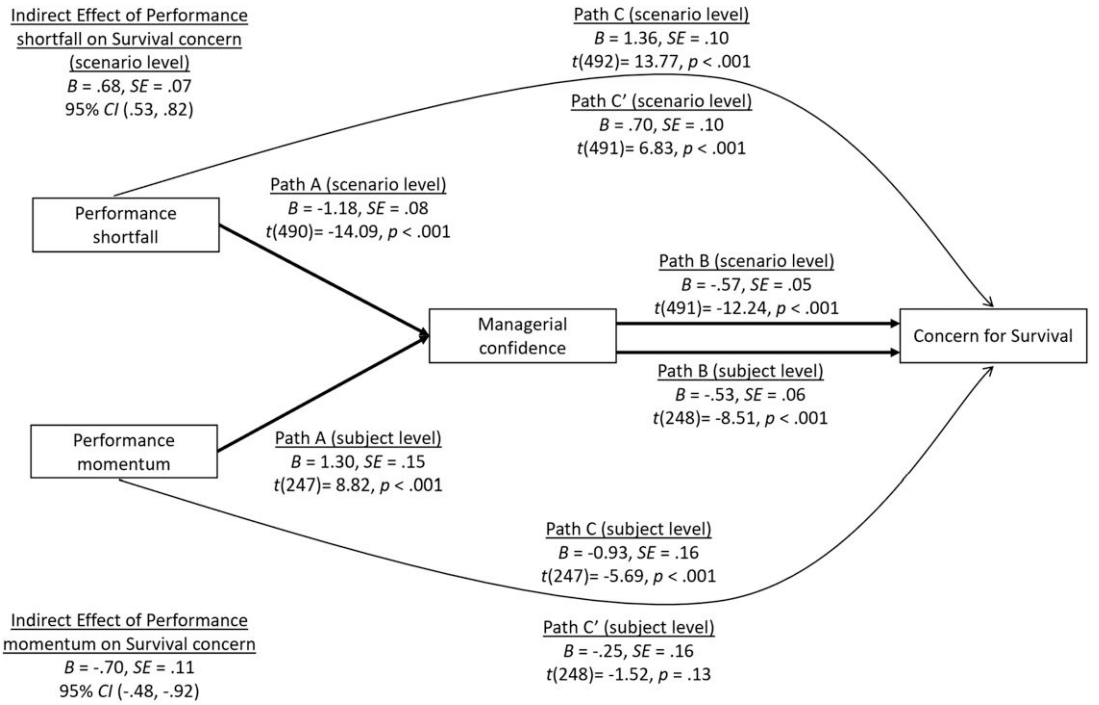
next sentence manipulated the firm's performance shortfall: "Also, in 2021, your firm failed to meet cash reserve targets. It lost \$100K (\$300K versus \$500K), reducing its cash reserves to \$500K (300K, \$100K)." Then, as an attention check, before they could proceed to the next decision stage, participants were required to choose the correct performance history scenario (e.g., in recent years, the firm has failed to meet cash reserve targets year after year), verifying that they had understood the instructions.

Second, participants were presented with all three scenarios of firms' performance shortfall: \$100K, \$300K, and \$500K below aspiration. Each scenario was presented in a different trial. The scenarios referred to three different firms, and their order was counterbalanced across participants. In each scenario, participants rated their confidence in the firm's ability to achieve its targets in the current year and their concern that their firm might go bankrupt, that is, concern for firm survival (1 = not at all, to 7 = very much). The first variable served as a potential mediator, and the second, the main dependent variable.[6]

**Results and Discussion.** First, we tested the total effects of *performance shortfall* and *performance momentum* on *concern for firm survival* (path C in Figure 4). To this end, we ran a mixed-level linear model (MLM) on concern for survival with performance shortfall (−0.5 = \$100K versus 0 = \$300K versus 0.5 = \$500K) and performance momentum (−0.5 = consistent failures versus 0.5 = consistent successes in meeting aspirations) as fixed factors and participants' intercept as a random factor. The total effect of performance shortfall was positive and significant, $B = 1.36$, $SE = 0.10$, $t(492) = 13.77$, $p < 0.001$, indicating that participants were more concerned about their firm's survival as the performance shortfall intensified. The total effect of performance momentum was negative and significant, $B = -0.93$, $SE = 0.16$, $t(247) = -5.69$, $p < 0.001$, indicating that participants were more concerned about their firm's survival after a momentum of underperformance than after a momentum of outperformance.

