



Linking top managers' behavioural traits with business practices and firm performance

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Abstract

We embed an experiment in an ongoing firm-level panel survey with a sample of 623 firms managed by their owners to explore the role of top managers' behavioral traits as drivers of corporate strategies and performance. We find that present biased managers are less likely to invest in business practices, leading to lower sales revenue. Younger managers are more patient and less risk-averse than older ones, and they play a more significant role in improving firm performance than their counterparts. Interestingly, we find compelling evidence that business practices play a crucial role as a mediating mechanism through which managers' present bias and loss aversion affect firm performance.

Keywords Managers' behavioral traits · Business practices · Corporate strategies · SMEs · Experiment

JEL Classification C93 · D22 · M50

1 Introduction

Lucas (1978)'s influential *span of control model* suggests that behavioral firms will be weeded out of the market. Furthermore, only individuals, who don't have behavioral biases, could become managers of firms. Building upon Kremer et al. (2019)'s insight that, compared with developed countries, firms in developing countries may be more likely to deviate from the neoclassical framework, this study explores whether there exist behavioral biases among top managers of firms in developing

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countries. Further, we examine how these traits drive business practices and firm performance.

Literature on management practices (Bloom et al. 2010, 2022; McKenzie and Woodruff 2017) considers business practices a unique kind of capital input. In line with McKenzie and Woodruff (2017), we focus on a firm's business practices in three main areas: marketing, record-keeping, and financial practices. These practices are essential and play crucial roles in firm performance. However, similar to other forms of capital inputs, investments in business practices can be costly in terms of the manager's time and the firm's resources. In addition, the return on business practices investment is uncertain due to exogenous events such as changes in regulations that directly impact the implementation of those practices. Such investments also take a long time to realize the benefits. These aspects underscore the importance of managers' preferences, especially risk and time preferences, in driving firms' business practices. In so doing, we expand an emerging strand of literature on behavioral firms (e.g., DellaVigna and Gentzkow 2019; Kremer et al. 2013; Pucheta-Martínez and Gallego-Álvarez 2020).

Furthermore, Hoskisson et al. (2017) note that the literature remains considerably silent on the behavioral mechanisms driving top managers' decisions. This shortcoming is primarily due to methodological challenges in measuring a manager's behavioral traits. Most prior studies used some observable characteristics to estimate the parameters of managers' risk and time preferences. Some studies use Vega and Delta metrics to capture managerial risk sensitivity (e.g., Caliskan and Doukas 2015; Doukas and Mandal 2018); others apply political orientation to measure CEOs' risk preferences (e.g., Christensen et al. 2015; Graffin et al. 2020).

Filling this gap in the literature, we join an emerging strand of literature that aims to estimate an individual's behavioral traits and then investigate their implications in a field setting. The field setting creates environments where the real-world behaviors and preferences of individuals are observed. In particular, we conducted a lab-in-the-field experiment to explore the link between managers' risk and time preferences and firm performance among 623 textile and garment firms in Vietnam in 2018. We then combine the experimental data with panel data from the same firms, which provides information about the firm's specifics. A unique aspect of our study is to focus on top managers, who are senior executives within a firm. They possess substantial decision-making power and are responsible for setting the strategic direction of the firm. They commonly hold prominent positions within the executive hierarchy, such as Chief Executive Officer (CEO), Chief Financial Officer (CFO), Chief Operating Officer (COO), Chief Supply Chain Officer (CSCO), and other C-suite roles. In our study, about 80% of sample managers held the positions of Chief Executive Officers (CEOs) or Chief Financial Officers (CFOs), as our study focused on SMEs managed by their owners. Owner-managers commonly hold positions as CEOs or CFOs because CEOs and CFOs are prominent individuals within a corporation, often occupying highly visible roles. Their actions and decisions are closely scrutinized by stakeholders, investors, and the public, making them an important sample of our study for understanding the impacts of managers' behavioral traits on firm performance. Such a setting provides a key advantage over other studies.

In addition, Pennings and Smidts (2003) found that two primary decision context criteria are needed to examine how manager preferences affect business behavior. First, individuals are vital to a firm's decision-making. Second, situational variables do not affect decision context. Our managers' decisions meet these two criteria. Firstly, in line with Belenzon et al. (2019), we focus on a relatively simple environment—small and medium-sized firms managed by their owners. Our owner-manager participants play the most crucial role in a firm's decision-making. Their effect is likely to be extensive (Belenzon et al. 2019; Friedman et al. 2016) as they have high commitment and excellent knowledge of firm-specific issues (Bertrand and Schoar 2006; Fabrizio et al. 2022). Secondly, these firms operate and compete in the same business environments. All are textile and garment firms competing in the exact location (province) and facing the same economic/legislative conditions. These features allow us to shed further light on the importance of owner-managers' behavioral traits as a driver of business practices and firm performance. For the simple exposition, hereafter, we use the term owner-managers and managers interchangeably.

The main results of our paper provide strong evidence for the existence of behavioral traits, especially loss aversion and present bias, among managers. These traits matter for the adoption of business practices and firm performance. Firms managed by greater present biased managers are associated with poorer business practices and lower revenue per employee. Similarly, one standard deviation reduction in loss aversion of managers leads to an improvement in sales revenue thanks to better business practices. We also observe some heterogeneity of these effects based on managers' demographic profiles. Our study documents that higher educated managers, who are patient and less risk-averse, play a more significant role in improving business practices adoption and increasing revenue than their counterparts. Interestingly, our study highlights a noteworthy finding about the significant role of business practices in mediating the association between firm performance and managers' loss aversion and present bias.

Thus, our paper contributes to the current literature in the following ways:

Firstly, to our best knowledge, our work is one of the pioneering efforts to investigate loss aversion at the individual management level and afterwards analyze its relationship with the firm's strategies. Even though previous studies provide many insights about risk and time preferences (Butler et al. 2017; Goldbach and Schluter 2018; Kairies-Schwarz 2017), they do not analyze how they affect business practices and firm performance in real corporate settings. Additionally, we use present bias, a key psychological and economic concept that describes an individual's tendency to change impatience over time. Present bias has been investigated in previous studies on some areas such as finance (Carvalho et al. 2016), and pension decisions (Choi et al. 2008). Nevertheless, there has been a lack of extensive research on the influence of a manager's present prejudice within the corporate environment. We enhance and broaden the existing body of literature by including the aspect of the owner-manager's present bias.

Secondly, our study provides insights in the context of strategic leadership and corporate management. The implications of our study suggest that for the purpose of enhancing company performance and promoting effective business practices, it

is vital for top-level managers to assess their risk and time preferences, and engage in well-informed decision-making. Therefore, this research endeavor aims to offer valuable perspectives into the effects of risk aversion and present bias on strategic leadership. It seeks to assess the degree to which an organization is inclined to pursue innovative initiatives aimed at enhancing business practices or exploring strategies to increase sales revenue. The findings of our research can also offer valuable insights to managers in developing strategies that successfully balance immediate benefits with long-term sustainability, fostering a corporate environment marked by patience and caution (Lee 2001; Hill and Hult 2020). The outcomes of the study can also offer significant perspectives that can be employed to improve risk management strategies. Consequently, this capability allows organizations to better evaluate and mitigate potential risks that may emerge as a result of their strategy choices. Through an understanding of the interplay between present bias and risk aversion, managers can enhance their decision-making processes, optimize resource allocation, and ultimately improve their ability to navigate complex challenges and opportunities in the current competitive business environment.

Lastly, our study also contributes directly to the management and economics literature in several respects. First, previous studies on family firms in emerging markets (e.g., Fang et al. 2021; Sitthipongpanich and Polsiri 2015) place much attention to the ownership and control of family-owned firms and their effects on firm value and performance (e.g., Bertrand and Schoar 2006; Ghalke et al. 2023; Swamipitak et al. 2020). However, little is known about the risk and time preferences of family-owned firms' managers; though, they are considered crucial traits driving the success of entrepreneurs. Our study contributes to the current literature by directly eliciting risk and time preferences of owner-managers. Second, we scrutinize the impacts of owner-managers' risk and time preferences on firms' business practices and sale revenue. The empirical findings show significant impacts of risk and time preferences of owner-managers, which confirm the necessity to foster understanding of these traits. Third, in relation to studies on executives, our study provides a key advantage by focusing on owner-managers, instead of hired executives. Such focus mitigates a common issue of selection bias i.e., firms have a tendency to hire top managers with traits that match the firms' types.

2 Literature review, conceptual framework, and research hypotheses

This section aims to construct a nuanced theoretical framework that explicates the intricate linkages between manager's risk and time preferences, business practices, and firm performance. Drawing from seminal work by Hambrick and Mason (1984), which posits that managerial traits act as catalysts for strategic firm actions that consequently shape firm performance, our study proposes a mediating role for business practices. Specifically, we contend that managerial traits influence business practices, which in turn have downstream effects on firm performance. Although our investigation appears pioneering in its focus on the interplay between managerial behavioral traits, business practices, and firm performance, it is anchored in a well-established corpus of literature on risk and time preferences (e.g., Kahneman

and Tversky 1979; Thaler 1981; Tanaka et al. 2010; Ahlbrecht and Webber 1997; Frederick et al. 2002; Schreiber and Weber 2016). This scholarly foundation provides a theoretical scaffold, enabling us to explore deviations from rational decision-making, thereby connecting our work to a burgeoning literature on the economics of behavioral traits. Finally, we leverage insights from an array of studies, especially Bloom et al. (2022), scrutinizing the impact of management practices on firm performance as a starting point to formulate our hypotheses.

2.1 Related studies on time preferences, and a conceptual framework linking manager's present bias, business practices, and firm performance

2.1.1 Related studies on time preferences

Time preferences describe how individuals make intertemporal choice supposing rational decision-making, so understanding and estimating time preferences is obviously of great importance to economists, researchers, and policy makers (Bamberg and Krapp 2016). Bohm-Bawerk (1895) and Fisher (1931) identify time preference with the marginal rate of exchange between current and future consumption. Their idea of time preference combines two separate effects: (1) The relative value set on present versus future consumption is contingent on the relative consumption levels; (2) The present and future consumption does not need to be evaluated equally, even along a conforming consumption pathway. The literature then has thoroughly examined these preferences, providing insights into several aspects of human decision-making. Studies conducted by Frederick et al. (2005) has extensively examined the intricacies of temporal discounting, wherein individuals tend to place less value on future rewards. Furthermore, scholars have classified time preferences into many dimensions, including impatience and patience (Thaler 1981), time consistency (Ainslie and Haslam 1992), and hyperbolic discounting (Laibson 1997), among other categorizations.

In particular, prominent scholars in the fields of behavioral economics and psychology, such as Thaler (1981) and Ahlbrecht and Webber (1997), have made substantial contributions to our understanding of how individuals frequently diverge from conventional economic concepts of rationality in their decision-making processes. One significant finding from their research is the recognition that individuals exhibit inconsistency in their levels of impatience when evaluating future rewards. This inconsistency is observed as a phenomenon in which individuals may display impatience in the short term, showing a preference for immediate rewards, but indicate greater patience when assessing prospects in the long term. Drawing upon these aforementioned findings, one of the prevailing empirical models for representing time preferences is the hyperbolic time weighting function initially expounded by Thaler (1981) and subsequently enhanced by Frederick et al. (2002). Hyperbolic discounting, an integral component of this theoretical framework, denotes a tendency to discount the value of immediate rewards while placing less discounts on future rewards over extended temporal horizons (Schreiber and Weber 2016). The inherent variability of time preferences has profound implications for comprehending human

behaviors, as it highlights the intricate interaction between temporal factors and the processes of decision-making.

In terms of empirical studies, as discussed above, present biased preferences, which refer to the tendency to deviate from rational decision-making in favor of immediate rewards, have emerged as a significant and intriguing aspect of individuals' decision making. Scholars from diverse disciplines have extensively explored the significant influence of present bias on numerous aspects of personality traits and the decision-making mechanisms. The aforementioned investigation has yielded significant insights into the intricacies of human behaviors, such as the relationships between present bias and individual emotional intelligence and cognitive ability (Ackert et al. 2020), consumption decision (Yaakov et al. 2019), smoking behavior (Miura 2019), educational decisions making (Kemptner and Tolan 2018); migration (Goldbach and Schluter 2018). In the realm of finance, Meier and Sprenger (2015) conduct a study examining the ramifications of present bias on financial decision-making. In the realm of finance, Meier and Sprenger (2015) conduct a study examining the ramifications of present bias on financial decision-making. The research sheds light on how individuals' inclination towards immediate rewards can impact their investing decisions, savings habits, and overall financial welfare. In a related context, the research conducted by Schreiber and Weber (2016) investigates the influence of present bias on individuals' choices regarding pension plans. This area of study is of utmost importance given implications associated with decisions made in retirement planning.

