MANAGERS' RISK AND TIME PREFERENCES IN ECONOMIC BEHAVIOR: REVIEW FROM THE EXPERIMENTS[1]

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Abstract

This survey reviews the recent developments in experimental studies on managers' preferences, with a focus on issues of experimental design. We concentrate our attention on studies that measure risk and time preferences. We review a number of models of risk and time preferences that have been estimated or otherwise studied using experimental methods, and highlight some issues associated with such models. We then survey thoroughly the theoretical and empirical studies to date in this area outside and in Vietnam. We conclude by discussing some potential research avenues in the future.

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1. Introduction

In the extant literature, the reasons why firms behave in the ways they do are not well understood. Traditionally, economic and financial theories suggest that in order to maximize shareholder wealth firms should simply pursue positive net present value projects. Nonetheless, it seems that even firms in the same country, in the same industry, of similar size and facing similar investment opportunities behave differently, which leads to speculation that heterogeneous objective functions are being maximized (see e.g., Allen, 2005). Being aware of these facts, some scholars wonder whether managerial behavior affects corporate policies (Akerlof, 2005). Given the business risk arising from volatile input and output prices and weak enforcement of contracts in emerging economies (Fafchamps, 2003), it would be of great interest to study manager's preferences.

Understanding individual decision-making under risk and time dimensions plays a key role in economic analysis (Vieider et

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al., 2019). Markowitz (1952) in his seminal paper proposes the earliest definition of risk preference. According to his definition, risk preference is a kind of individual preferences when an individual faces the expected gains or losses. Then, more people know the risk preference thanks to psychology development and the joining of more researchers in this area. Roll (1986) is one of the first scholars proposing and investigating managers' risk preference; Perrino, Poteshman and Weisbach (2005) show that risk-averse managers favored low-risk projects more than risk- loving managers. Hong, Yanxi, Rui and Jingjing (2006) evidence that risk-loving policy- makers are more partial to inflate corporate profits. In short, risk preferences are constituted by the extent to which people are willing to take the possible risks to achieve a particular goal. Different individuals' decision-making, motivation and behaviors depend on their different attitudes to risk.

Time preferences, on the other hand, 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. Bohm-Bawerk (1891) and Fisher (1930) identify time preference with the marginal rate of exchange between current and future consumption. Their idea of time preference combines two separate effects as follows: (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

Risk and time preferences are integral to modern economics. They are the main focus of literature on decision- making, and a central driver in models of financial economics (Barsegyan et al., 2018). In the fact that, experiments, whether in laboratory or field settings, generate many insights about time and risk preferences. Laboratory experiments show large heterogeneity in risk preferences and significant deviations from expected utility theory. They also provide natural and attractive frameworks to study time discounting. On the contrary, field settings provide environments in which individuals' real-world behaviors are observed, so they reduce limitations commonly related to laboratory experiments. There has been much effort to estimate the coefficient of risk aversion and the rate of time preference in the current literature. Prelec and Loewenstein (1991) claim that the discounted utility model - one of time preference models- and the expected utility model - one of risk preference models - have similar structures in terms of their known anomalies. However, many researchers, for example Rachlin and Siegel (1994), Ida and Goto (2009), argue that the nature of the individual-level relationship between time and risk preferences remains contentious.

In this paper, we thoroughly review the emerging and growing body of work in risk and time preferences, with a focus on experimental designs, in particular the measurement of time and risk preferences. We recognize that while behavioral economics has played a key role in providing policy makers with behavioral insights to improve wellbeing of individuals in many countries in the world, literature on behavioral economics in Vietnam is relatively young and the number of empirical studies is

scarce. Furthermore, even though experiment method is considered a gold standard in identifying causal relationship, it has been rarely conducted in Vietnam. By combining review of experimental designs in theoretical studies and survey on empirical evidence in experimental studies, our paper aims to encourage the application of behavioral economics and experiments in Vietnam.