Next, we tested the effects of performance shortfall and performance momentum on managerial confidence (path A in Figure 4). We ran an MLM on participants' self-reported confidence with performance shortfall and performance momentum as fixed factors and participants' intercept as a random factor. The effect of performance shortfall was negative and significant, $B = -1.18$, $SE = 0.08$, $t(490) = -14.09$, $p < 0.001$, indicating that participants' confidence in their firm's ability to recover declined as the performance shortfall increased. The effect of performance momentum was positive and significant, $B = 1.30$, $SE = 0.15$, $t(247) = 8.82$, $p < 0.001$, indicating that participants were less confident in their firm's abilities after a momentum of underperformance than after a momentum of outperformance.

**Figure 4.** Effects of Performance Shortfall and Performance Momentum on Concern for Survival Mediated by Managerial Confidence (Experiment 3)



Then, we tested the effect of managerial confidence on concern for survival (path B) and the direct effects of performance shortfall and performance momentum on concern for survival (path C′). Specifically, we ran an MLM on concern for survival with performance shortfall (scenario-level), performance momentum (subject-level), subjects' mean confidence (subject-level), and subject-centered confidence (scenario-level) as fixed factors and participants' intercept as a random factor. This model showed a significant negative effect of the subject-level confidence (averaged across the scenarios) on concern for survival (Path B), $B = -0.53$, $SE = 0.06$, $t(248) = -8.51$, $p < 0.001$. Moreover, the scenario-level confidence also negatively predicted a firm's concern for survival, $B = -0.57$, $SE = 0.05$, $t(491) = -12.24$, $p < 0.001$. The direct effect of performance shortfall (path C′) was also significant, $B = 0.70$, $SE = 0.10$, $t(491) = -6.83$, $p < 0.001$, whereas the direct effect of performance momentum (path C′) was not significant, $B = -0.25$, $SE = 0.16$, $t(491) = -1.52$, $p = 0.13$.

Finally, to obtain the indirect effects of performance shortfall and performance momentum on concern for survival through scenario-level and subject-level confidence, respectively, we used the Monte Carlo method. Supporting Hypothesis 3, the indirect effect of performance shortfall was positive and significant, $B = 0.68$, $SE = 0.07$, 95% CI [0.53, 0.82]. Supporting Hypothesis 4, the indirect effect of performance momentum was negative and significant, $B = -0.70$, $SE = 0.11$, 95% CI [−0.48, −0.92].

## Testing Joint Effects of Motivation and Ability with Archival Data

### Data and Sample

To test Hypothesis 5, which proposes an inverted U-shaped relationship between the magnitude of performance shortfall and the level of risk taking, we used archival data on new foreign market entry, as this action involves substantial risks, including the liability of foreignness (Zaheer 1995, Hitt et al. 2006, Ref and Shapira 2017, Ref and Gnizy 2021). Aligning with the literature (Eggers and Kaul 2018), we assume that firms' risky activities, including their foreign market entry, are jointly determined by their risk-taking motivation and ability, despite that our data do not allow for a direct test of risk-taking motivation and ability. We obtained our data from three primary sources: the annual financial statements of the firms under study, the annual Compustat database, and the Compustat segment database. We based our study of entry into new foreign markets on a two-year period, as firms' annual segment reports compare sales for only the two previous years for each segment, in accordance with the 1997 Statement of Financial Accounting Standards. To expand the sample and ensure that the analysis results would not be affected by particular year conditions, we used five time periods: 2000–2001, 2002–2003, 2004–2005, 2006–2007, and 2008–2009. Our sample included firms that met the following conditions: (1) incorporated in the United States to avoid confounding effects of different home markets; (2) manufacturing firms defined based on North American Industrial Classification System codes 311111–339999 to reduce industry effects; and (3) more than $15 million in sales to avoid comparing very large firms with much smaller ones. Our final sample included 3,926 observations (1,413 firms), of which 243 were cases of entry into new foreign markets (6.2%). On average, the number of new foreign market entries within a given period of time was 1.32, and the highest number of entries was 4.

### Measures

**Dependent Variable.** We used firms' new foreign market entry to capture risk taking. *New foreign market entry*$_t$ was a binary indicator, coded as one if the focal firm entered at least one new foreign market within the given period of time and zero otherwise.[7]

**Independent Variable.** To measure performance shortfall, we first needed to calculate performance feedback—that is, the difference between a firm's performance and its aspiration. Following the vast majority of the extant literature (Posen et al. 2018), we used the return on assets (ROA), measured as net income divided by total assets, as our performance indicator. Firm performance was measured in the base year, $t - 1$. In this study, 1999, 2001, 2003, 2005, and 2007 were the five base years. Because identifying the appropriate social reference point is nearly impossible for external observers (Washburn and Bromiley 2012, Ref et al. 2021), following recent studies (Vidal and Mitchell 2015, Ref and Shapira 2017), we used historical performance of the firm as a proxy for the aspiration level. The aspiration level was measured one year prior to the base year (i.e., $t - 2$).