As far as corporate level is concerned, the concept of time preference plays a pivotal role in shaping a firm's strategic decisions (Mishra 2023). These decisions, in turn, exert a substantial influence on the overall performance and success of the firm. Studies in this domain have provided valuable insights into how time preferences affect corporate behavior and outcomes. One significant area of study involves the impacts of present bias on a firm's dividend policies. Chen et al. (2014) study the optimal dividend strategies of insurance companies, taking into account the presence of managers with present biased preferences. Their findings indicate that managers who exhibit present biased preferences have a tendency to pay out dividends earlier compared to managers who are time-consistent. The aforementioned conduct may have implications for the financial stability and long-term sustainability of the insurance company, as early dividend payouts could curtail the organization's capacity to allocate resources to reinvest in growth opportunities. Likewise, Chunxiang et al. (2016) explore the behavior of sophisticated fund managers and find that the sophisticated fund manager has present-biased preferences. The more the fund manager is present-biased, the more funding is invested in risky asset.

Another crucial aspect of corporate behavior related to time preference involves a firm's inclination towards either short-term or long-term goals. The research conducted by Birhanu et al. (2016) reveals a correlation between a firm's temporal horizon and its decision-making and operational activities. It has been observed that companies with a focus on short-term goals exhibit a higher tendency to engage in unethical acts, such as giving bribes, in order to achieve rapid advantages immediate gains. On the other hand, firms that have a long-term perspective are inclined to allocate resources towards acquiring fixed assets and establishing executive

compensation systems that incentivize long-term performance. The adoption of a strategic orientation towards the long term resulted in a notable augmentation in both firm value and its operational performance, as emphasized by Flammer and Bansal (2017).

Furthermore, our study is related to a recent study of Kim and Nguyen (2022a, b), which investigate the relationship between managers' present bias and corporate investment. They show that firms controlled by managers exhibiting a higher degree of present bias tend to display a propensity for reduced levels of investment. Additionally, it has been observed that the impact of managers' present bias on corporate investment is more prominent in small and medium-sized firms (SMEs) in comparison to larger firms. This highlights the diverse consequences of time preference on distinct categories of firms.

2.1.2 A conceptual framework linking manager's present bias, business practices, and firm performance

The relationship between investment in various business activities and firm performance has been a subject of extensive research in the field of business management and economics (e.g., Nguyen and Kim 2019; McKenzie and Woodruff 2017; Porto and de Abreu 2019). When a firm invests in various business activities such as marketing, research and development, business practices, it aims to enhance its operational efficiency and market presence. As a result, these investments can lead to higher sales revenue. A main contribution of our study is to explore the role of manager's behavioural traits in driving such investment, which in turn impacts firm performance as measured by sales revenue.¹ In this section, building upon the foundational theories of time preferences as proposed by Thaler (1981), Laibson (1997) and Frederick et al. (2005), we will elaborate further on the role of manager's behavioural traits in influencing firm performance.

Building upon the theoretical framework proposed by Bloom et al. (2022), we first assume that business activities require phased investments, which are undertaken in two periods, t_1 and t_2 , with corresponding investment levels I_1 and I_2 . The benefits of these investments materialize in a third period, t_3 , and are modeled as a function $f(I_1, I_2)$. We may consider $f(I_1, I_2)$ a measure of firm performance such as sales revenue.

For simplicity, we posit a constant cash flow y per period, which can be viewed as a dividend the firm can earn immediately in t_1 and t_2 . Using standard discounting models, the present value (PV) of the investment in a business activity can be expressed as:

For the standard exponential discount rate model:

¹ Our main purpose in this framework is to give some intuition behind the effect of manager's behavioral traits on firm's practice. As such, we simplify the matter to a great extent. For example, we do not consider the role of compensation in aligning the incentives of CEOs (e.g., Flammer and Bansal 2017).

$$PV_{\text{business activity}} = y - I_1 + \delta(y - I_2) + \delta^2(f(I_1, I_2) + y)$$

For the model incorporating present bias:

$$PV_{\text{business activity}} = y - I_1 + \beta\delta(y - I_2) + \beta\delta^2(f(I_1, I_2) + y)$$

Here, β signifies the present bias factor, capturing the manager's inclination to overweight the present relative to the future.

The role of manager's present bias

In standard exponential discounting, a manager's discount factor for benefits realized in t_2 and t_3 would simply be δ and δ^2 , respectively. However, present bias introduces a novelty. A manager with present bias would discount t_2 benefits at $\beta\delta$ and t_3 benefits at $\beta\delta^2$. Thus, the manager's short-term impatience is captured by the discount factor $\beta\delta$ between t_1 and t_2 , and δ between t_2 and t_3 .

Hypothesis derivation

Given this framework, let's consider how present bias affects managerial decisions in investing in business activities:

At t_1 : The manager assesses the trade-off between the immediate return $y - I_1$ and the future benefits at t_3 . A manager with a higher degree of present bias ($\beta < 1$) is more likely to underestimate the future benefits, leading to smaller investment I_1 .

At t_2 : Again, the manager faces a similar trade-off. A heightened present bias (β) makes the immediate gains $y - I_2$ seem more attractive, likely leading to a reduction in investment I_2 .

In sum, building upon the insights of related studies and our conceptual framework, managers with greater present bias have a greater tendency to reduce investment in business practices, leading to lower performance.

Hypothesis 1a There is a negative relationship between a manager's present bias and business practices.

Hypothesis 1b Firms led by managers with lower level of present bias are associated with better firm performance.

2.2 Related studies on risk preferences and a conceptual framework linking manager's loss aversion, business practices, and firm performance

2.2.1 Related studies on risk preferences

Theoretical studies on risk preferences have undergone substantial development over the years, featuring plenty of fundamental contributions and delicate insights. One of the earliest and most influential works in this domain is Markowitz (1952)'s study. Markowitz's seminal paper presented a groundbreaking conceptualization of risk preference, highlighting its significance in shaping individual preferences when individuals are faced with the prospects of expected gains or losses. This pioneering

concept established a framework for the systematic investigation of risk attitudes and their influence on processes of decision-making.

As the psychology field has progressed and an increasing number of scholars has been exploring the intricate nature of risk preferences, our understanding of this phenomenon became broader. Roll (1986) emerges as one of the first scholars who put out and examined the risk preferences exhibited by managers. His study represents a key milestone, acknowledging that risk preferences of managers could significantly impact the strategic decisions of organizations. Building on this, Parrino et al. (2005)' research provides valuable insights on the risk-averse managers. Their study indicates that risk-averse managers exhibit a tendency to prioritize projects with lower levels of risk, as opposed to those with higher levels of risk. The finding offers significant implications for organizations, as it indicates that the risk preferences of managers can influence the selection of projects undertaken by a firm, thus affecting its growth path and overall performance. Additionally, Hong (2006)'s study presents a thought-provoking viewpoint by providing evidence that risk-loving policymakers are more likely to partake in activities that could inflate corporate profits. In short, risk preferences constitute a fundamental facet of human decision-making and behavior. They are defined by the extent to which individuals are willing to embrace or mitigate potential risks in their pursuit of specific goals. These preferences display considerable variability across individuals and exert significant influence on their decision-making processes, motivational factors, and behavioral patterns.

The early empirical studies on risk preferences were firmly grounded in the theoretical framework of the expected utility theory, a foundational concept in economics and decision theory and was first proposed by Bernouli (1738). Barseghyan et al. (2018) demonstrate that in the expected utility theory, there are two sources of changes in risk attitudes. Firstly, individuals may exhibit varying degrees of reducing marginal utility for wealth, which is commonly referred to as utility curvature. Secondly, individuals may deviate from their subjective beliefs and objective probabilities. The empirical studies based on expected utility theory often utilized data derived from controlled laboratory experiments to scrutinize the decision-making processes of humans when confronted with uncertain outcomes (e.g., Yaari 1965; Preston and Baratta 1948). For example, the pioneering work by Yaari (1965) aimed to measure and analyze these variations in utility curvature among individuals. This study uncovered the impact of variations in utility curvature on individuals' risk preferences and decision-making mechanisms.

In contrast to traditional economic models that assume individuals make rational choices to maximize outcomes, Kahneman and Tversky (1979) developed the prospect theory, which acknowledges that human decision-making is inherently shaped by cognitive biases. At its core, prospect theory assumes that people try to maximize outcomes, but they are unable to do so in systematic and predictable ways. The theory predicts that people generally make risk-averse decisions when choosing between options that appear to be gains and risk-seeking decisions when choosing between options that appear to be losses. In other words, people are often willing to take risks to avoid losses but are unwilling to take risks to accumulate gains. Tversky and Kahneman (1992) extend the framework and introduced the concept of

“cumulative prospect theory”. This theory further explored how individuals make decisions under conditions of risk and uncertainty. Cumulative prospect theory, at its fundamental essence, acknowledges the cognitive process by which individuals assess and appraise choices by considering both gains and losses. The idea of “prospect weights” is introduced, which encompasses the manner in which individuals weigh different possible outcomes based on their perceived probabilities. Cumulative prospect theory has emerged as a fundamental framework in the fields of behavioral economics and psychology due to its ability to offer a more intricate and authentic portrayal of human decision-making, influencing our comprehension of risk attitudes and preferences across a wide range of contexts.

Applying the cumulative prospect theory (Tversky and Kahneman 1992), a substantial body of empirical research has explored the far-reaching effects of risk preferences on a wide set of disciplines such as management, economics and finance. To illustrate, conducting experiments in Vietnam, Sharma and Tarp (2018) focus on micro and small-to-medium-sized enterprise (SME) owners and managers, and discover a noteworthy relationship between risk aversion and firm revenue. Specifically, their findings indicate that higher levels of risk aversion among owners and managers lead to lower firm revenue. Likewise, with a sample of Vietnamese farmers, a study of Vieider et al. (2019) aims to estimate their risk preferences and explore their impacts on income levels. The study highlights a negative association between risk aversion and income, indicating that farmers who display a higher degree of risk aversion tend to experience lower levels of income. Moreover, Arrfelt et al. (2018) delves into the realm of organizational decision-making and risk-taking. They posit that various risk-taking decisions can exert significant impacts on organizational outcomes. Their findings provide light on the impact of risk attitudes held by key decision-makers in organizations on the strategies they pursue and subsequent outcomes they achieve.

Furthermore, our study is close to a growing body of empirical studies that underscores the importance of top managers’ risk preferences in influencing firm performance. In particular, Graham and Puri (2013) reveals a compelling connection between the risk tolerance of chief executive officers (CEOs) and a company’s propensity to engage in mergers and acquisitions (M&A) activities. Their findings suggest that companies led by more risk-tolerant CEOs are more inclined to partake in mergers and acquisitions. On the other hand, impatient CEOs have higher propensity to receive a larger proportion of their compensation in the form of a fixed salary. Another dimension investigated by Rashad Abdel-Khalik (2014) is the link between CEO risk tolerance and a firm’s investment in research and development (R&D). His research uncovers a significantly positive association, indicating that CEOs who are more risk-tolerant are more likely to allocate resources toward R&D expenditures. The study conducted by Dittmann et al. (2010) examine the complex dynamics of CEO compensation packages in relation to their risk aversion levels. They provide evidence to support the notion that CEO risk aversion has an impact on the determination of compensation, albeit it was generally outweighed by the incentive effect.

To clarify, compensation packages incorporating stocks and equity-based incentives are deemed as optimal for risk-averse CEOs. In the same vein, De Meza and Webb (2007), Herweg et al. (2010) find the consistent evidence that compensation contracts including bonuses are likely to be optimal in the case that CEO is loss-averse.

Furthermore, a comprehensive exploration of the intricate relationship between managers' risk preferences and corporate financing strategies has unveiled compelling insights into how managers' risk preferences can shape financial decision-making within organizations. Caliskan and Doukas (2015) brings attention to a noteworthy correlation between the risk aversion of chief executive officers (CEOs) and dividend payments. They find that risk-averse CEOs are more likely to prioritize dividend payments over risk-loving CEOs. Their finding suggests that debt-like compensation could prevent risk-averse CEOs from taking risk, and could increase dividend payouts. Similarly, Corgnet et al. (2018) scrutinize into the realm of principal-agent relationships and risk preferences. They propose a principal-agent model that incorporates risk preferences with a particular emphasis on situations where managers demonstrate loss aversion primarily in non-monetary incentives rather than monetary ones. They shed light on why some firms heavily rely on unexpected, weak monetary incentives by focusing on the role of wage-irrelevant goals in the workplace. Recently, Kim and Nguyen (2022a, b) investigate the corporate debt financing of small and medium-sized enterprises (SMEs) in relation to managers' loss aversion. They indicate that SMEs that are led by managers with a higher loss aversion are less inclined to utilize domestic debt and exhibit a notably reduced level of foreign debt.

2.2.2 A conceptual framework linking manager's loss aversion and firm performance

Our work specifically interrogates the concept of loss aversion within the broader context of behavioral economics. This lens allows us to go beyond the traditional focus on gains to also consider the disproportionate psychological impact of losses. This concept is foundational to Cumulative Prospect Theory (Tversky and Kahneman 1992), which broadens the scope to include various forms of utility such as psychological incentives.