The rest of the paper is organized as follows. We first review studies on theoretical models. Then we turn to the focus of our survey: experimental design, and risk and time preferences measurement. The aim of this review is to reveal the underlying assumptions and logic of each design. Finally, we review some empirical studies to support those experimental designs.

2. Models of risk preferences

An essential assumption in standard economic theory is that agents are fully rational, self-interested, maximisers of expected utility. Yet, researchers have been ever more realizing that the psychological biases of managers and investors might have influence on decision-making and outcomes in firms and in financial markets. Consequently, a new area of research, behavioral economics, has come forth as a challenge to the traditional economics. The first works in behavioral economics came out as a reaction to empirically observed anomalies in financial markets, which were incompatible with the standard economic theories. Behavioral economics is an approach consolidating traditional economics, psychology and sociology in an effort to explain these anomalies (Fairchild, 2010). In this section, we review in details some risk preferences models. We begin with expected utility (EU) theory. We then review some alternative models including rank-dependent expected utility theory, and prospect theory.

2.1. Expected utility theory

Early empirical studies on risk preferences rely on the expected utility theory and often use data from laboratory experiments (e.g., Yaari, 1965; Preston and Baratta, 1948). Barsegyan et al. (2018) show that in the expected utility theory, there are two sources of changes in risk attitudes. First, individuals may differ in their degrees of reducing marginal utility for wealth- i.e., their utility curvature. Second, individuals might be different from their subjective beliefs.

In particular, the expected utility (EU) theory states that a person will choose the option $X \in X$ which maximizes:

$$EU(X) = \sum_{n=1}^{N} \mu_n u(w + x_n)$$

where:

$X (x_1, \mu_1; x_2, \mu_2;...; x_N, \mu_N)$: a choice set that is a lottery yielding outcome x_n with probability μ_n, where $\sum_{n=1}^{N} \mu_n = 1$

u: utility function which depicts final wealth in the real line

w: is the individual initial endowment (wealth)

According to EU theory, individuals' risk attitude is captured by their utility function *u*. If *u* is concave, a person will be risk averse. If *u* is convex, a person is risk loving. If *u* is linear, a person is neutral. Thus, the main objective when estimating an EU model is to estimate the utility function *u*. In most cases, researchers often assume a specific parametric functional form for u including the constant

absolute risk aversion, the constant relative risk aversion, and the hyperbolic absolute risk aversion families.

In terms of the constant absolute risk aversion form, researchers estimate the coefficient of absolute risk aversion- the parameter r, in which higher r means more risk averse. From the econometrician's viewpoint, the advantage of the constant absolute risk aversion is that it indicates an individual's previous wealth w is irrelevant to his choices. However, from the viewpoint of economic theorists, this is disadvantageous because they believe that individuals show decreasing absolute risk aversion.

An important family of utility functions focuses on constant relative risk aversion. The constant relative risk aversion family implies that people exhibit decreasing relative risk aversion- i.e., when one becomes wealthier, he becomes more risk averse. It is the advantage of this form. However, the limitation of this form is that it considers previous wealth w as an input. Therefore, scholars usually either postulate some reasonable values for previous wealth or proxy for wealth using some aspect of the data, if they use this form and do not observe previous wealth. Researchers (e.g., Chaigneau, 2013) also make a great use of the hyperbolic absolute risk aversion families. These parameters altogether determine the degree of absolute risk aversion. One of the characteristics of the hyperbolic absolute risk aversion form is that it uses the constant absolute risk aversion and the constant relative risk aversion as special cases.

2.2. Rank-dependent expected utility theory

Kahneman and Tversky (1979), Quiggin (1982) propose a rank-dependent expected utility theory. This theory relaxes the feature of EU theory in which outcomes are weighted by their probabilities.