Consistent with prior studies (Miller and Chen 2004), we used a spline function that split the difference between performance and aspiration into two variables. The first variable was *performance below aspiration*$_{t-1}$, calculated as the value of performance minus aspiration for those observations where performance was below aspiration, and set to zero otherwise. This variable was our main independent variable. The more negative the value, the larger the performance shortfall. The second variable was *performance above aspiration*$_{t-1}$, which equaled performance minus aspiration when performance was above or equal to aspiration and was set to zero otherwise. Following, for example, Kuusela et al. (2017), we considered *performance above aspiration*$_{t-1}$ as a control variable in our study. Furthermore, because we posit an inverted U-shaped relationship between the magnitude of performance shortfall and the level of risk

taking, we included a quadratic term for *performance below aspiration* in our estimations. Similarly, we included a quadratic term for *performance above aspiration* in our estimations to control for a potential curvilinear relationship between this variable and the level of risk taking.

**Control Variables.** We included a set of control variables. Because firm size may affect a firm's likelihood of entering new foreign markets (Lin 2014), we controlled for *firm size* ($Size_{t-1}$) using the lagged log number of employees in a firm (in thousands). We also controlled for *firm age* ($Age_{t-1,}$ logged), as older firms are generally more experienced in new foreign market entry (Ref et al. 2021).

In addition, we controlled for firm slack, which has been found to influence firm risk taking (Iyer and Miller 2008, Kuusela et al. 2017). Slack is often defined as an excess of actual or potential resources beyond what is necessary to maintain the organization (George 2005). Because the necessary amount of resources to maintain the organization is unobservable, following, for example, Mishina et al. (2004), we used the median value of the firm's industry as a proxy for it. We calculated the value of a firm's slack as the difference between the firm's resources and the median value of the firm's core industry. Slack resources are indicated by positive values, and shortages in resources are indicated by negative values. We included multiple proxies for slack: a firm's *available financial resources*$_{t-1}$ using its current ratio, calculated as the firm's current assets divided by current liabilities minus the median core industry value; a firm's *potential financial resources*$_{t-1}$ based on its leverage, calculated as total liabilities divided by shareholder equity (debt to equity ratio) minus the median value of the firm's core industry; *excess production capacity*$_{t-1}$ based on the firm's net property, plant, and equipment divided by firm sales compared with the firm's core industry net property, plant, and equipment divided by core industry sales; and *excess technological competencies* ($R\&D_{t-1}$), measured as the difference between the firm's R&D intensity (R&D expenses divided by sales) and the median value of the firm's core industry.

Furthermore, as a firm's prior foreign market entry experience may influence its foreign market entry decisions (Berry et al. 2010), we controlled for a firm's foreign market experience, *foreign experience*$_{t-1}$, defined as the number of foreign markets served by a firm in the base year. Since a firm's product scope may also affect its propensity to enter new foreign markets (Berry 2013), we controlled for *product scope*$_{t-1}$, measured as the number of product markets served by a firm in the base year.

Finally, we controlled for two industry-level factors. One is *industry concentration*$_{t-1}$, as firms in highly concentrated industries may have more resources to take risks (Grullon et al. 2019). We measured *industry concentrations*$_{t-1}$ using the Herfindahl–Hirschman index for the 50 largest firms in every industry. The variable was normalized to range between zero and one, where zero indicates perfect competition and one indicates monopoly. The other is *industry growth*$_{t-1}$, as firms in industries with slow growth rates may seek to grow by expanding into new foreign markets (Delios and Beamish 1999). We obtained the data for these two variables from the U.S. Census Bureau's Economic Census and Annual Survey of Manufacturers, respectively. We used five time periods and, accordingly, included four dummy variables to account for any time trends (with the omitted period as the base).

## Model Estimation and Results

Because our dependent variable was a binary variable, we applied the probit model to predict a firm's probability of entering new foreign markets within a given two-year time period.[8] The descriptive statistics and correlations are shown in Table 1. Online Appendix 2 presents the estimated coefficients from the probit estimation. Because estimated coefficients are not easily interpretable in the probit model (Ai and Norton 2003, Hoetker 2007), we reported the average marginal effects resulting from changing the independent, moderating, and control variables (ceteris paribus) by one unit on the likelihood that a firm would enter new foreign markets in Tables 2 and 3.[9] As shown in Table 2, the average marginal effect of *performance below aspiration* $_{t-1}$ was significantly negative ($-0.264$, $p < 0.01$). It revealed that for a one-unit increase in performance shortfall (i.e., a one-unit decrease in the negative value of *performance below aspiration*), the likelihood of new foreign market entry increased by 26.4%. The average marginal effect of *performance above aspiration*$_{t-1}$ was significantly positive (0.152, $p < 0.01$). Available financial resources (*Available financial resources*$_{t-1}$), excess production capacity (*Excess production capacity*$_{t-1}$), and foreign market experience (*Foreign experience*$_{t-1}$) were also positively and statistically related to new foreign market entry, whereas firm size ($Size_{t-1}$), firm age ($Age_{t-1}$), and excess technological competencies ($R\&D_{t-1}$) were negatively and statistically related to new foreign market entry.