Drawing from Bloom et al. (2022), we incorporate the notion that management practices can be viewed as a form of technology aimed at enhancing firm performance. This perspective serves as a bridge between investment in managerial practices and organizational outcomes, thereby enriching our paper's contribution to the literature.

Formal Model

Variables and Notations

- w_0 : Manager's base wage without investment in management practices.
- B : Bonus for successful investment in management practices.
- D : Penalty for unsuccessful investment.

- p : Probability of successful investment.
- λ : Manager's loss aversion coefficient.
- θ_i : Risk aversion level of manager i .
- $U(w|\theta)$: Utility function dependent on wage w and risk aversion θ .
- I : Investment in management practices.
- $T(I)$: Technological improvement through management practices.
- $F(T)$: Firm performance as a function of T , echoing the "management as technology" perspective (Bloom et al. 2022). As before, we may consider $f(I_1, I_2)$ a measure of firm performance such as sales revenue.

Manager's Expected Utility:

For Expected Utility Theory (EUT):

$$V_i(I = 1|\theta_i) = pU(w_0 + B|\theta_i) + (1 - p)U(w_0 - D|\theta_i) + \gamma F(T(I))$$

For Cumulative Prospect Theory (CPT):

$$V_i(I = 1|\lambda, \theta_i) = pU(w_0 + B|\theta_i) + (1 - p)\lambda U(w_0 - D|\theta_i) + \gamma F(T(I))$$

Investment Decision Criteria: The manager will invest if:

$$V_i(I = 1|\lambda, \theta_i) > U(w_0|\theta_i) + \gamma F(T(I = 0))$$

Thus, the above evidence from related studies and our conceptual framework lead to Hypothesis 2a and Hypothesis 2b as follows:

Hypothesis 2a Managers' loss aversion levels negatively affect firms' business practices adoption.

Hypothesis 2a posits that a manager's degree of loss aversion, quantified by λ , serves as a dual hindrance: (1) It is inversely related to a firm's propensity to adopt innovative business practices; (2) Within the framework of Cumulative Prospect Theory, higher λ values act as a utility multiplier for potential losses, thereby discouraging investment in new business activities, particularly when $F(T(I))$ is an increasing function.

Hypothesis 2b Firms managed by managers with greater level of loss aversion is associated with lower firm performance.

Hypothesis 2b contends that firms managed by managers with elevated levels of loss aversion, denoted by λ , are likely to underperform. This underperformance is manifested in two ways: (1) Lower rates of adoption for innovative business practices; (2) Reduced investment in activities that could otherwise lead to better firm performance metrics, such as revenue and market share, especially when $F(T(I))$ is an increasing function.

3 Study design and research method

3.1 Basic setup and sample selection

The design of the embedded experiment is closely aligned with the risk and time preference elicitation approach put forth by Tanaka et al. (2010). Tanaka et al. (2010)'s methodological approach serves as the cornerstone for our experiment, allowing us to systematically measure parameters that are pertinent to both the cumulative prospect theory (Tversky and Kahneman 1992), and the quasi-hyperbolic discounting functions (Thaler 1981). There were two different decision-making sections in the experiment- a risk preference section and a time preference section, and they were performed in sequence. Detailed experimental instructions and question sets are provided in Appendix 3. Collaborating with the General Statistics Office of Vietnam (GSO), we conducted our experiment in 2018. We then embedded our experiment data with an ongoing firm-level repeated survey, which has been conducted annually since 2005 by GSO. Specifically, we randomly selected firms from the textile and garment industry in the three largest hubs of textile and garments firms in Vietnam, namely Thai Binh, Hai Duong, and Binh Duong provinces. We excluded multinational corporations (MNCs) as they often have distinct management structures compared to domestic firms. This is because they commonly face the liability of foreignness (Kim et al. 2017) and have a weak connection to the institutional settings of the host country (Nguyen et al. 2018). As our study aims to investigate the behavioral traits and decision-making of top managers in SMEs operating within the textile and garment sector in Vietnam, so the sample are restricted to firms with between 10 to 200 employees. SMEs often face unique challenges and opportunities compared to larger corporations, and their top managers may exhibit different decision-making patterns and behavioral traits. Importantly, all firms are managed by their owners. In addition, these firms have been operating for more than five years. Our final sample consisted of 623 firms. Based on data sourced from the Vietnam Textile and Apparel Association,² as of the time we conducted this study in 2018, it was estimated that there were approximately 6000 textile and garment firms operating in this country. Among this diverse range of firms, a substantial proportion, almost 80%, were classified as SMEs, while approximately 18.5% were multinational enterprises (MNEs). The first SMEs were established in 1991 after the Private Enterprise Law and the Company Law were promulgated in 1990. SMEs within this sector primarily operated in industrial parks located in proximity to cities. They were characterized by their relatively smaller scale, both in terms of workforce and production capacity, compared to their larger counterparts. Workforce within SMEs typically ranged from 10 to 200 employees, of which around 80% of these employees were women. So, the sample in our study comprises around 13% of small and medium-sized textile and garment firms, and represents more than 10% of the total industry in terms of the number of firms. Additionally, our sample also is inclusive

² https://www.phs.vn/data/research/PDF_Files/analysis_report/vn/20190320/Textile%20and%20Apparel%20Industry%20Report-20190320-V.pdf.

of SMEs established between the years of 2000 and 2015, thereby focusing on a representative subset of SMEs in this industry.

Vietnam's textile and garment industry is chosen as the context of interest for investigating top managers' behavioral traits and firm performance is underpinned by the following uniqueness of Vietnam's economic context and the strategic significance of this industry within the nation's economy.

Firstly, Vietnam's economic landscape has undergone a remarkable transformation in recent years, progressing from being one of the world's poorest countries to a middle-income country in a single generation. This transition since the launch of Doi Moi in 1986 together with favorable global trend has fueled rapid economic growth and industrialization, positioning Vietnam as one of the fastest-growing countries in Asian region. Prior to the onset of the Covid-19 pandemic, Vietnam experienced an annual GDP growth rate ranging from approximately 6 to 7%. In the year 2022, the country's GDP witnessed a notable increase, reaching a growth rate of 8%.³ Vietnam's rapid economic growth has resulted in significant transformations in the business landscape, including the emergence of a wide array of industries and firms. This diversification of industries and enterprises have created a dynamic and multifaceted business environment in Vietnam. The dynamic nature of the business landscape, characterized by rapid market changes and intense competition, emphasizes the importance of proficient leadership and strategic decision-making. Top managers play a central role in navigating firms through this evolving terrain. Their actions, strategies, and leadership have significant influences on both their own enterprises and the wider economic landscape of Vietnam. As such, the intricate interaction between top managers and the dynamic business environment makes Vietnam a highly suitable and captivating scenario for investigating the influence of managers' behavioral traits on firm performance in a context marked by changes and opportunities.

Secondly, the textile and garment industry in Vietnam is not only a crucial economic contributor but also a linchpin of the country's economic landscape. This industry is a major employer in Vietnam, providing jobs to millions of people. It is estimated that the sector employs over 2.7 million workers, making it one of the largest employers in the country. Its role extends beyond mere employment numbers; this industry consistently ranks as one of Vietnam's top export sectors, and has become the second largest exporter of textiles and garments in the world (Le 2023). This export-driven prowess is not merely a reflection of Vietnam's local manufacturing capabilities, but rather serves as evidence of Vietnam's successful integration into the global economy. The significance of the textile and garment industry extends beyond its economic contributions, as it serves as an indicator of Vietnam's overall economic patterns. Its fortunes are intrinsically tied to global market dynamics, reflecting changes in consumer preferences, trade policies, and international demand. Given this intricate array of influences, the textile and garment industry provides a valuable perspective for examining the behavioral traits of top managers and their impacts on firm performance.

³ <https://www.worldbank.org/en/country/vietnam/overview>.

Moreover, it is important to note the insight of Pennings and Smidts (2003), who state that there are two main requirements in the decision context to investigate the impact of manager's preferences on organizational behaviours: (1) The individual is an essential factor in the firm's decision-making, and (2) The decision context is not affected by situational variables. These two conditions are satisfied by the decision environments in which our managers operate. First, our manager participants are highly influential because they make the majority of strategic decisions for the company. Second, they share the same working and competitive conditions. All are textile and garment manufacturers operating in the same country and subject to the same economic and legal framework. With this additional information, the choice of Vietnam's textile and garment industry as the research context offers a unique opportunity to explore the interaction between top managers and firm performance in a highly dynamic setting.

Sample firms are randomly selected from the archives of the General Statistics Office of Vietnam (GSO). To ensure the creditability of the data, many officials from the General Statistics Office of Vietnam were hired to help us conduct the experiment. GSO officials sent invitations to managers and the participation of managers in this study was totally voluntary. Just one manager represented one firm, so there were 623 managers from 623 different firms. Approximately 80% of the sampled managers currently occupy the positions of Chief Executive Officers (CEOs) or Chief Financial Officers (CFOs). Among 623 participants, 182 participants were in Thai Binh province (29.22 percent), 219 participants in Binh Duong province (35.15 percent), and 222 participants in Hai Duong province (35.63 percent). As shown in Table 2, 65.25 percent of our managers are male; and 34.75 percent are female. The participants' average age is 49.59 years, and about 57 percent of participants completed universities and have bachelor's degrees.

3.2 Structural estimation of risk and time preference parameters

In this study, we have adopted a well-established risk and time preference elicitation procedure, inspired by the work of Tanaka et al. (2010). This methodology procedure serves as a comprehensive framework for evaluating and quantifying diverse aspects of individual risk and time preferences. Specifically, it enables us to measure the three crucial parameters associated with the cumulative prospect theory (Tversky and Kahneman 1992): utility concavity/convexity, loss aversion, and probability weighting. Additionally, we elicit the two key parameters related to quasi-hyperbolic discounting functions (Thaler 1981), with specific emphasis on exponential discounting and present bias. We have provided detailed instructions of experimental process in Appendix 3. Furthermore, building upon the study of Nguyen (2011), we structurally estimate these parameters by using the maximum simulated likelihood (SML) technique proposed by Train (2003).

It took participants about one hour to complete the experimental sessions. At the beginning of each session, our research assistants provided all participants with detailed instructions in Vietnamese about the experiment, gave them some examples and answer sheets with a series of questions to be answered. It is important to note

that to incentivize participants to make serious decisions, their decisions were paid with real money in some randomly selected tasks.

In particular, participants received a combination of a fixed participation fee of \$15 and additional payments based on the outcomes of their decisions within the experiment. At the beginning of session, every participant was provided a base participation fee of \$15 for their involvement in the experiment. In terms of additional payments, a random selection was conducted at the conclusion of each session, including a cohort of six participants, in order to determine which experiment (either loss aversion or present bias) would result in a monetary reward. A coin toss decided the reward allocation. If the coin came up heads, the selected participants would receive payment for the loss aversion experiment. If it came up tails, the reward would be based on the present bias experiment. For the loss aversion experiment rewards, the selected participants were asked to choose a card from a set containing numbers from 1 to 7, corresponding to pairs of lottery tickets from 1 to 7. The chosen card determined their payment outcome. If a participant selected card number 4 and had chosen Option B for row 4, they would receive either \$30 (the sum of the base participation fee of \$15 and a possible outcome of \$15) or \$7 (resulting from the base participation fee of \$15 minus the possible outcome of \$8), depending on the second coin toss. A second coin toss determined whether the participant received the \$30 or \$7 reward. If it resulted in a head, the participant would receive \$30; if it resulted in a tail, the participant would receive \$8. Similarly, for present bias experiment rewards, participants rewarded for the present bias experiment were required to select a card at random from a set containing numbers from 1 to 17. These numbers represented lottery tickets in the present bias experiment. For instance, a participant who randomly picked the card with the number 17 would receive \$115 immediately (the sum of the base participation fee of \$15 and an outcome of \$100) if they had chosen Option A for row 17. Otherwise, that participant would receive a total of \$185 in one week (the sum of the base participation fee of \$15 plus an outcome of \$170) if Option B for row 17 had been selected.

3.2.1 Risk preferences parameters

The participants are asked to make decisions on 35 questions with three series of binary choices between a certain amount (Option A) and a probability-based alternative (Option B). In question sets 1 and 2, a decision is made by choosing the preferred prospect for each paired lottery in each question. For example, at question 1, if a participant chooses Option A, he/she would have a 30% chance of getting \$20 and a 70% chance of receiving \$5. If a participant chooses Option B, he/she have a 10% chance of getting \$34 and a 90% chance of receiving \$2.50. The amount in Option A is fixed and held constant throughout each series. In contrast, the amount of Option B is changed over the course of the series to address different risk preferences. Further, the pattern is clear and is detailed for all participants in the experimental instruction that moving down the rows; Option B becomes more and more attractive than Option A. For instance, at Question 14, Option A does not change as compared to Question 1. However, if a participant chooses Option B, he/she have a 10% chance of getting \$850 and a 90% chance of receiving \$2.50. Thus, it is logical

that at a specific row, if a participant switches from Option A to Option B, he will continue to prefer Option B and will not switch back to Option A after that point. It is clear that a risk-averse person might switch from Option A to Option B later than a risk-seeking one.