Under this theory, let $X = (x_1, \mu_1; x_2, \mu_2;...; x_N, \mu_N)$ denote a lottery which generates outcome x_n with probability μ_n where $\sum_{n=1}^{N} \mu_n$ and outcomes are ordered in the way that $x_1 < x_2 <.... < x_N$. When one evaluates a lottery X, he first ranks from the best outcomes to the worst outcomes, then the weight on outcome n will be:

$$w_n = \begin{cases} \pi(\mu_1) & for \quad n = 1 \\ \pi(\sum_{j=1}^{n} \mu_j) - \pi(\sum_{j=1}^{n-1} \mu_j) & for \quad n \in (2,...,N-1) \quad \text{for } n \in \{1,...,N\} \\ 1 - \pi(\sum_{j=1}^{n-1} \mu_j) & for \quad n = N \end{cases}$$

Where: π is a probability weighting function.

When one uses this theory, the implications will rely on the probability weighting function π. Many studies based on experimental methods highlight the inverse S-shape of the function. In case of small μ, the function is concave, while it is convex if μ is large.

On the other hand, in the extant literature, besides the general inverse-S shape, there

are a number of parameterized functional forms (e.g., Karmarkar, 1978; Tversky and Kahneman, 1992; Lattimore, Baker and Witte, 1992; Prelec, 1998). These functions have two features: (1). they are not symmetric, but often cross the 45 degree line; (2). They show excess steepness near $\mu = 0$ and $\mu = 1$. However, Barseghyan et al (2018) indicate that evidence of the excess steepness of probability weighting function is ambiguous because in studies using experiments, it is necessary to investigate whether and how event with low probability are encompassed into an individual's decision assessment.

2.3. Prospect Theory

Kahneman and Tversky (1979) develop the prospect theory, which is an empirical theory that describes how people actually make decisions. 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 theory and labeled "cumulative prospect theory".. To illustrate the theory, let's consider a lottery $X = (x_1, \mu_1; x_2, \mu_2;...; x_N, \mu_N)$ and a reference point s, and given that $x_1 < .... < x_{n^- -1} \le s < x_{n^-} < ... < x_n$. According to the theory, the lottery is assessed as follows

$$V(X;r) = \sum_{n=1}^{N} w_n v(x_n - s)$$

The value function V is defined over differences from a reference point r rather than over the overall wealth. The formulation of w (the weight on outcome the outcome xn) is as follows:

$$w_n = \begin{cases} \pi^-(\mu_1) & for \quad n = 1 \\ \pi^-(\sum_{j=1}^{n} \mu j) - \pi^-(\sum_{j=1}^{n-1} \mu_j) & for \quad n \in \{2,...,n^- - 1\} \\ \pi^+(\sum_{j=n}^{N} \mu_j) - \pi^+(\sum_{j=n+1}^{N} \mu_j) & for \quad n \in \{n^-,...,N-1\} \\ \pi^+(\mu_N) & for \quad n = N \end{cases}$$

where, the decision-maker transforms the probabilities with a probability weighting function π- and π+, which are applied to the loss and gain events, respectively.

The functional form of the prospect theory is as below:

$$v(y) = \begin{cases} y^\alpha & for \quad y \ge 0, \quad \alpha \in (0,1) \\ -\lambda(-y)^\beta & for \quad y < 0, \quad \beta \in (0,1), \ \lambda > 1 \end{cases}$$

In this functional form, α and β create diminishing sensitivity that is concave over gains and convex over losses; λ >1 indicates loss aversion. Tversky and Kahneman (1992) base on their experimental data and estimate that the value function is slightly concave (convex) over gains (losses) with a loss aversion coefficient of 2.25 (λ= 2.2.5). When applying the prospect theory, ones must specify a reference point r. In field experiments, researchers often argue that the reference point should be zero or natural reference point given the setting (e.g, Rees-Jones, 2018)

DellaVigna (2009) show that the features of the prospect theory capture the evidence on risk-taking, consisting of risk-aversion over gains, risk-seeking over losses. In behavioral finance, Statman and Caldwell (1987) investigate the effect of managerial biases in a conceptual framework combined prospect theory. They consider the following example. A manager has already lost $2000 when he participates in a project, and he is a risk-averse. What should he do? Given that now he faces two options: (1). he will terminate the project to make a gain of $2000; (2). he will continue the project to get the risky prospect of an equal probability of gaining $2000 or zero. On the basis of economic accounting, which ignores the sunk cost, the manager should terminate the project. However, if taking sunk cost into account, the manager now copes with the choice between curtailing the project and get a loss of $1000 or carrying on the project with the prospect of probability of making a loss of $2000 or zero.