However, the average marginal effect mentioned earlier shows just one point of interest and does not give a complete picture of the relationship between the dependent and independent variables. Recall that we hypothesized an inverted U-shaped relationship between these two variables. Thus, to capture this relationship, we must estimate the marginal effect of *performance below aspiration* and the predicted probabilities for entry

**Table 1.** Descriptive Statistics and Correlations

| Variable | Mean | Standard deviation | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. *New foreign market entry*$_t$ | 0.06 | 0.24 | 1 | | | | | | | | | | | | |
| 2. *Performance below aspiration*$_{t-1}$ | −0.05 | 0.15 | −0.03 | 1 | | | | | | | | | | | |
| 3. *Performance above aspiration*$_{t-1}$ | 0.048 | 0.12 | 0.07 | 0.13 | 1 | | | | | | | | | | |
| 4. *Size*$_{t-1}$ *(log)* | 7.16 | 19.96 | −0.06 | 0.04 | −0.08 | 1 | | | | | | | | | |
| 5. *Age*$_{t-1}$ *(log)* | 38.15 | 32.83 | −0.09 | 0.10 | −0.14 | 0.34 | 1 | | | | | | | | |
| 6. *Available financial resources*$_{t-1}$ | 0.64 | 2.95 | 0.05 | 0.03 | −0.01 | −0.15 | −0.15 | 1 | | | | | | | |
| 7. *Potential financial resources*$_{t-1}$ | 1.69 | 74.84 | 0.06 | 0.01 | 0.04 | 0.00 | 0.01 | −0.02 | 1 | | | | | | |
| 8. *Excess production capacity*$_{t-1}$ | 0.04 | 0.34 | 0.01 | −0.01 | −0.03 | 0.01 | −0.00 | −0.02 | −0.02 | 1 | | | | | |
| 9. *R&D*$_{t-1}$ | 0.03 | 0.29 | 0.01 | −0.09 | 0.04 | −0.04 | −0.10 | 0.11 | −0.02 | 0.66 | 1 | | | | |
| 10. *Foreign experience*$_{t-1}$ | 3.29 | 1.97 | 0.11 | −0.01 | −0.02 | 0.16 | 0.12 | −0.07 | 0.05 | 0.02 | −0.05 | 1 | | | |
| 11. *Product scope*$_{t-1}$ | 1.97 | 1.26 | −0.06 | 0.07 | −0.11 | 0.43 | 0.32 | −0.19 | 0.01 | −0.01 | −0.09 | 0.20 | 1 | | |
| 12. *Industry concentration*$_{t-1}$ | 0.26 | 0.21 | 0.03 | −0.06 | 0.03 | 0.12 | −0.02 | −0.03 | 0.04 | 0.00 | −0.02 | 0.06 | 0.01 | 1 | |
| 13. *Industry growth*$_{t-1}$ | −0.02 | 0.20 | −0.01 | 0.06 | −0.01 | 0.01 | −0.04 | 0.03 | 0.01 | 0.02 | 0.05 | −0.03 | −0.02 | −0.07 | 1 |

*Notes.* $N$ = 3,926. Correlations with absolute values equal to or greater than 0.04 are significant at $p < 0.05$ level, two-tailed.

into new foreign markets at several different values of *performance below aspiration* (Ai and Norton 2003, Karaca-Mandic et al. 2012).[10] Accordingly, Table 3 expands the results from Table 2 by providing a range of marginal effects and predicted probabilities for a number of *performance below aspiration* values. Confirming Hypothesis 5, Table 3 shows that the relationship between a firm's performance shortfall (i.e., *performance below aspiration*$_{t-1}$) and the likelihood of entering new foreign markets followed an inverted U-shaped relationship. In the neighborhood of aspiration, the average marginal effects were negative and significant (−0.279, $p < 0.01$ with *performance below aspiration* = −0.02). Thus, in the neighborhood of aspiration, as performance shortfall increased, the likelihood of new foreign market entry increased. As performance shortfall continued to increase, the average marginal effects changed; when the performance shortfall became substantial, the sign of the average marginal effects switched from negative to positive. Specifically, with a significant performance shortfall (e.g., when *performance below aspiration* = −0.92), the average marginal effects were positive and statistically significant (0.189, $p < 0.01$). That is, when performance shortfall was substantial, firms reduced their propensity to enter new foreign markets. Table 3 also presents the predicted probabilities.