Question sets 1 and 2 measure the risk preference parameters, utility concavity/convexity (α), and probability weighting (γ) based on the cumulative prospect theory (Tversky and Kahneman 1992) and Prelec's weighting function (1998), respectively. In particular, α represents the degree of risk aversion, and a higher value of α indicates to higher risk aversion. If $\alpha > 0$, a person is risk-averse, he will be risk-seeking if $\alpha < 0$, and risk-neutral if $\alpha = 0$. Prelec's weighting function (γ) indicates whether a person has either S-shaped or inverse S-shaped probability weighting. The weighting function is S-shaped if $\gamma > 1$, inverse S-shaped if $\gamma < 1$, and linear if $\gamma = 1$.

Question set 3 measures the loss-aversion parameter (λ). As such, Option A and B both have gains and losses, in which the gains and losses in Option B are much more substantial than Option A, and participants could make binary choices with a chance of 50–50. The latter a participant switches from Option A to Option B, the more loss-averse he is. Specifically, an individual is loss-averse if $\lambda > 1$, loss-seeking if $\lambda < 1$.

3.2.2 Elicitation of time-preference parameters

The approach to elicit time preferences, including time discounting rate (ρ) and present bias (β), is similar to the risk-preference elicitation. Again, in 2 question sets, we ask participants to make 35 binary decisions between receiving a certain amount and receiving a larger amount in the future. While the sooner amount is fixed and held constant throughout of the question set, the later amount varies throughout the question set to detect different time preferences. Expressly, the question set 1 presents the participants with 18 choices between receiving \$100 in one week and receiving a larger amount of money in two weeks, which ranges from \$100.25 to \$150. These questions yield estimates of time discounting rate (ρ). A higher value of ρ refers to a higher deviation from rationality. Question set 2 yields estimates of present bias (β), in which we ask participants to make 17 choices between \$100 received today (Option A) and Option B of receiving a greater sum (ranging from \$101 to \$170) in one week.

A person is present biased if $\beta < 1$, higher value of β implies lower present bias. It is worth noting that in our following regressions, in order to interpret empirical results easily, we use the absolute value of 1 minus β , which is denoted as β^* . As such, a lower value of β^* refers to a lower level of present bias.

4 Empirical model specification

The main variable is the composite score of business practices. Specifically, we employ the approach by McKenzie and Woodruff (2017) to measure business practices used in a firm's daily operations. There are 23 questions measuring basic practices in three areas: marketing, cost and record-keeping, and financial planning

practices. Business practices score is calculated by the average value of the three above types of business practices. It varies from 0 (adopting none of the business practices) to 1 (adopting all of the business practices). McKenzie and Woodruff (2017) note a positive link between this score and a firm's investment in time and money to adopt and improve their practices.

Next, considering business practices as a mediator through which manager's behavioral traits influence firm performance, we apply the mediation analysis approach (Baron and Kenny 1986; Imai et al. 2010) as follows:

$$P = \alpha_0 + \alpha_1\beta^* + \alpha_2\lambda + \alpha_M M + FE + \alpha_x X + \zeta$$

$$Y^* = \gamma_0 + \gamma_1\beta^* + \gamma_2\lambda + \gamma_3 P + \gamma_M M + FE + \gamma_x X + \varepsilon$$

where Y^* represents firm performance, specifically the natural log of net sales revenue; P represents the business practices score in the natural logarithm.

Of particular importance is that we incorporate the manager's behavioral traits—especially loss aversion λ and present bias β^* elicited from the experiment.

M is a vector of a manager's demographic characteristics, including age, gender, and education. Importantly, we also incorporate other managers' standard risks and preferences, which have been associated with the firm's activities and performance. Specifically, we include the manager's risk attitude and time exponential discount factors in all analyses.

FE is the province's fixed effect to control for the province's characteristics, such as population and level of economic development, which affect all firms located in that province.

X is a vector of firm-specific variables, including firm size as measured by the number of employees, charter capital, cost of goods sold.

ε and ζ are the error terms that are clustered at the province level.

To explore the role between manager's traits, we can focus on the estimated coefficients $\hat{\gamma}_1$ and $\hat{\gamma}_2$. Consistent with our theoretical framework, we conjecture that managers with a lower level of present bias, i.e., lower β^* are associated with better performance. In other words, $\hat{\gamma}_1$ is expected to be negative. Likewise, we expect that $\hat{\gamma}_2$ is negative, implying that firms managed by managers with greater loss aversion are associated with lower firm performance (Table 1).

5 Results analysis

5.1 Summary statistics

Table 2 presents the descriptive statistics for our sample firms and managers. In terms of sample firms, approximately 72.81 percent of sample firms adopt all of 23 business practices, in which the most often used practices are financial planning. In contrast, marketing practices are the least frequently used ones (untabulated). On average, the sale revenue is 8,547.41 million Vietnamese Dong (VND), which

Table 1 Definitions of variables

| Variables | Measurement | Sources |
|------------------------------------|--|--|
| <i>Dependent variables</i> | | |
| Business practices score | The average score of marketing practices, record-keeping practices, and financial planning practices (Natural logarithm) | Authors' construction |
| Revenue | Net sales revenue (natural logarithm) | General Statistics Office of Vietnam (GSO) |
| <i>Independent variables</i> | | |
| β | A time preference represents present bias. A higher value of β implies lower present bias | Authors' construction |
| β^* | $11 - \beta$. A lower value of β^* refers to a lower level of present bias and less deviate from rational decision making | Authors' construction |
| Time discounting rate (ρ) | A time preference measures the time discounting rate. A higher value of ρ refers to higher deviation from rationality or higher present bias | Authors' construction |
| Loss aversion (λ) | A risk preference parameter represents the degree of loss aversion. A higher value of λ implies higher loss aversion | Authors' construction |
| Risk aversion (α) | A risk preference parameter measures the concavity/convexity of the prospect theory function. A higher value of α indicates higher risk aversion | Authors' construction |
| Probability weighting (γ) | A risk preference parameter measures Prelec's probability weighting function. The weighting function is linear if $\gamma = 1$, S-shaped if $\gamma > 1$, and reverse S-shaped if $\gamma < 1$ | Authors' construction |
| <i>Control variables</i> | | |
| Age | Age of participants (in years) | Authors' construction |
| Gender | Dummy variable coded 1 if a participant is male and 0 otherwise | Authors' construction |
| Education | Educational levels, ranging from 1 (untrained) to 8 (doctoral degree) and 9 (higher than Ph.D.) | GSO |
| Charter capital | Natural logarithm of accumulated charter capital | GSO |
| Cost of good sold | Natural logarithm of cost of goods sold | GSO |
| Firm size | Natural logarithm of the total number of employees | GSO |

Table 1 describes dependent variables, independent variables, and control variables. The risk and time preference parameters are computed from the managers' responses collected in the experiment

Table 2 Descriptive statistics of firms and participants

| Variables | Full sample | | Thai Binh province | | Binh Duong province | | Hai Duong province | |
|---|-------------|-----------|--------------------|-----------|---------------------|-----------|--------------------|-----------|
| | Mean | Std. dev. | Mean | Std. dev. | Mean | Std. dev. | Mean | Std. dev. |
| <i>Firm-specific characteristics</i> | | | | | | | | |
| Business practices score | 0.72 | 0.17 | 0.723 | 0.158 | 0.749 | 0.167 | 0.712 | 0.164 |
| Revenue | 8547.41 | 3616.12 | 6018.29 | 3936.5 | 8877.67 | 5317.41 | 8095.43 | 5687.99 |
| Firm size | 147.37 | 87.29 | 139.12 | 88.05 | 172.34 | 98.11 | 113.52 | 75.26 |
| Charter capital | 37,268.63 | 17,776.1 | 37,351.28 | 18,149.6 | 37,935.9 | 16,208.7 | 35,878.46 | 24,437.63 |
| COGS | 8158.14 | 5928.45 | 8503.76 | 6863.36 | 8059.34 | 6412.81 | 7828.94 | 5245.41 |
| <i>Characteristics of managers elicited in the experiment</i> | | | | | | | | |
| Present bias (β) | 0.73 | 0.75 | 0.724 | 0.692 | 0.703 | 0.618 | 0.765 | 0.539 |
| Time discounting rate (ρ) | 0.25 | 0.23 | 0.258 | 0.236 | 0.249 | 0.237 | 0.268 | 0.235 |
| Loss aversion (λ) | 2.13 | 0.53 | 2.149 | 0.548 | 2.09 | 0.558 | 2.136 | 0.51 |
| Risk aversion (α) | 0.57 | 0.53 | 0.563 | 0.529 | 0.552 | 0.538 | 0.590 | 0.528 |
| Probability weighting (γ) | 0.45 | 0.42 | 0.462 | 0.430 | 0.450 | 0.434 | 0.477 | 0.429 |
| Age | 49.59 | 10.02 | 49.606 | 10 | 49.26 | 10.122 | 50 | 10.133 |
| Gender | 0.65 | 0.35 | 0.66 | 0.34 | 0.649 | 0.357 | 0.645 | 0.362 |
| Education | 5.50 | 1.97 | 5.606 | 1.93 | 5.551 | 1.947 | 5.477 | 1.929 |
| Observations | 623 | | 182 | | 219 | | 222 | |

is equal to about USD 370,82.⁴ The average accumulated charter capital in 2018 is 3,7268.63 million VND, which is equivalent to USD 1,616,860. The maximum number of employees- as already noted- is 200, while the minimum number of employees is 10 ($M=147.3728$, $S.D=87.2914$). On average, the sample firm's cost of goods sold in 2018 is 845 million VND, which translates to approximately USD 36,659.

Regarding managers' time preferences, the present bias parameter (β)'s mean value of 0.73 is noted, which is somewhat higher than the mean value of 0.644 and 0.610 reported in Tanaka et al. (2010), and Nguyen et al. (2012), respectively, but quite close to the 0.72 value found in the Brown et al. (2009). Most importantly, in reference to standard intertemporal preferences $\beta=1$, the estimated value of

⁴ According to the State Bank of Vietnam, USD/VND = 23,050 in 2018.

β ($M=0.73$, $S.D=0.75$) reveals the existence—i.e., the tendency to deviate from rational decision-making—among our managers.

As for managers' risk preferences, the mean value of loss aversion (λ) is 2.13, which is reasonably close to the mean of 2.25 reported by Tversky and Kahneman (1992), and the 2.63 value found in Tanaka et al. (2010). As such, it implies that, on average, our managers are loss averse. In terms of other risk preferences parameters, the mean of risk aversion (α) and probability weighting (γ) are 0.57 and 0.45, respectively, as compared to the means of 0.74 and 0.59 estimated by Tanaka et al. (2010) and those found by Liu (2013) with the same approach (0.69, 0.48). The finding indicates that participants' utility is described by risk aversion and inverse S-shaped probability weighting function.

Additionally, Table 2 provides some compelling glimpses into the firm-specific characteristics and managerial traits of our sample firms in three Vietnamese provinces. Firms in Binh Duong province have the largest average size ($M=172.34$), whereas firms in Hai Duong province have the smallest size ($M=113.52$). The highest sales revenue is also reported in Binh Duong's firms, while the lowest is in Thai Binh's firms. Although the score for business practices is fairly similar across all provinces, the mean score for business practices is highest in firms in Binh Duong province. Interestingly, we observe that managers of firms in Binh Duong province appear to be less loss-averse and present-biased than their counterparts in Thai Binh and Hai Duong provinces. These findings suggest that managers' preferences may vary according to different firm sizes.

5.2 Correlation matrix

We implement the Pearson correlation matrix among all variables in Table 3, which provides some apparent tendencies and valuable information about the quality of our measures of risk and time preferences. Starting with the correlation between dependent variables and managers' time preferences, there are negative correlations between business practices and managers' present bias (β^*) and time discounting rate ($r=-0.081$, $p<0.05$; $r=-0.076$, $p<0.1$, respectively). In contrast, present bias (β^*) is significantly correlated to firms' sale revenue ($r=-0.085$, $p<0.05$), but time discounting rate and revenue are not statistically significant at any levels ($r=0.06$, $p>0.1$). As for risk preferences, we also observe that loss aversion (λ) is negatively correlated with a firm's revenue and business practices ($r=-0.11$, $p<0.01$; $r=-0.19$, $p<0.01$, respectively). Likewise, there are negative correlation between firm's revenue and business practices and risk aversion (α) ($r=-0.16$, $p<0.01$; $r=-0.12$, $p<0.01$, respectively). However, we cannot find any correlation between revenue, business practices, and probability weighting (γ).