On the other hand, scholars have been increasingly recognizing that the psychological biases that beset investors may also be widespread amongst firm managers. Shefrin (2007) identifies three categories of psychological phenomenon; biases, heuristics, and framing effects. As outlined by Shefrin (2007), a bias is a predisposition towards error. A heuristic is a mental shortcut or rule of thumb, which facilitates decision-making. Framing refers to the way in which "a person's decisions are influenced by the manner in which the setting for the decision is described."

Gervais et al. (2003) employ a real-options framework in order to consider the combined effects of managerial risk-aversion and overconfidence on the decision to invest immediately in a project, or delay investment. Risk-aversion may induce a manager to delay investment sub-optimally, reducing shareholder value.

Hackbarth (2004) employs a real options framework, combined with an earnings-based capital structure model, in order to analyze the relationship between managerial overconfidence, investment and debt. Specifically, he focuses on the conflict between shareholders and bondholders, embodied in Myers' (1977) underinvestment problem. Debt induces an inefficient delay in investment, and mild overconfidence increases this problem. Hackbarth further demonstrates that an increase in risk-shifting opportunities exacerbates underinvestment, and that leverage is inversely related to the value of investment opportunities.

Hackbarth (2002) models the effect of managerial overconfidence in a trade-off model of capital structure. First, he considers the case where the manager attempts to maximise firm value, trading-off the tax shield benefit of debt and the bankruptcy

cost of debt. Second, he considers the case where an agency conflict exists between the manager and investors over managerial diversion of discretionary resources. In both cases, Hackbarth finds a positive relationship between overconfidence and debt.

Fairchild (2005) develops the work of Heaton (2002) and Hackbarth (2004) by presenting two models of managerial overconfidence and capital structure. His first model considers the combined effects of managerial overconfidence and asymmetric information. His second model considers the combined effects of managerial overconfidence and moral hazard.

In short, when scholars apply the expected utility theory (EUT), they estimate the utility of all possible outcomes and choose the highest weighted average, in which the weights (π) are simple probabilities. In stead of weighting values by probabilities as in EUT, even though scholars applying the prospect theory also choose the option that give the best possible outcome, they use transformed probability which depends on the distance from impossibility and certainty (Tversky and Kahneman, 1992).

3. Models of time preferences

In this section, we explore a key insight from behavioral economics: present bias preference. Researchers in behavioral economics and psychology (e.g., Ainslie, 1993; Thaler, 1981; Ahlbrecht and Webber, 1997) have long found that individuals frequently act in ways that violate standard economic assumptions of rationality in decision-making. One of the key insights is that individuals display inconsistency in impatience levels over time. Specifically, an individual might be impatient in the short-run, but less impatient in the long-run.

First, we consider the stylized version of the standard model, which is modified from Rabin (2002). Under the model, let consider an individual *i* maximizes expected utility subject to a probability distribution p(s) of the states of the world s ∈ S at time t=0 as follows

$$\max_{x_i^t \in X_i} \sum_{t=0}^{\infty} \delta^t \sum_{s_t \in S_t} p(s_t) U(x_i^t \left| s_t \right.)$$

Where U (x|s) : utility function

x_i^t : payoff of individual i

The future utility is discounted with the discount factor δ

The standard model assumes that a discount factor between any two different time points is independent, implying time consistency. Time consistency means an individual has the same preferences about future plans at different histories. In other word, if a plan is optimal to implement today, it will be considered optimal to fulfill tomorrow and in the future.