**Table 2.** Average Marginal Effects from the Probit Model Estimating Risk Taking (i.e., the Likelihood of New Foreign Market Entry)

| Independent variables | Average marginal effects |
|---|---|
| 1. *Performance below aspiration*$_{t-1}$ | −0.264*** |
| | (0.067) |
| 2. *Performance above Aspiration*$_{t-1}$ | 0.152*** |
| | (0.051) |
| 3. *Size*$_{t-1}$ *(in logarithmic form)* | −0.015*** |
| | (0.003) |
| 4. *Age*$_{t-1}$ *(in logarithmic form)* | −0.016*** |
| | (0.005) |
| 5. *Available financial resources*$_{t-1}$ | 0.002* |
| | (0.001) |
| 6. *Potential financial resources*$_{t-1}$ | 0.000 |
| | (0.000) |
| 7. *Excess production capacity*$_{t-1}$ | 0.036** |
| | (0.016) |
| 8. *R&D*$_{t-1}$ | −0.040* |
| | (0.021) |
| 9. *Foreign experience*$_{t-1}$ | 0.013*** |
| | (0.002) |
| 10. *Product scope*$_{t-1}$ | −0.002 |
| | (0.04) |
| 11. *Industry concentration*$_{t-1}$ | 0.005 |
| | (0.008) |
| 12. *Industry growth*$_{t-1}$ | −0.006 |
| | (0.017) |
| Number of observations | 3,926 |
| Wald $\chi^2$ (20) | 135.89*** |

*Notes.* Standard errors are in parentheses. Period dummies are not shown. Note that *performance below aspiration* has only one marginal effect. That is, there are no separate marginal effects for *performance below aspiration* and its quadratic term. *Performance below aspiration* occurs only with negative values. The more negative the value, the larger the performance shortfall.

***, **, and *Statistically significant at 1%, 5%, and 10%, respectively; two-tailed tests.

## Discussion

In this study, we reemphasize the distinction between firms' motivation and ability to take risks, with a primary focus on building a theory around risk-taking motivation. Our investigation involved a combination of experiments and archival data to examine and validate our theoretical framework. We found that firms' motivation to take risks exhibits a positive monotonic relationship with performance shortfalls. Specifically, in the neighborhood of the aspiration level, it increases with performance declines, then in the range of moderate to substantial performance shortfalls, it levels off, and in proximity to the survival point, it increases yet again with performance declines. We also uncovered that managers' concern for firm survival weakens the

**Table 3.** Average Marginal Effects of Performance Below Aspiration and Predicted Probabilities

| Performance below aspiration | Average marginal effect | *p* value | Predicted probability | *p* value |
|---|---|---|---|---|
| −0.02 | −0.279 | 0.000 | 0.057 | 0.000 |
| −0.12 | −0.264 | 0.001 | 0.085 | 0.000 |
| −0.22 | −0.186 | 0.014 | 0.108 | 0.000 |
| −0.32 | −0.071 | 0.362 | 0.121 | 0.000 |
| −0.42 | 0.040 | 0.611 | 0.123 | 0.000 |
| −0.52 | 0.121 | 0.126 | 0.114 | 0.000 |
| −0.62 | 0.163 | 0.094 | 0.100 | 0.000 |
| −0.72 | 0.183 | 0.071 | 0.082 | 0.002 |
| −0.82 | 0.193 | 0.010 | 0.063 | 0.029 |
| −0.92 | 0.189 | 0.000 | 0.044 | 0.137 |

positive monotonic relationship between performance shortfall and risk-taking motivation. Furthermore, we theorized and empirically demonstrated that firms' performance shortfall and performance momentum affect managers' confidence, which in turn affects their concern for firm survival. In addition, we found suggestive evidence for an inverted U-shaped relationship between performance shortfall and risk taking, indicating that underperforming firms take the greatest risks when firm performance is moderately below aspiration. This finding highlights the mismatch between firms' motivation and ability to take risks and confirms the cruciality of separately theorizing the two components. These theoretical underpinnings and empirical findings carry important implications for the understanding of firm risk-taking behavior.