It is notable that present bias (β^*) and time discounting rate (ρ) are positively correlated at 1% level ($r=0.69$, $p<0.01$); probability weighting (γ) also has a positive correlation with risk aversion (α) ($r=0.73$, $p<0.01$). These pair-wise correlations suggest that some of these variables should be dropped in the multivariate regressions. Thus, we only use present bias (β^*) and risk aversion (α) in the following analyses.

Table 3 Correlation matrix

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
|--|-----------------------|----------------------|---------------------|--------------------|---------------------|----------------------|----------------------|---------------------|-------|-------|---------------------|------|------|
| Revenue (1) | 1 | | | | | | | | | | | | |
| Business practice score (2) | 0.018 | 1 | | | | | | | | | | | |
| Present bias (β) (3) | -0.085 ^{***} | -0.081 ^{**} | 1 | | | | | | | | | | |
| Time discounting rate (ρ) (4) | -0.06 | -0.076 [*] | 0.69 ^{***} | 1 | | | | | | | | | |
| Loss aversion (λ) (5) | -0.11 ^{***} | -0.19 ^{***} | 0.08 ^{**} | 0.072 [*] | 1 | | | | | | | | |
| Risk aversion (α) (6) | -0.16 ^{***} | -0.12 ^{***} | -0.01 | -0.05 | -0.05 | 1 | | | | | | | |
| Probability weighting (γ) (7) | -0.007 | -0.008 | -0.03 | -0.01 | 0.15 ^{***} | 0.73 ^{***} | 1 | | | | | | |
| Age (8) | 0.03 | 0.06 | 0.01 | -0.02 | -0.03 | 0.01 | -0.02 | 1 | | | | | |
| Gender (9) | -0.03 | -0.00 | -0.02 | -0.03 | -0.06 | 0.04 | 0.04 | 0.16 ^{***} | 1 | | | | |
| Education (10) | 0.02 | 0.01 | -0.02 | 0.01 | 0.03 | -0.068 [*] | -0.095 ^{**} | 0.17 ^{***} | -0.03 | 1 | | | |
| Firm size (11) | 0.15 ^{***} | 0.00 | 0.096 ^{**} | 0.05 | -0.06 | -0.02 | -0.05 | 0.01 | 0.01 | -0.02 | 1 | | |
| Charter capital (12) | 0.02 | -0.03 | 0.03 | -0.00 | -0.01 | -0.086 ^{**} | -0.04 | 0.03 | 0.01 | -0.01 | 0.03 | 1 | |
| COGS1 (13) | 0.086 ^{**} | 0.01 | 0.03 | 0.01 | 0.06 | 0.02 | -0.01 | 0.074 [*] | 0.01 | 0.01 | 0.086 ^{**} | 0.02 | 1 |

Table 3 displays the correlation matrix among variables. * $p < 0.1$, ** $p < 0.05$, and *** $p < 0.01$

5.3 Linking managers' behavioral traits with business practices and firm performance

Table 4 explores how a manager's behavioral traits, i.e., loss aversion and present bias, correlate with business practices and firm performance. We scrutinize the effect of these traits on business practices separately in models 1 and 2; we then examine their combined effect in model 3. Likely, separate effects of managers' traits on sale revenue are reported in models 4 and 5, while their combined effect is presented in model 6.⁵

We first examine the link between present bias and business practices. Recall that we define $\beta^* = |1 - \beta|$ to represent the degree of bias, i.e., the manager's tendency to deviate from the rational intertemporal decision. Conforming with

Table 4 Effect of managers' risk and time preferences on firm performance

| Independent variables | Ln(Business practices) | | | Ln(sale revenue) | | |
|-----------------------------|------------------------|-------------------|-------------------|--------------------|--------------------|--------------------|
| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
| Present bias (β^*) | 0.06 (0.54) | | -2.74** (1.21) | -0.29*** (0.11) | | -0.26** (0.12) |
| Loss aversion (λ) | | -0.12 (0.17) | -0.11** (0.05) | | -0.19*** (0.03) | -0.10** (0.05) |
| Risk aversion (α) | | -0.14 (1.09) | -0.01 (0.07) | | -0.21 (0.16) | -0.23 (0.16) |
| Age | 0.04* (0.02) | 0.62 (0.54) | 0.05 (0.03) | -0.03 (0.26) | 0.01 (0.08) | 0.21 (0.53) |
| Gender | -0.13 (0.16) | 0.22* (0.12) | 0.35** (0.16) | -0.16 (1.07) | -0.14 (0.16) | -0.08 (0.09) |
| Education | -0.71 (1.01) | -0.03 (0.02) | -0.06 (0.09) | -0.51 (0.82) | -0.92 (1.12) | -0.27 (1.02) |
| Firm size | -0.08 (0.29) | 0.83 (1.07) | 0.08** (0.04) | 0.32*** (0.05) | 0.33*** (0.06) | 0.36*** (0.07) |
| Other firm's specifics | Yes | Yes | Yes | Yes | Yes | Yes |
| Intercept | 2.92*** (0.22) | 5.35*** (0.58) | 0.58** (0.28) | -2.74*** (0.40) | -2.90*** (0.44) | -3.06*** (0.50) |
| Number of firms | 623 | 623 | 623 | 623 | 623 | 623 |
| Adjusted R-squared | 0.27 | 0.18 | 0.25 | 0.80 | 0.80 | 0.801 |

Table 4 reports the effects of managers' risk and time preferences on firm performance. The dependent variable is measured by the natural log of net sales revenue and business practices; standard errors are in parentheses. The highest VIFs are 1.06, 1.03, and 1.11 for Model 1, Model 2, and Model 3, respectively. In terms of Model 4, Model 5, and Model 6, the highest VIFs are 1.07, 1.04, and 1.12, respectively * $p < 0.1$, ** $p < 0.05$, and *** $p < 0.01$. Standard errors are clustered at the province level. See Table 1 for all variables' definitions

⁵ The graphs showing the relationships between business practices, sales revenue and managers' preferences are displayed in Appendix 1 and Appendix 2, respectively.

hypothesis 1a, the -2.74 estimated coefficient on β^* in model 3 indicates that a decrease in managers' present bias level is associated with a 2.74 percentage point increase in adoption of business practices ($\hat{\gamma}_1 = -2.74$, $p < 0.05$). We also observe that the estimated coefficients on β^* are significant in model 4 and 6 ($\hat{\gamma}_1 = -0.29$, $p < 0.01$; $\hat{\gamma}_1 = -0.26$, $p < 0.01$, respectively). This result supports hypothesis 1b that firms led by managers with lower present bias are more likely to perform better thanks to sound business practices. In addition, the -0.26 estimated coefficient on β^* indicates that greater deviation from rational decision making is associated with 2.6 percent lower sale revenue.

Extending our discussion to risk preference, as in hypotheses 2a and 2b, it is anticipated that firms managed by managers with greater loss aversion are associated with lower business practices adoption, and sale revenue. We find a negative link between loss aversion of managers and firms' adoption of business practices in model 3 ($\hat{\gamma}_2 = -0.11$, $p < 0.05$), although they are not statistically significant in model 2 ($\hat{\gamma}_2 = -0.012$, $p > 0.1$). This result implies that a one-point increase in managers' loss aversion level would lead to an approximately 1.1% decrease in business practices. In the same vein, Model 5 and 6 reveal a negative and significant relationship between managers' loss aversion and revenue ($\hat{\gamma}_2 = -0.19$, $p < 0.01$; $\hat{\gamma}_2 = -0.10$, $p < 0.05$, respectively). The coefficient of -0.10 says that firms with managers who are averse to loss are associated with a 10 percent lower revenue.

Turning to risk aversion (α), the -0.01 and -0.23 coefficients on risk aversion in models 3 and 6 imply that increasing the managers' risk aversion by one percentage would lead to 1 and 23 percent reduction in business practices and sale revenue, respectively, although they are not statistically significant at any level. The insignificant effects could be caused by the fact that our sample firms are family-owned SMEs, and risk aversion in those firms might be contingent on preference reversals, as Fang et al. (2021) noted. Our result is also consistent with the finding of Doukas and Mandal (2018) that CEO risk aversion does not impact corporate derivatives hedging. Regarding control variables, in models 3 and 6, we find strong positive relationships between firm size and firms' business practices and revenue ($\hat{\gamma} = 0.08$, $p < 0.05$; $\hat{\gamma} = 0.36$, $p < 0.01$);).

5.4 Moderation analysis of the association between business practices, firm performance, and managers' behavioral traits

While Table 4 reports findings on the effects of managers' risk and time preference, it is a natural corollary to investigate whether these preferences matter for firm performance in different ways under the influence of demographic profiles. Sharma and Tarp (2018) point out that research in economics has paid little attention to the moderating effect of various conditions on the translation of preferences into the performance of firms. Thus, in Table 5, we examine the firm performance effect of managers' risk and time preferences with moderating effect of managers' age and educational levels.

Table 5 Moderating effects of age and educational level

| Independent variables | Ln(Business practices) | | Ln(sale revenue) | |
|------------------------------|-------------------------------|--------------------------------|-------------------------------|-------------------------------|
| | Model 1 | Model 2 | Model 3 | Model 4 |
| Present bias (β^*) | 0.06 (0.12) | -3.67 ^{***} (1.02) | -2.65 (1.84) | -2.45 ^{**} (1.15) |
| β^*_age | 0.45 (1.57) | | 0.09 [*] (0.06) | |
| $\beta^*_\text{education}$ | | -0.45 ^{**} (0.17) | | -0.41 [*] (0.24) |
| Loss aversion (λ) | 0.12 (1.78) | -0.19 (0.77) | -4.02 ^{**} (1.94) | -1.92 [*] (0.99) |
| λ^*_age | 0.36 (1.14) | | 0.16 ^{***} (0.04) | |
| $\lambda^*_\text{education}$ | | -0.18 (0.59) | | -0.33 [*] (0.19) |
| Age | -0.12 (0.16) | 0.02 [*] (0.01) | -0.28 ^{**} (0.11) | -0.03 (0.23) |
| Education | -0.35 (1.02) | 0.58 ^{**} (0.27) | 0.18 ^{***} (0.06) | 0.47 [*] (0.25) |
| Firm-specific variables | Yes | Yes | Yes | Yes |
| Intercept | 0.85 ^{***} (0.27) | 2.35 ^{**} (1.18) | 3.30 [*] (1.92) | 3.76 ^{***} (1.39) |
| Number of firms | 623 | 623 | 623 | 623 |
| Adjusted R-squared | 0.48 | 0.52 | 0.73 | 0.79 |

Table 5 reports the moderation analysis of the relationship between business practices, firm performance, and managers' behavioral traits. The dependent variable is measured by the natural log of net sales revenue; standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, and *** $p < 0.01$. Standard errors are clustered at the province level. All variables' definitions are provided in Table 1

5.4.1 Moderating effect of age

As the first avenue of heterogeneity in models 1 and 3 of Table 5, we examine whether managers' risk and time preferences in our study determine the performance of firms differently depending on manager age. As far as the interaction between present bias (β^*) is concerned, we cannot find any link between manager age and business practices adoption. However, we observe a negative correlation of manager age and revenue in model 3 ($\hat{\gamma}_1 = -0.28, p < 0.05$); the estimated coefficient on the interaction term between this variable and present bias (β^*) is positive and statistically different from zero at 10% significance level ($\hat{\gamma} = 0.09, p < 0.1$). These results suggest that younger and patient managers contribute to increase sales revenue at higher degrees than their older counterparts.

In terms of loss aversion (λ), no association between the age of loss-averse managers and business practices is found at any significant level. However, it has a negative and significant relation with sale revenue ($\hat{\gamma}_2 = -4.02, p < 0.05$), which is in line with our findings in the previous section. Furthermore, its interaction term with manager's age is also significantly and positively associated with firm revenue ($\hat{\gamma} = 0.16, p < 0.01$), implying that firms managed by younger and patient managers are likely to perform better than other firms.

5.4.2 Moderating effect of educational levels

The second avenue of heterogeneity relates to managers' educational levels, reported in the model 2 and 4 of Table 5. The first thing to note is the strong negative association between present bias (β^*) and business practices ($\hat{\gamma}_1 = -3.67, p < 0.01$) and sale revenue ($\hat{\gamma}_1 = -2.45, p < 0.01$), which is conforming to our hypotheses 1a and 1b. The education variable is significantly related to firms' business practices and sale revenue ($\hat{\gamma} = -0.58, p < 0.05, \hat{\gamma} = 0.47, p < 0.1$, respectively). At the same time, the estimated coefficient on the interaction terms between this variable and present bias in models 2 and 4 are negatively related to firm performance ($\hat{\gamma} = -0.45, p < 0.05, \hat{\gamma} = -0.41, p < 0.1$, respectively). These results imply that education mitigates the negative link between present bias with the adoption of business practices and revenue.