However, large experimental evidence on intertemporal choice support representation of time preferences is the hyperbolic time weighting function (e.g., Thaler, 1981; Frederick, Loewenstein and O'Donoghue, 2002). In particular, hyperbolic discounting refers to strong discounting of payment in short term, but weaker discounting of payments in the longer term (Schreiber and Weber, 2016).

To illustrate this insight, we consider the study of Thaler (1981) who asked individuals to choose between getting money now versus

getting more money later in two different scenarios.

Scenario 1: What amount ($X) makes you indifferent between getting $15 today and $X **in 1 month?**

In the typical response, X = 20. This implies a discount rate of 345% per year, reflecting a very high impatience level.

Scenario 2: What amount ($X) makes you indifferent between getting $15 today and $X **in ten years?**

In the typical response, X = 100, which implies a discount rate of 19% per year - indicating a much lower impatience level as opposed to scenario 1.

It is worth noting a much higher level of impatience in the first scenario, in which the time horizon is much shorter. In other words, individuals are inconsistent in their impatience. This finding contradicts a standard assumption in economics stating that individual's impatience is consistent and independent of time horizon - i.e., which is also known as exponential discounting. Inconsistence in patience level has been confirmed in numerous studies with individuals from various background (see for example Tanaka at el., 2010 which focuses on Vietnam population). Scholars in behavioral economics refer to this phenomenon as present bias preference. McClure et al. (2004) explain the present bias preference as the intertemporal decisions involving payoffs in the present than the decisions involving only payoffs in future periods.

According the present bias preference model (e.g., Laibson, 1997; O'Donoghue and Rabin, 1999), the lifetime utility U_t at the time t is as follows:

$$U_t = u_t + \beta\delta u_{t+1} + \beta\delta^2 u_{t+2} + \beta\delta^3 u_{t+3} + ... + \beta\delta^n u_{t+n}$$

Where: u_t : utility for each time period t

δ^t : is discount factor at any time period t

While in the standard model the δ captures the discount factor, in the present bias preference model besides δ, the parameter δ captures the present bias problem (δ≤1). If δ<1, the discounting between the present and the future is higher than between any periods in the future. If δ = 1, the present bias preference model becomes the standard model.

4. Review of empirical literature

To our knowledge so far, there is no study investigating impact of managers' risk and time preference on firm performance, however, our study is related to a growing literature that documents the effects of risk preference and time preference on various aspects of economic activities. In this section, we will review empirical studies on this area outside Vietnam, and studies in Vietnam.

4.1. Empirical studies outside Vietnam

Researchers have long paid attention to measure and investigate risk and time preferences. A study of Tanaka, Camerer, and Nguyen (2010) is unique in the way it measures risk and time preferences by conducting experiments with villagers. The study investigates how wealth, political history, and economic circumstances are related to rate of risk preferences and present biased preferences. They find that people in villages with higher mean income are less loss-averse and more patient. Household income has a relationship with patience but not with risk.

Nguyen (2011) develops a theoretical framework to investigate the relationship between environment and preferences. Using a structural model approach, he incorporates prospect theory and hyperbolic time discounting into a single framework, to simultaneously estimate the rate risk preferences and coefficients of time preferences. To empirically test the model's prediction, combining field experiment and household survey data, the author examines whether involvement is risky and has long-run targeted benefits, thereby causing fishermen to exhibit different risk and time preferences. This study finds that fishermen those who less risk-averse and more patient than workers in other occupations, which is in line with the theoretical prediction about the influence of the working environment on preferences.

Tanaka, Camerer, and Nguyen (2006) conduct field experiments to scrutinize how wealth, political history, occupation are correlated with risk, time discounting and trust in Vietnam. They demonstrate that risk and time preferences are contingent on the degrees of economic development. People in wealthier villages are less loss-averse and more patient. Their study also shows that people who participate in rotating credit associations (ROSCAs) are more patient than non-participant. However, bidding ROSCAs participants are less patient, and more risk averse than fixed ROSCAs participants. Carlsson, Johansson, and Pham (2014) find that pro-social preferences are stable over long periods of time. To arrive at this finding, they elicit pro-social behavior using experiments at four different points in time. They note a significant positive correlation between behaviors across time.