## Contributions to the BTOF Literature

This study makes two main contributions to the BTOF literature. First, it develops a theory centered on risk-taking motivation. Building on and extending the model of March and Shapira (1992), we highlight that firms' motivation to take risks is contingent on their chosen reference points and the shifts between them. This dynamic yields diverse patterns of motivation to take risks in response to performance shortfalls across firms. Accordingly, we theorize and empirically demonstrate that, at the population level, underperforming firms' risk-taking motivation exhibits a positive monotonic pattern with performance shortfalls. This perspective helps resolve the existing lack of consensus on the relationship between performance shortfalls and risk-taking motivation. Specifically, our findings elucidate that in the neighborhood of the aspiration level, firms generally focus on their aspiration levels, and accordingly, their motivation to take risks increases as performance shortfalls enlarge, aligning with the insights from Cyert and March (1963). In the range of moderate to substantial performance shortfalls, firms display diverse patterns. Although some focus on the aspiration level, others attend to the survival point. This diversity in response supports the coexistence of various viewpoints (Cyert and March 1963, Staw et al. 1981, March and Shapira 1992, Hu et al. 2011). Our findings suggest that, in this range, on average, firms' motivation to take risks reaches a plateau as performance declines. Additionally, our findings reveal that in proximity to the survival point, a majority of firms either maintain or reestablish their focus on their aspiration levels, primarily driven by the "all or nothing" mindset. These results contribute to a more comprehensive understanding of the intricate relationship between performance shortfalls and risk-taking motivation, thus addressing the current fragmentation in this area of research.

Furthermore, our study delves deeper into the underlying mechanisms of the model of March and Shapira (1992) by proposing and empirically demonstrating that managers' concern for firm survival moderates the positive monotonic relationship between performance shortfalls and risk-taking motivation, marking the first direct examination of this underlying mechanism. Moreover, we theorize and provide empirical evidence that two pivotal situational factors, namely, performance shortfall and performance momentum, influence managerial confidence, which, in turn, impacts managers' concern for firm survival. To our knowledge, this study stands as one of the initial endeavors to directly theorize and test the antecedents of risk-taking motivation. In so doing, it contributes to the development of a comprehensive theory on risk-taking motivation.

Second, this research contributes to the existing knowledge of firm risk-taking behavior by (re)emphasizing the distinction between firms' motivation to take risks and their ability to do so. Prior literature in the BTOF tradition has generally not separated a firm's motivation from its ability to take risks, with only a few exceptions theorizing on the separate effects in the contexts of radical inventions (Eggers and Kaul 2018), radio format changes (Greve 1998), and bribery expenditures and R&D intensity (Xu et al. 2019). Our study extends these insightful works in important ways. Notably, although these studies have offered separate theorizing on the role of motivation and ability to take risks, they have typically measured risk taking as a single unified construct, without empirically disentangling

risk-taking motivation from risk-taking ability. This approach may inevitably obscure the individual effects and/or the potential mismatch between motivation and ability in directing firm risk-taking behavior. In contrast, our study directly theorizes and empirically measures risk-taking motivation. It also indicates that firms may manage their risk taking by independently modifying their risk-taking motivation and ability. For instance, by setting high aspiration levels, firms are motivated to take more risks, ultimately influencing their risk-taking levels.

Furthermore, through the distinct theorization of risk-taking motivation and ability, our study offers several insights into the conflicting empirical evidence on the relationship between performance shortfall and risk taking. As previously discussed, some studies have found that a larger performance shortfall leads to greater risk taking (Bromiley 1991, Greve 2003, Miller and Chen 2004, Baum et al. 2005), whereas others have observed that firms decrease their risk taking as their performance shortfall increases (Wiseman and Bromiley 1996, Iyer and Miller 2008). Our theory and findings offer at least two explanations to address this inconsistency.

The first explanation relates to the mismatch between ability and motivation as performance declines. Eggers and Kaul (2018) were among the first to highlight how risk-taking motivation and ability can diverge as firm performance changes. While building on this fundamental work, our research takes a distinctive stance regarding how performance feedback impacts risk-taking motivation and ability. In contrast to the assertion of Eggers and Kaul (2018, p. 72) that "for performance below aspirations, both motivation and ability are rising, but motivation rises faster than ability," our proposition is that motivation and ability are moving in opposite directions when firms face performance shortfalls. According to our theory, underperforming firms take the most significant risks when they face a moderate performance shortfall, with both motivation and ability being at a moderate level. This mismatch also explains why firms with similar risk-taking motivations may engage in different levels of risk taking due to their distinct risk-taking abilities. It provides an explanation for the finding of Kuusela et al. (2017) that firms with similar levels of performance shortfalls (indicating similar levels of risk-taking motivation in our framework) may engage in different risk-taking activities, such as divestitures versus acquisitions, depending on their resource stock (indicating different risk-taking abilities in our framework). Similarly, we can envision scenarios where firms with different risk-taking motivations and abilities (e.g., high motivation/low ability versus low motivation/high ability) might embrace similar levels of risk.