In the same fashion, we observe that revenue is negatively predicted by managers' loss aversion ($\hat{\gamma}_2 = -1.92, p < 0.1$). At the same time, while the interaction term between managers' loss aversion and education is also negatively associated with the firm performance ($\hat{\gamma} = -0.33, p < 0.1$). These results indicate that education lessens the negative link between risk-aversion with adoption of management practices, and firm performance.

5.5 Mediation analysis of the relationship between managers' behavioral traits and firm performance

Given that a variety of studies have evidenced a direct positive relationship between good business practices and firm performance (e.g., Bloom et al. 2022; McKenzie and Woodruff 2017; Nguyen and Kim 2019). On the other hand, our findings in Tables 4 and 5 demonstrate the direct effect of managers' behavioral traits attributes on both business practices and firm performance. Put together, the investigation of a potential mediation impact of business practices on the relationship between managers' risk and time preferences and firm performance is of significant interest to us. In particular, the hypothesis posits that managers exhibiting higher degrees of present bias are inclined to decrease their adoption of business practices, resulting in adverse effects on firm performance. Likewise, managers with higher levels of loss aversion or risk aversion are less inclined to adopt business practices, leading to a reduction in sales revenue. Applying the approach of Nguyen et al. (2021), we have conducted a mediation analysis. In this analysis, firm performance measured by the natural log of net sales revenue is outcome variable. The mediator variable is business practices, while treatment variables are managers' risk and time preferences.

The results indicate that there is a statistically significant negative relationship between managers' present bias and firms' sales revenues, with an estimated coefficient of -0.0115 ($p < 0.01$). It suggests that if managers are present biased, the firms' average sales revenue would be 1.15 percent lower than the average sales revenue if managers are not present biased. Of this sales revenue reduction, 1.02 percent is attributed to direct effect ($p < 0.05$), while the remaining 0.133 percent is due to the indirect path via lower business practices ($p < 0.1$). The magnitude of the direct effect is significantly greater than that of the indirect effect, suggesting that the impact of a manager's present bias on sales revenue is not primarily attributable to the influence of present bias levels on business practices, which subsequently affects sales revenue. In particular, the estimated proportion of 0.1153 ($p < 0.1$) implies that the indirect effect via business practices explains approximately 11.53% of the effect that managers' present bias has on firm performance. The remaining 88.47% of this effect is due to other mechanisms.

Turning to the mediating effects of business practices on the relationship between managers' loss aversion and firm performance, Table 6 reports the estimated total effect of -0.0768 ($p < 0.05$) with direct and indirect effects of -0.0572 ($p < 0.1$) and -0.0196 ($p < 0.01$), respectively. The results indicate that a decline of 7.68 percent in sales revenue is due to managers' loss aversion. Among this decrease, 1.96 percent is attributed to a reduction in business practices resulting from managers' higher loss aversion level, whereas the remaining 5.72 percent is due to other mechanisms. While it has been shown a statistically significant indirect effect of managers' loss aversion on sales revenue via business practices, it is worth noting that this indirect effect is comparatively smaller in magnitude when compared to the direct effect. Specifically, the estimated proportion of 0.255 ($p < 0.05$) suggests that the impact of managers' loss aversion on firm performance is somewhat mediated by business practices, accounting for approximately 25.5% of the total effect. Our findings address the concern about a mediation effect on the relationship between managers' personality traits and firm performance as previously highlighted by Ong and Ismail (2013), Seibert et al. (2017), and other scholars.

In terms of the link between managers' risk aversion and firm performance, total effect and natural direct effect are not statistically significant at any level, which is consistent with results in Table 4. However, the estimated coefficients of -0.1426 ($p > 0.1$) and -0.119 ($p > 0.1$) on risk aversion in model 3 suggest that a one percentage increase in managers' risk aversion would result in a 14.26 percent decrease in sales revenue, of which 11.9 percent of this reduction is attributed to direct effect. Interestingly, we observe that indirect effect of managers' risk aversion on firm sale revenue via business practices is statistically significant at 10% level. The estimated indirect effect of -0.0236 ($p < 0.1$) suggests that higher risk aversion level of managers reduces business practices adoption, which in turn leads to a decrease in sales revenue by approximately 2.36 percent.

5.6 Robustness check

For robustness check, we incorporate time discounting rate (ρ) and probability weighting (γ) as they are of great significance for all economic decisions under the

Table 6 Mediation analysis of the relationship between managers' behavioral traits and firm performance

| | (1) | (2) | (3) |
|--------------------------------------|-------------------------|-----------------------|---------------------|
| | Sales revenue | Sales revenue | Sales revenue |
| <i>Natural Indirect Effect (NIE)</i> | | | |
| Present bias | -0.00133*** (-15.04) | | |
| Loss aversion | | -0.0196*** (-8.82) | |
| Risk aversion | | | -0.0236* (-1.71) |
| <i>Natural Direct Effect (NDE)</i> | | | |
| Present bias | -0.0102** (-2.3) | | |
| Loss aversion | | -0.0572* (-1.73) | |
| Risk aversion | | | -0.119 (-1.14) |
| <i>Total effect (TE)</i> | | | |
| Present bias | -0.0115* (-1.7) | | |
| Loss aversion | | -0.0768** (-1.98) | |
| Risk aversion | | | -0.1426 (-0.9) |
| Proportion | 0.1153* -1.7 | 0.255** -1.99 | 0.2459 -0.76 |
| Intercept | 5.310*** -27.63 | 5.377*** -20.45 | 5.390*** -24.09 |
| Number of firms | 623 | 623 | 623 |

Table 6 reports the mediation analysis of the relationship between managers' behavioral traits and firm performance. Firm performance measured by the natural log of net sales revenue is outcome variable; business practices score is mediator variable; and managers' risk and time preferences are treatment variables; z statistics are in parentheses. * $p < 0.1$, ** $p < 0.05$, and *** $p < 0.01$. All variables' definitions are provided in Table 1

intertemporal circumstance (Hermann and Musshoff 2016). Table 7 reports regression results with alternative parameters of risk and time preferences.

In line with Holmes et al. (2011)'s and Bromiley (2010)'s insights into the importance of other components of prospect theory in the organizational setting, we also incorporate probability weighting (i.e., decision weights), which is a crucial element of prospect theory. Probability weighting plays a significant role in determining a broad set of risk attitudes, and refers to probabilistic risk aversion (Gonzalez and Wu 1999). Table 7 note that probability weighting doesn't significantly impact on business practice; however, it plays a highly significant role in driving firm performance. Firms whose managers deviate from

Table 7 Incorporating time discounting rate and probability weighting

| Independent variables | Ln(Business practices) | | | Ln(sale revenue) | | |
|---------------------------------------|------------------------|--------------------|--------------------|--------------------|--------------------|-------------------|
| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
| Time discounting rate (ρ) | -0.21* (0.12) | | -0.10* (0.06) | -3.00* (1.78) | | -0.12* (0.06) |
| Probability weighting (γ) | | -0.02 (0.77) | -0.03 (0.07) | | -0.81*** (0.28) | -0.56** (0.28) |
| Loss aversion (λ) | | -0.09*** (0.04) | -0.09*** (0.03) | | -0.63*** (0.22) | -0.10** (0.04) |
| Risk aversion (α) | -0.03** (0.01) | -0.06*** (0.02) | -0.05*** (0.02) | 0.04** (0.02) | -0.03 (3.47) | 0.02 (0.02) |
| Managers' demographic characteristics | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm-specific variables | Yes | Yes | Yes | Yes | Yes | Yes |
| Intercept | 5.88*** (0.29) | 0.76*** (0.04) | 5.76*** (0.36) | -2.77*** (0.39) | 2.13** (1.05) | 0.14*** (0.03) |
| Number of firms | 623 | 623 | 623 | 623 | 623 | 623 |
| Adjusted R-squared | 0.43 | 0.37 | 0.31 | 0.80 | 0.82 | 0.80 |

Table 6 reports the cross-sectional regression with standard risk and time preferences parameters- time discounting rate and risk aversion. Plus, we incorporate probability weighting. The dependent variable is measured by the natural log of net sales revenue and business practices; standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, and *** $p < 0.01$. Standard errors are clustered at the province level. All variables' definitions are provided in Table 1

rational decision-making as described by the expected utility theory (EUT) framework have much lower sale revenues. Together these two findings indicate that probability weighting affects a firm's performance through a different channel than business practice. It would be of great interest for future studies to explore which channel it is.

We observe that managers' time discounting rate and loss aversion are consistently correlated with firm performance, even we examine their effect separately or their combined effects in models 3 and 6. The results show that firms led by present biased managers have 10 percent and 12 percent lower business practices adoption and revenue than firms with managers who are not present biased ($\hat{\gamma}_1 = -0.10$, $p < 0.1$, $\hat{\gamma}_1 = -0.12$, $p < 0.1$; respectively). Likewise, one standard deviation decrease in the loss aversion level of managers leads to higher adoption of business practices and firm sale revenue by approximately 9 percent and 10 percent, respectively ($\hat{\gamma}_1 = -0.09$, $p < 0.01$; $\hat{\gamma}_1 = -0.10$, $p < 0.05$).

6 Discussion and conclusion

6.1 Discussion of main results

Our study expands the literature on behavioural firms by uncovering the role of a manager's behavioral traits as a driver of business practices and firm performance. Though to

a lesser extent than general population, we find the existence of behavioural traits among our managers. Furthermore, these manager's traits play a significant role in driving business practices and firm performance. Firstly, firms whose managers with higher present bias are less likely to adopt business practices leading to approximately 2.6 percent lower sale revenue. The reason for this effect might be that greater present biased managers would prefer to invest more in the risky assets to obtain income early (Chunxiang et al. 2016) and pay dividends (Chen et al. 2014).

Secondly, firms led by managers who are more averse to loss are associated with a 10 percent lower performance due to poorer business practices. These results are consistent with the findings of some recent studies such as Vieider et al. (2019), Sharma and Tarp (2018), and Best and Grauer (2016) and supports the notion that loss aversion predicts lower firm performance as loss-averse managers may forgo investment opportunities and pay more dividends when their exposure to debt is high (Caliskan and Doukas 2015).

Thirdly, firms led by younger and patient managers are associated with approximately 0.09 percentage points higher revenue than other firms. Our results align with Sitthipongpanich and Polsiri (2015)'s finding that young family CEOs increase firm value as they have business expertise. In the same vein, recent research conducted by Kim (2022) demonstrates that a firm's debt financing activities are affected by the age of its managers as people get older, they become more risk- and loss-averse. On the other hand, findings from our study corroborate those of scholars who have followed the upper echelons theory for the past thirty years, arguing that managers' demographics, such as age and gender, significantly affect firm performance and decision making (Friedman et al. 2016; García-Meca and Santana-Martín, 2023; Ren and Zeng 2022).

Fourthly, we find that education helps to alleviate the detrimental effects of the negative link between managers' present bias and loss aversion with the implementation of business practices and revenue. Individual differences in cognitive ability and their association with risk taking behavior and risk preferences have only recently been the subject of academic inquiry (for a review, see Dohmen et al. 2018). Fredrick (2005), and Falk et al. (2018), among others, note that risk aversion and patience may be linked to cognitive ability. Our study's results back up these claims.

Finally, Ong and Ismail (2013), Seibert et al. (2017), among others, have shown their concern about the indirect relationship between owner-managers' personality traits and firm performance. Our study partly responds to that concern by providing compelling evidence that, in addition to the direct impact of managers' risk and time preferences on company performance, there exists an indirect pathway in this relationship through the influence of business practices. The study finds that there is a significant relationship between managers' loss aversion and firm performance, with 11.53 percent of this impact being mediated by business practices. It suggests that managers displaying higher degrees of present bias are more likely to reduce their adoption of business practices, leading to negative consequences for firm performance. Likewise, mediating effect of business practices accounts for approximately 25.5% of the total effect of managers' loss aversion on firm performance. This finding suggests that managers with higher levels of loss aversion are less likely to embrace business practices, resulting in a decline in sales revenue.

6.2 Contributions

The main contribution of this study is to collect direct survey measures of managers' time and risk preferences and link them to firm-level data. In particular, our paper contributes to the current literature in the following ways:

First, our study contributes to the current literature by being among the first to directly investigate loss aversion at the individual manager level and subsequently explore its connection with the firm's strategic decisions. Loss aversion, a fundamental behavioural trait outlined in prospect theory by Kahneman and Tversky (1979), has been extensively studied in various contexts, but its specific implications for managerial decision-making within organizations have not been thoroughly examined. By investigating this relatively unexplored domain, our research sheds light on the role of loss aversion in influencing strategic choices, thus providing valuable insights into managers' preferences and their impacts on firm outcomes.