Our study is also close to a related strand of literature that investigates the link between risk and/or time preferences, and business activities or corporate policies. Graham, Harvey, and Puri (2012) find that companies implement more mergers and acquisitions (M&A) when their CEO is more risk tolerant. They also evidence that it is more likely that firms with high historical or future growth rates are run by risk-tolerant CEOs. It is also more likely that risk- averse CEOs prefer to be compensated by salary than performance related packages. They further find that CEOs who are impatient (i.e., have a high rate of time preference) have higher propensity to be paid proportionately more in salary.

Investigating CEO compensation package when they are risk-averse, Dittmann et at (2010) show that the incentive effect prevails the risk-tolerance effect so that the compensation package is optimal if it should only involve stocks. 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. Recently, Corgnet, Gomez-Minambres and Hernan-Gonzalez (2018) propose a principal-agent model with risk preferences to investigate the case in which agents are loss-averse in the non-monetary incentives rather than in monetary incentives. They show that the use of wage-irrelevant goals in workplace can explain why firms depend on unexpected weak monetary incentives.

Hirose, Kato, and Bremer (2009) evidence a significant cross-sectional relationship between margin buying and stock returns at both market- and firm- level. Their study indicates that margin-buying traders have

herding behavior. The information on outstanding margin buying shares predicts future stock returns, especially for small-firm stocks. The theoretical prediction remains even when they control for liquidity and firm size.

Testing the link between CEO risk preferences and payout policy, Caliskan and Doukas (2015) find that risk-averse CEOs are more likely to pay dividends than risk-loving CEOs do. Specifically, CEOs may give up investment opportunities and pay out more dividends when they suffer higher exposure to inside debt. When the authors examine the case of CEOs with less convex compensation packages, this pattern also happens. Their findings suggest that debt-like compensation could prevent risk-averse CEOs from taking risk, and could increase dividend payouts.

In terms of time preferences, Chen, Li, and Zeng (2014) study the optimal dividend strategies of an insurance company when the manager has present biased preferences. They analytically derive the optimal dividend strategies when investigating a naive manager and a sophisticated manager, and claiming sizes follow an exponential distribution. Their findings show that manager with present biased preferences tends to pay out dividends earlier than time-consistent manager. They also find that the sophisticated manager is more likely to pay out more dividends than the naive manager. Likewise, Chunxiang, Li, and Wang (2016) 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.

4.2. Empirical studies in Vietnam

To our best knowledge, in Vietnam, there is no study investigating the link between managers' preferences including risk and time preferences. Nevertheless, there are some studies on behavioral economics, even though the research on this area is still relatively young and the number of empirical studies is scarce.

Nguyen (2015) examines the effect of managerial overconfidence on investment sensitivity to cash-flow in non-financial firms listed in the Vietnam stock market over the period of 2008-2012. They find that managerial overconfidence increases dependency of investment on internal cash-flow. The interaction effect reducing investment sensitivity to cash-flow is evidence of benefits when financial conditions improve or financial markets develop, enabling Vietnamese firms to access to external capital. They also document that there is difference in managerial overconfidence regarding firm size. They are unable to find any evidence of overconfidence, financial conditions, or financial development in big firms, while those effects are strong in small firms.

Some studies investigate behaviors of investors in the Vietnam stock market. In particular, Nguyen (2012) uses questionnaires to 500 individual investors in the Vietnam stock market and trading results of 2300 accounts of individual investors with over 100,000 orders to analyze and investigate behaviors of individual investors. He develops a model to measure investor behaviors with five groups of psychological factors and 19 attributes, namely overoptimism, herding, overconfidence, risk aversion, and pessimism. His study finds that individual investors in the Vietnam stock market are irrational and have behavioral biases such as extra position bias, disposition effect, herding bias, etc. Thus,

traditional theories are unable to explain investor behaviors. Some other studies examine herding (e.g., Tran, 2010; Nguyen, 2009); or apply behavioral finance to explain some anomalies in the Vietnam stock market (e.g., Tran and Ho, 2007; Le, 2007; Vu, 2011). However, those studies do not thoroughly examine investor behaviors according to behavioral economics theories. Further, they do not provide any comprehensive studies on the link between investment returns or benefits and investor behaviors.