The second explanation pertains to the heterogeneity in risk-taking motivation across firms. Our findings indicate that managers with distinct levels of concern for firm survival may vary in their risk-taking motivation when confronted with similar performance shortfalls, ultimately resulting in distinct risk-taking behaviors. Our findings also suggest that firms following diverse performance trajectories, such as outperformance versus underperformance momentum, may exhibit varying levels of managerial confidence and thus different levels of concern for firm survival—a factor that, as we showed, moderates the effect of performance shortfall on risk-taking motivation. This, in turn, leads to divergent risk-taking behaviors in response to similar performance shortfalls. In one additional experiment (Experiment S3 in the online appendix), we delved into the impact of managers' prevention focus, as an illustrative example of individual characteristics that may cause chronic concern for firm survival. We found that higher levels of prevention focus weaken the positive monotonic relationship between performance shortfalls and risk-taking motivation. This discovery underscores the role of individual characteristics among managers in fostering heterogeneity in their risk-taking motivation, subsequently influencing their risk-taking behaviors.

## Limitations and Implications for Future Research

Because of the scope of this study and data limitations, our work left several unanswered questions that constitute promising directions for future research. First, to better understand what affects managers' concern for firm survival and risk-taking motivation, we made an initial effort to explore two situational factors, performance shortfall and performance momentum, and a mediating variable, managerial confidence. We also explored the role of managers' prevention focus in Experiment S3. Although these factors provide valuable insights, they may not capture the entirety of the underlying dynamics. For instance, other individual factors such as managers' personality, experience, and power, as well as organizational contingencies, including size, age, slack, and governance structures, could also play pivotal roles in shaping managers' concern for firm survival and risk-taking motivation. Future investigation into these factors could contribute to a more comprehensive understanding of risk-taking motivation.

Relatedly, although our theoretical framework focuses on the three patterns (in how performance shortfalls impact risk-taking motivation) proposed by March and Shapira (1992) and discusses the newly derived patterns, we recognize the possibility of additional patterns. Indeed, the ex post analysis of Experiment S3 reveals a rich tapestry of patterns among managers in response to performance shortfalls. It also validates the coverage of the three predominant patterns identified by March and Shapira (1992) and substantiates the emergence of new patterns. Despite this, it is important to note that our

study represents just a preliminary stride in developing a theory on risk-taking motivation. We have not fully conceptualized all the complexities of managerial risk-taking motivations revealed in the ex post analysis. This highlights the potential for further research to delve deeper into the various nuances of managerial risk-taking behaviors.

Second, in this study, we took the established position in the literature (Kuusela et al. 2017, Titus et al. 2022) that risk-taking ability decreases with performance declines, without formally theorizing or testing it. Nevertheless, it is worth noting that low-performing firms may still have the resources necessary to execute risk-taking activities (Kuusela et al. 2017, Xu et al. 2019). For instance, despite failures, state-owned enterprises may receive continuous resource support from the government (Xu et al. 2019), indicating the potential role of the institutional environment in determining risk-taking ability. Additionally, managerial experience in risk taking may also play a significant role in influencing a firm's ability to take risks. Therefore, future studies should investigate these factors to gain a more comprehensive understanding of the determinants of firms' risk-taking ability.

More broadly, it would be valuable to explore how various factors at different levels (industry, firm, and individual) may influence firms' motivation and ability to take risks, thereby possibly altering the complex relationship between underperformance and risk taking. Leveraging our archival data, we conducted additional analyses, as documented in Online Appendix 3. These analyses investigated the moderating effect of industry concentration and revealed that underperforming firms in highly concentrated industries have higher risk-taking motivation and ability (i.e., moving up both the motivation and ability lines in Figure 1) and shift their focus of attention from the aspiration level to the survival point at a lower performance level (i.e., shifting the turning point to the left in Figure 1). Although these results are promising, we were unable to directly observe how industry concentration changes firms' motivation and ability to take risks. We believe that our theory and findings present fruitful opportunities for future research in this domain.

Finally, we adopted multiple research methods in this study, an approach that presents both advantages and opportunities for future research. We used experiments to test the arguments on risk-taking motivation. This method allowed us to tease out some causality mechanisms underlying managers' concern for firm survival and risk-taking motivation. We acknowledge, however, that experiments may be subject to limited external validity because they do not examine how managers make decisions in real-life settings, where decision stakes typically escalate considerably beyond those encountered in experiments, and decision-making processes often exhibit greater complexity.