Moreover, our study addresses a notable gap in the literature concerning the investigation of managers' preferences within real-world corporate settings. A significant portion of the extant literature, exemplified by the studies conducted by Butler et al. (2017), Goldbach and Schluter (2018), and Kairies-Schwarz et al. (2017), primarily use simulation methodologies and samples consisting of college students in order to investigate individuals' preferences. While these studies have contributed valuable insights into risk and time preferences, they often fall short in capturing the intricacies and complexities of decision-making within real-world corporate contexts (Butler et al. 2017; Goldbach and Schluter 2018; Kairies-Schwarz et al. 2017). Our study's focus on the actual managerial context aims to bridge this gap by providing a more realistic and applicable understanding of how managers' behavioral traits matter within the intricate dynamics of firms.

Additionally, our research aligns with the broader call for ecologically valid approaches in studying individual behavior, as emphasized by Osborne-Crowley (2020), Parsons (2015), and Shamay-Tsoory and Mendelsohn (2019). Researchers advocating for ecologically valid approaches argue that simulations and student samples may not effectively replicate the preferences and decision-making processes exhibited by managers and executive teams in real-world settings (Mumford et al. 2007; Van Velsor et al. 1989). Our study responds to this call by exploring managerial preferences and firm performance within real-world organizational contexts, offering findings that are more directly relevant to managerial situations in practice. In doing so, we contribute to a more comprehensive understanding of the intricate interplay between individual preferences and strategic decision-making in the context of real-world scenarios.

Second, we incorporate another vital insight from psychology and economics: *present bias*, which refers to the tendency in which an individual displays inconsistency in impatience levels over time. Specifically, an individual might be impatient in the short run but more patient in the long run. Existing studies have explored the effect of present bias on individual decision-making in various areas, such as finance (Carvalho et al. 2016), commitment to exercising, and pension decisions (Choi et al. 2008). However, while existing literature has touched upon the effects of managers' characteristics on firm performance, the specific influence of present bias among owner-managers remains an emerging area

of inquiry. Our study, therefore, contributes to this growing body of knowledge by incorporating and examining the aspect of an owner-manager's present bias. This expansion is particularly pertinent given the unique dynamics and pressures faced by owner-managers in steering the strategic direction of family firms (Bouncken and Kraus 2022), where the interplay of managers' time preferences and decision-making can significantly impact both business practices and firm performance. By incorporating this aspect of the owner-manager's present bias into our research, we aim to contribute valuable insights to the understanding of how that trait shape managers behaviors and strategic choices in family firms.

Third, in the context of strategic leadership, our study offers invaluable insights into the decision-making processes. Understanding behavioural factors of time preferences and risk aversion is crucial for effective decision-making and long-term success in the business world. Time preferences, encompassing the manner in which individuals or organizations assess the relative value of immediate rewards compared to future benefits (Thaler 1981; Frederick et al. 2005), exert an influence on strategic decisions such as the timing of investments, allocation of resources, and acceptance of innovations. Our study suggests that present biased managers may prioritize immediate financial gains at the cost of sustainable development, whereas managers who adopt a more patient perspective might strategically position their firms for long-term success. Risk aversion, on the other hand, affects the willingness to undertake uncertain ventures (Caliskan and Doukas 2015; Corgnet et al. 2018). In order to foster firm performance and facilitate business practices, it is necessary for top managers to evaluate their risk and time preferences and engage in informed decision-making. Thus, this study can provide insights into the impacts of risk aversion and present bias on strategic leadership by evaluating the extent to which a firm is inclined to engage in innovative endeavours by improving business practices, or explore strategies to increase sales revenue. The results derived from our research can assist firms in customizing their leadership methods to correspond with their risk and time preferences and long-term objectives.

Furthermore, our study can offer implications for corporate management. Our study can provide guidance to managers in formulating plans that effectively balance short-term benefits with long-term sustainable development, thereby cultivating a corporate environment characterized by patience and caution (Lee 2001; Hill and Hult 2020). The study's findings can also provide valuable insights that can be utilized to enhance risk management strategies. This, in turn, enables firms to more effectively assess and address possible hazards that may arise from their strategic decisions. By understanding the interaction between present bias and risk aversion, managers may enhance their decision-making processes, optimize the allocation of resources, and ultimately improve their capacity to cope with intricate challenges and opportunities in the current competitive business environment. Additionally, by identifying the behavioral traits of managers and how they correlate with decision-making outcomes, organizations can develop tailored leadership development programs (Den Hartog and Belschak 2012; Groves and LaRocca 2011). These programs can help managers enhance their strategic thinking by addressing potential biases related to risk and time preferences. In this way, our research contributes not only to the theoretical understanding of these behavioral traits but also

to their practical application in corporate settings, ultimately fostering better decision-making and firms' long-term success.

Finally, our study makes a direct contribution to the management and economics literature in several significant ways. First, existing literature on family firms has mainly concentrated on various facets, including the examination of ownership and control dynamics within family-owned firms and their consequent impacts on firm value and performance (Bichler et al. 2022; Fang et al. 2021; Sitthipongpanich and Polsiri 2015; Bertrand and Schoar 2006; Swanpitak et al. 2020). However, little attention has been paid to the risk and time preferences of managers within these family-owned firms, despite the recognition of these characteristics as crucial factors influencing entrepreneurial achievements. Our study fills this research gap by directly eliciting and examining the risk and time preferences of owner-managers, thereby enhancing the current literature's understanding of these pivotal behavioral factors.

In addition, our research adds a significant aspect to the existing literature on entrepreneurship and decision-making by examining the risk and time preferences of managers in family-owned firms. Previous studies have highlighted the important role of these preferences in shaping entrepreneurial behavior and subsequent consequences of entrepreneurial endeavors (Eesley and Wang 2017; Kreilkamp et al. 2023; Shane 2003). Expanding upon the existing framework, our study takes a step further by focusing on owner-managers within family firms, a subgroup that plays a crucial role in the dynamic landscape of entrepreneurship. Through an in-depth exploration of the risk and time preferences of owner-managers, we are able to provide different viewpoints on the ways in which how these behavioral traits influence their strategic decision-making processes.

Furthermore, the concept of entrepreneurship, as emphasized by Sarasvathy (2001) and Mitchell et al. (2002), is a multifaceted process shaped by a range of various individual factors. In line with this point of view, our study makes a contribution by shedding light on how the risk and time preferences of owner-managers within family-owned firms impact their entrepreneurial activities. These insights are particularly relevant in the context of family businesses, where the interaction among familial dynamics, ownership, and management can have an impact on the direction and outcomes of entrepreneurial endeavors. By uncovering the link between managers' preferences and firm performance, our study provides a comprehensive understanding of the intricate decision-making processes that drive entrepreneurial success within family firms. This knowledge possesses the potential to not only in advancing academic dialogue but also to provide valuable insights for devising practical approaches aimed at enhancing the performance and long-term sustainability of family-owned firms.

Moreover, our study explores the intricate impacts of owner-managers' risk and time preferences on various facets of firms' business practices and sale revenue. Our study's empirical findings about both direct effect and indirect effect of owner-managers' risk and time preferences on firm performance via business practices unveil compelling evidence indicating that owner-managers' behavioral traits have a substantial impact on firm performance. This aligns with previous research that highlights the critical role of managers' characteristics in shaping family firms' performance (Goh et al. 2014; Hiebl

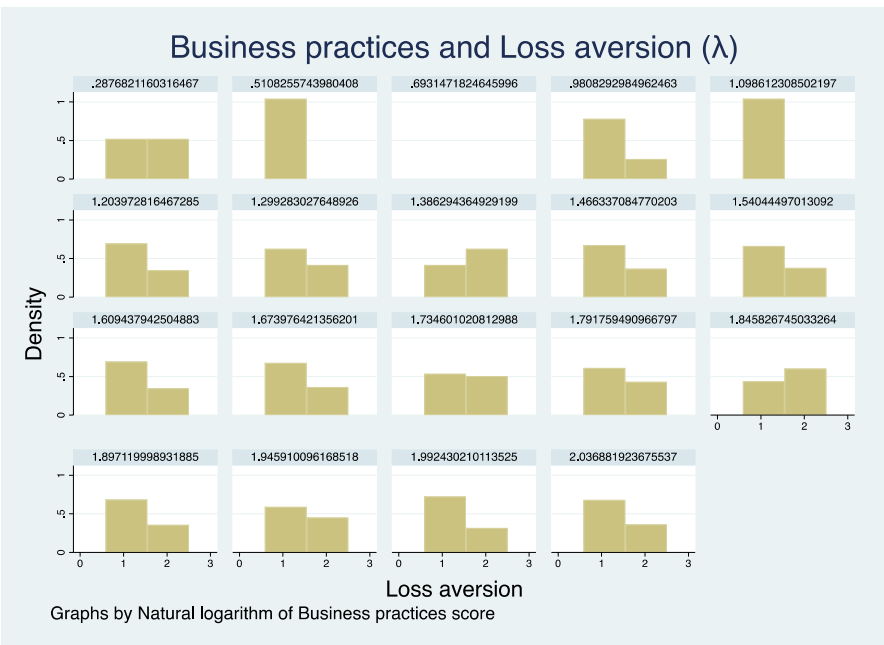
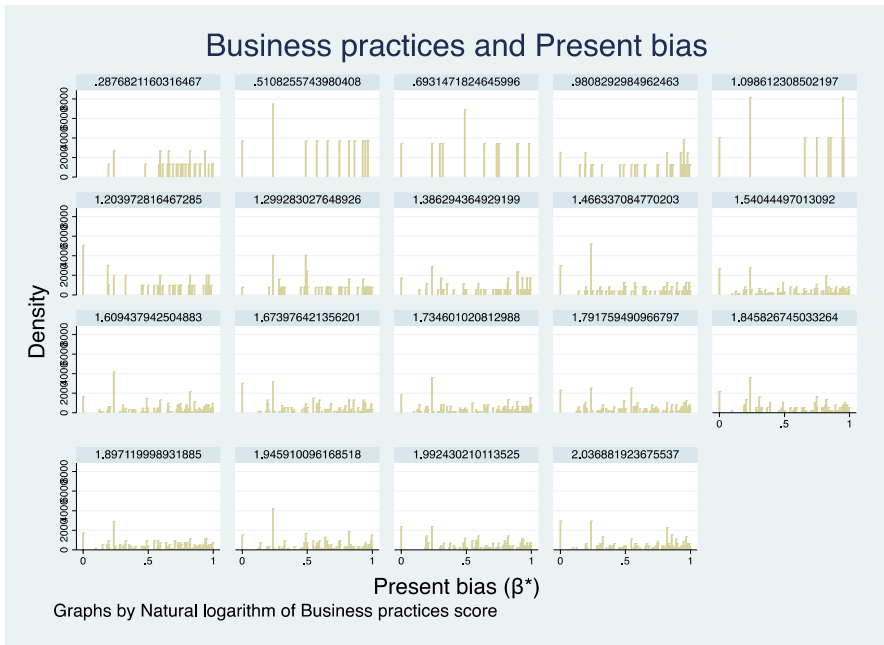
and Li 2020). It also underscores the necessity for a more comprehensive understanding of these traits and mediating mechanism through which these traits influence managerial decision-making within family-owned firms.