On the other hand, while behavioral economics has played a key role in providing policy makers with behavioral insights to improve wellbeing of individuals in numerous countries, it has been paid much less attention in Vietnam. Only few interesting behavioral economics based studies have been done in Vietnam. Likewise, experiments, especially the randomized controlled trial (RCT) method, have been rarely conducted in Vietnam, though it is considered a gold standard in identifying causal relationship. To our knowledge, the most close-to RCT study done in Vietnam is by Malesky, Nguyen, and Tran (2014). Specifically, these authors use quasi-experiment to test the core hypotheses of recentralization on public services. Their research design offers an overtime (diff-in-diff) analysis of real institutional change (not an artificial intervention) with a clearly identified counterfactual performed at scale within one country.

Recently, a study by Nguyen and Kim (2019) conduct RCT to investigate whether and how government information intervention affects a firm's manager perception and adoption of quality management practices, output quality, and firm performance. The study finds that information intervention improves manager perception of benefits from quality management practices, which stimulates managers to adopt quality management, and ultimately improves quality and firm performance.

5. Conclusion and discussion about future research

The literature on estimating and measuring risk preferences and/or time preferences using experiments has been blossomed a lot over the years in numerous countries in the world, but it is still young and has been paid much less attention in Vietnam. Also, in Vietnam, experimental methods have been rarely implemented. Thus, in the fact that the experiment method is considered a gold standard in identifying causal relationship, and thanks to increasingly available experimental data, we do expect that the literature will develop more and more in the future, we also do hope that our paper can encourage the application of behavioral economics and experiments in Vietnam.

In this paper, we have summarized models of risk preferences and models of time preferences; we also have highlighted the important dimensions of those models, which scholars should focus on and pay attention to when they do research. We then review how market forces respond to the features of those models by discussing empirical studies in this area.

Regarding models of risk preferences, in the future, whether in EU model or non-EU model, it is necessary to think about a model that has both a domain-general and a context-specific component. In terms of models of time preferences, the review shows that deviations from the standard model are

not restricted to experimental decisions. Most of phenomena, which are important in experimental settings, also affect decisions in many economic settings. Therefore, we expect that researchers will more and more take behavioral phenomena into consideration in their analysis. It is possible that new and more parsimonious models will emerge in the future to address some open questions, for example, can models of risk preferences predict choice in different decisions for fixed parameters (β, δ).

On the other hand, we expect that future research continue using most of methods presented in this survey including laboratory experiments, natural experiments and field experiments. However, we think that to address the question of consistency across behavioral contexts, researchers can combine laboratory experiments and data from field settings. It is because laboratory experiments provide a rich set of survey questions, while field settings provide environments in which, real-world behaviors applications are observed.

Finally, although the traditional economic and financial theories provide comprehensive insights into the determinants of corporate finance and performance, there are still many events and issues that are unable to be explained by the tools and visions of the traditional theories. For example, traditional theories do not take into consideration some aspects of firm managers' behaviors such as personality traits and competencies. Consequently, it is time to call for an alternative theoretical underpinning. Additionally, we recognize that while the research in behavioral economics is well-developed, relatively few studies, instead, have tackled firm managers' preferences in developing countries. We suggest investigating the effect of managerial biases such as present bias problems, risk aversion, regret, overconfidence, and loss aversion on firms' asset pricing and allocation. Future research is also likely to explore the probably most under-researched area such as market linkage, judgmental biases of politicians, and political decisions. We think that our suggestions propose an interesting avenue for future behavioral research.

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