Meanwhile, we analyzed the archival data of U.S. firms' foreign market entries to test the inverted U-shaped relationship between performance shortfall and risk taking. Generalizing our findings to alternative situations requires additional studies in other contexts. Additionally, our proxy for risk taking was entering new foreign markets. We did not differentiate between entries into foreign countries with various geographic locations, political risks, and other characteristics that may have different implications for risk taking (Berry et al. 2010). Future research may examine whether our results are robust to the use of more fine-grained measures of risk taking in our context or other proxies for risk taking in different contexts. Also, because of the data limitations, we included only a relatively limited set of control variables in our regression models. This is not ideal, as prior work (Berry 2013) has suggested many factors that may influence foreign market entry decisions. In addition, although our data were longitudinal, the panel was very unbalanced and contained relatively few repeated observations, limiting what we could do to tease out the causality or to address the endogeneity concern. Future work may test whether our theory and findings are robust under other settings with more appropriate and comprehensive data.

In conclusion, our study contributes to advancing the understanding of underperforming firms' risk-taking behavior. It sheds light on the complexities and nuances of risk-taking motivation. The development of the theoretical framework and the insights obtained from this research pave the way for future explorations in the field of risk-taking motivation and its influence on managerial decision making and firm outcomes.

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## Endnotes

[1] Mathematically, in a positive monotonic function (sometimes also known as a monotonically nondecreasing function), if $a > b$, then $f(a) \geq f(b)$. This implies that, as the value of $X$ increases, the value of $Y$ either remains constant or increases. In essence, the function maintains a consistent or ascending trajectory without any reversals.

[2] It is noteworthy that even though participants were informed about having two goals, they still retained the flexibility to focus on either one of the goals or both in their decision making. In so doing, we aimed to simulate that managers can direct their attention toward or opt to prioritize one reference point over the other, which aligns with our theorizing, while still acknowledging both reference points in their decision-making process.

[3] In Experiment 1, we established a specific amount of resource stock as the firm's aspiration level and then manipulated the remaining resource stock in different scenarios to capture varying degrees of performance shortfalls. To ensure that the main finding is primarily driven by the effects of performance shortfalls and not by the varying remaining resource stocks, we conducted two additional experiments (S1 and S2). In Experiment S1, we sought to validate the findings from Experiment 1 by keeping the remaining resource level constant while varying the aspiration level to capture diverse degrees of performance shortfalls. In Experiment S2, we introduced two different levels of resource stock orthogonally to two levels of performance shortfall to examine whether the level of resource stock also affects the motivation to take risks and/or whether it modifies the effect of performance shortfall on risk-taking motivation. Additionally, as Experiment 1 used a between-subject design, we conducted a third additional experiment (S3) using a within-subject design to further investigate the effect of performance shortfalls on risk-taking motivation. Notably, all three additional experiments involved participants with managerial experience. These supplementary experiments provided additional support to Hypothesis 1. We report these additional experiments and results in Online Appendix 1.

[4] See https://osf.io/5xpvr/?view_only=16791e097d904468865c52874626188e.

[5] See https://osf.io/c8s36/?view_only=c6cb8bff7dbb4e0dafd24389c34fb00a.

[6] We also asked participants to allocate the remaining resource stock between the risky and conservative investment options. However, because the results of this measure were significantly affected by the presentation order of the scenarios, we do not report them here.

[7] Because there were relatively few new foreign market entries in a given two-year period (1.32), we considered one or more entries into foreign markets within a period as an event. The results were robust when we used the number of new foreign markets as the dependent variable.

[8] We used the logit model for a robustness check and found consistent results. It is also important to note that, although we used five two-year time periods, we did not analyze our data using a panel structure. The logit model with conditional fixed effects (the probit fixed effects model does not exist) is restrictive as it only allows for observations that experience sufficient variation in the dependent variable over time. In our data, we do not see this variation. Moreover, some variables we controlled were either stable or changed slowly during the observation period. As a result, the logit model with conditional fixed effects significantly reduced the sample size from 3,926 to 540. Not surprisingly, the results from this estimation are weaker statistically, although generally consistent with our main findings. The logit model with random effects makes use of the panel structure of the data and provides for more efficient estimates but assumes that the individual-specific effects are uncorrelated with the independent variables. This model also provided results generally consistent with our main findings. These additional analysis results are available upon request.

[9] We calculated the marginal effect for each firm using the specific value of each variable and then average it over the entire sample (Hoetker 2007). It is important to note that there are no separate marginal effects for performance below aspiration and its quadratic term. See Hoetker (2007) for further explanation.

[10] In Table 2, we calculated the marginal effect for each observation, and we then averaged them over the entire sample. In evaluating the marginal effect for specific values of *performance below aspiration* (Table 3), we replaced the actual value of the observation's *performance below aspiration* with the value under study.

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