6.3 Limitations and suggestions for future research

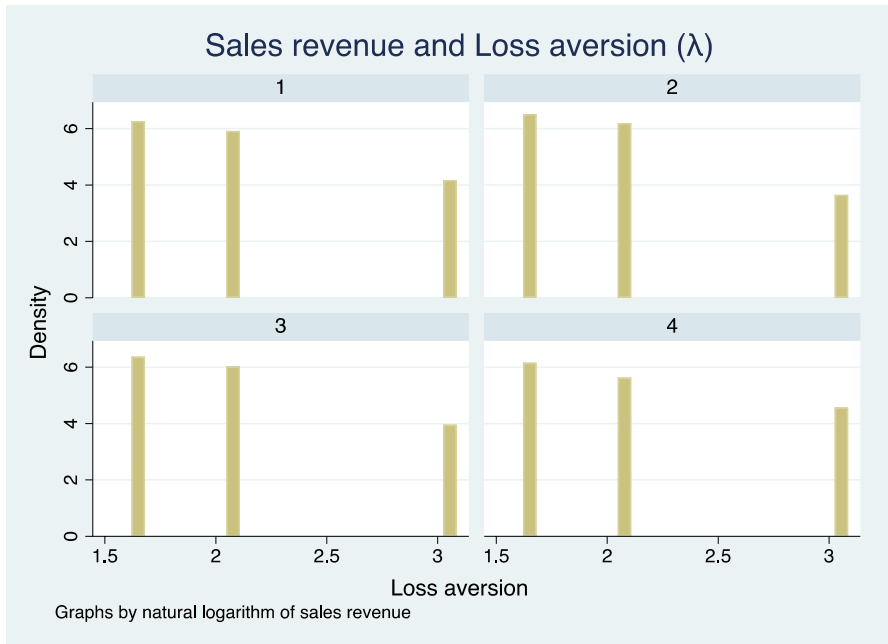
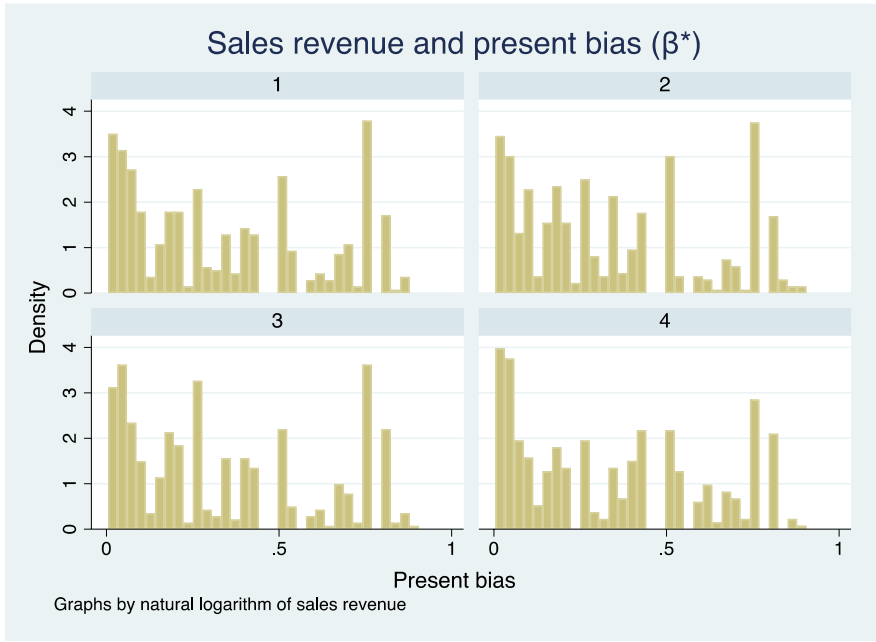
There are a few limitations to this research that offer some direction for future study. In the first place, our sample is made up of Vietnam-based firms operating in the same industry. Although the homogeneity of our sample enterprises comes from focusing on a single industry, there is room for expansion if this study is replicated in firms from other sectors or areas. Additionally, our research also focuses on how managers' individual risk and time preferences affect the decisions made by domestically based companies. But so far, future study may benefit from focusing on that relationship with a larger spectrum of enterprises, including MNEs. Researchers may be able to learn more about how managers' preferences and business performance are influenced by institutional contexts by examining the heterogeneity of both domestic and multinational firms. Finally, despite the fact that we investigate the risk and time preferences of the managers of small and medium-sized enterprises (SMEs), we do not make full use of the rich sources of variability that exist within SMEs. One example of this is ownership structure, in which SMEs are likely to have a greater proportion of family businesses. This constraint paves the way for future research to investigate not only the preferences of owner-managers, but also the relationship between those preferences and the actions of family-owned firms.

On the other hand, our findings about the existence of behavioral traits such as loss aversion and present bias among owner-managers who are the firm's most influential decision-makers provide several managerial implications. These traits are associated with the tendency to deviate from rational decision-making behaviour (Thaler 1981). As a result, managers with behavioral traits are likely to make suboptimal corporate decisions, such as not making enough investment in business practices, which leads to lower performance. Our study highlights the role of correcting these behavioral traits by offering entrepreneurial training and personal education for managers. This initiative could help managers make more optimal decisions, such as investing in sound business practices to improve firm performance.

Appendix 1: Firms' business practices and managers' preferences



Appendix 2: Firms' sales revenue and managers' preferences



Appendix 3: Experimental instructions

Thank you for attending this session. Your participation will be of great benefit to our research into financial decision-making. The two components of financial decision-making that we will explore in this session are risk and time preference. Your risk preference is how comfortable you are with risk-taking. Your time preference reveals how much you wish to be compensated for receiving money later rather than sooner. Risk preference is investigated in Section A and time preference is addressed in Section B. There are no correct or incorrect answers to these questions since answers are based on your personal preferences.

All answers should be clearly written *in pen* in the appropriate answer boxes on the two-sided sheet provided. Please pay careful attention to the units (e.g., years, dollars, etc.). The questions must be done in order. Also, after writing in an answer, please do not go back and change it as you move to later questions.

SECTION A: QUESTION SET 1 Choose between Option A and Option B

| | Option A | | | | Option B | | | | Prefer A or B? | |
|-----------|----------|---------------------|----|------|---------------------|----------|---------------------|----|-------------------|------|
| | Cash | With prob (%) | Or | Cash | With prob (%) | Cash | With prob (%) | Or | | Cash |
| Choice 1 | \$20 | 30 | Or | \$5 | 70 | \$34.00 | 10 | Or | \$2.50 | 90 |
| Choice 2 | \$20 | 30 | Or | \$5 | 70 | \$37.50 | 10 | Or | \$2.50 | 90 |
| Choice 3 | \$20 | 30 | Or | \$5 | 70 | \$41.50 | 10 | Or | \$2.50 | 90 |
| Choice 4 | \$20 | 30 | Or | \$5 | 70 | \$46.50 | 10 | Or | \$2.50 | 90 |
| Choice 5 | \$20 | 30 | Or | \$5 | 70 | \$53.00 | 10 | Or | \$2.50 | 90 |
| Choice 6 | \$20 | 30 | Or | \$5 | 70 | \$62.50 | 10 | Or | \$2.50 | 90 |
| Choice 7 | \$20 | 30 | Or | \$5 | 70 | \$75.00 | 10 | Or | \$2.50 | 90 |
| Choice 8 | \$20 | 30 | Or | \$5 | 70 | \$92.50 | 10 | Or | \$2.50 | 90 |
| Choice 9 | \$20 | 30 | Or | \$5 | 70 | \$110.00 | 10 | Or | \$2.50 | 90 |
| Choice 10 | \$20 | 30 | Or | \$5 | 70 | \$150.00 | 10 | Or | \$2.50 | 90 |
| Choice 11 | \$20 | 30 | Or | \$5 | 70 | \$200.00 | 10 | Or | \$2.50 | 90 |
| Choice 12 | \$20 | 30 | Or | \$5 | 70 | \$300.00 | 10 | Or | \$2.50 | 90 |
| Choice 13 | \$20 | 30 | Or | \$5 | 70 | \$500.00 | 10 | Or | \$2.50 | 90 |
| Choice 14 | \$20 | 30 | Or | \$5 | 70 | \$850.00 | 10 | Or | \$2.50 | 90 |

SECTION A: QUESTION SET 2 Choose between Option A and Option B

| | Option A | | | | Option B | | | | Prefer A or B? | |
|-----------|----------|---------------|------|---------------|----------|---------------|------|---------------|-------------------|----|
| | Cash | With prob (%) | Cash | With prob (%) | Cash | With prob (%) | Cash | With prob (%) | | |
| Choice 15 | \$20 | 90 | Or | \$15 | 10 | \$27.00 | 70 | or | \$2.50 | 30 |
| Choice 16 | \$20 | 90 | Or | \$15 | 10 | \$28.00 | 70 | or | \$2.50 | 30 |
| Choice 17 | \$20 | 90 | Or | \$15 | 10 | \$29.00 | 70 | or | \$2.50 | 30 |
| Choice 18 | \$20 | 90 | Or | \$15 | 10 | \$30.00 | 70 | or | \$2.50 | 30 |
| Choice 19 | \$20 | 90 | Or | \$15 | 10 | \$31.00 | 70 | or | \$2.50 | 30 |
| Choice 20 | \$20 | 90 | Or | \$15 | 10 | \$32.50 | 70 | or | \$2.50 | 30 |
| Choice 21 | \$20 | 90 | Or | \$15 | 10 | \$34.00 | 70 | or | \$2.50 | 30 |
| Choice 22 | \$20 | 90 | or | \$15 | 10 | \$36.00 | 70 | or | \$2.50 | 30 |
| Choice 23 | \$20 | 90 | or | \$15 | 10 | \$38.50 | 70 | or | \$2.50 | 30 |
| Choice 24 | \$20 | 90 | or | \$15 | 10 | \$41.50 | 70 | or | \$2.50 | 30 |
| Choice 25 | \$20 | 90 | or | \$15 | 10 | \$45.00 | 70 | or | \$2.50 | 30 |
| Choice 26 | \$20 | 90 | or | \$15 | 10 | \$50.00 | 70 | or | \$2.50 | 30 |
| Choice 27 | \$20 | 90 | or | \$15 | 10 | \$55.00 | 70 | or | \$2.50 | 30 |
| Choice 28 | \$20 | 90 | or | \$15 | 10 | \$65.00 | 70 | or | \$2.50 | 30 |

SECTION A: QUESTION SET 3 choose between option A and option B

| | Option A | | | | Option B | | | | Prefer A or B? | |
|-----------|----------|---------------|------|---------------|----------|---------------|------|---------------|-------------------|----|
| | Cash | With prob (%) | Cash | With prob (%) | Cash | With prob (%) | Cash | With prob (%) | | |
| Choice 29 | \$12.50 | 50 | or | (\$2.00) | 50 | \$15.00 | 50 | or | \$(10.50) | 50 |
| Choice 30 | \$2.00 | 50 | or | (\$2.00) | 50 | \$15.00 | 50 | or | \$(10.50) | 50 |
| Choice 31 | \$0.50 | 50 | or | (\$2.00) | 50 | \$15.00 | 50 | or | \$(10.50) | 50 |
| Choice 32 | \$0.50 | 50 | or | (\$2.00) | 50 | \$15.00 | 50 | or | \$(8.00) | 50 |
| Choice 33 | \$0.50 | 50 | or | (\$2.00) | 50 | \$15.00 | 50 | or | \$(8.00) | 50 |
| Choice 34 | \$0.50 | 50 | or | (\$2.00) | 50 | \$15.00 | 50 | or | \$(7.00) | 50 |
| Choice 35 | \$0.50 | 50 | or | (\$2.00) | 50 | \$15.00 | 50 | or | \$(5.50) | 50 |

SECTION B: QUESTION SET 1 choose between option A and option B

| | What would you rather have? | | Prefer A or B? |
|-----------|-----------------------------|---------------------|-------------------|
| | Option A | Option B | |
| Choice 1 | \$100 in one week | \$100.25 in 2 weeks | |
| Choice 2 | \$100 in one week | \$100.50 in 2 weeks | |
| Choice 3 | \$100 in one week | \$101 in 2 weeks | |
| Choice 4 | \$100 in one week | \$102 in 2 weeks | |
| Choice 5 | \$100 in one week | \$103 in 2 weeks | |
| Choice 6 | \$100 in one week | \$104 in 2 weeks | |
| Choice 7 | \$100 in one week | \$105 in 2 weeks | |
| Choice 8 | \$100 in one week | \$106 in 2 weeks | |
| Choice 9 | \$100 in one week | \$108 in 2 weeks | |
| Choice 10 | \$100 in one week | \$110 in 2 weeks | |
| Choice 11 | \$100 in one week | \$112 in 2 weeks | |
| Choice 12 | \$100 in one week | \$114 in 2 weeks | |
| Choice 13 | \$100 in one week | \$117 in 2 weeks | |
| Choice 14 | \$100 in one week | \$120 in 2 weeks | |
| Choice 15 | \$100 in one week | \$125 in 2 weeks | |
| Choice 16 | \$100 in one week | \$130 in 2 weeks | |
| Choice 17 | \$100 in one week | \$140 in 2 weeks | |
| Choice 18 | \$100 in one week | \$150 in 2 weeks | |

SECTION B: QUESTION SET 2 choose between option A and option B

| | What would you rather have? | | Prefer A or B? |
|-----------|-----------------------------|----------------------|-------------------|
| | Option A | Option B | |
| Choice 19 | \$100 today | \$101 in one week | |
| Choice 20 | \$100 today | \$102 in one week | |
| Choice 21 | \$100 today | \$103 in one week | |
| Choice 22 | \$100 today | \$104 in one week | |
| Choice 23 | \$100 today | \$105 in one week | |
| Choice 24 | \$100 today | \$107.50 in one week | |
| Choice 25 | \$100 today | \$110 in one week | |
| Choice 26 | \$100 today | \$115 in one week | |
| Choice 27 | \$100 today | \$120 in one week | |
| Choice 28 | \$100 today | \$125 in one week | |
| Choice 29 | \$100 today | \$130 in one week | |
| Choice 30 | \$100 today | \$135 in one week | |
| Choice 31 | \$100 today | \$140 in one week | |

| | What would you rather have? | | Prefer A or B? |
|-----------|-----------------------------|-------------------|-------------------|
| | Option A | Option B | |
| Choice 32 | \$100 today | \$145 in one week | |
| Choice 33 | \$100 today | \$150 in one week | |
| Choice 34 | \$100 today | \$160 in one week | |
| Choice 35 | \$100 today | \$170 in one week | |

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