

Article

Risk Preferences and Entrepreneurial Decision-Making: Evidence from Experimental Methods in Vietnam

Truc Thanh Tran * and Nam Khanh Pham

School of Economics, College of Economics, Law and Government, University of Economics Ho Chi Minh City, Ho Chi Minh City 700000, Vietnam; khanhnam@ueh.edu.vn

* Correspondence: tructran.ncs2019011@st.ueh.edu.vn

Abstract: This study investigates the relationship between risk preferences and entrepreneurial decisions within the Vietnamese context through controlled laboratory experiments. Specifically, we examine whether individuals with higher levels of risk aversion are more likely to become fixed-wage employees, while those with a propensity for risk-taking are more likely to pursue entrepreneurial ventures. Our findings underscore a significant relationship between risk aversion and the initiation of new businesses at the point of decision-making. Individuals exhibiting greater risk aversion demonstrate a decreased likelihood of venturing into entrepreneurship compared to their risk-taking or risk-neutral counterparts. Importantly, this relationship withstands variations in experimental measures of risk preferences, affirming its robustness across diverse contexts. These insights contribute to a deeper understanding of the role of risk attitudes in shaping entrepreneurial behavior and hold implications for policy interventions aimed at fostering entrepreneurship in Vietnam.

Keywords: entrepreneurial decision making; risk preferences; investment decision; Vietnam



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1. Introduction

Why do some individuals lean towards self-employment while others choose to be employed? In recent years, entrepreneurship research has explored various drivers of an individual's entrepreneurial intention or decision to start a business [1–7]. The decision to become a fixed-wage earner or venture into self-employment can be viewed as an occupational choice influenced by various factors, including individual aspirations and attitudes, abilities, opportunity cost, and external environmental elements [8,9].

Among these factors, risk preferences emerge as the main driver of entrepreneurial decision, delineating the processes, practices, and decision-making frameworks that lead to new entry [10,11]. Given the inherent risk and uncertainty associated with entrepreneurial activities, individuals choosing self-employment often have a positive attitude toward risk as they identify opportunities or create a new business.

The predominant focus in entrepreneurial studies has been on risk-taking propensity, characterized as an individual's inclination or orientation toward taking risks [12]. Previous research has been conducted to examine the relationship between risk and entrepreneurial intention or decision. The majority merely compares the risk preferences of entrepreneurs with those of employed individuals to find potential differences [4,13,14]. The role of an individual's risk preferences at the time that person decides to become self-employed remains largely untested [15]. Moreover, empirical studies have been limited due to a lack of data on individual risk preferences [16,17].

Even when data are available in the context of entrepreneurship, studies have commonly used questionnaire surveys that rely on the individual self-reporting for risk propensity to measure risk preferences (See, for example, [17]). Although a questionnaire is simple to understand and easy to conduct, it is not directly incentivized to reflect actual underlying risk preferences [18]. The measure of risk preferences should be associated with actual risk-taking behavior, which is incentivized to ensure that choices reveal the

true behavior of an individual. While there is a need for additional empirical research to comprehend the relationship between risk preferences and entrepreneurship [19], achieving this understanding is far from straightforward.

This paper aims to analyze the impacts of risk preferences on entrepreneurial decision. By conducting different experiments to measure the risk preferences of an individual at the time of career choice, we argue that these experiments are well-suited to elicit the actual risk behavior of an individual. Are people with higher risk-averse levels more likely to become employed, and more risk-taking individuals prefer to become entrepreneurs? This paper sheds light on the complex effects of risk preferences and entrepreneurial decisions and shows that the probability of starting a new business is lower if the subjects are more risk-averse than others who are risk-taking and risk-neutral. This study utilized different experimental methods to measure individuals' risk preferences at the time he/she made entrepreneurial decisions instead of traditional self-assessment questionnaires, which are commonly used in entrepreneurship studies. Experimental methods with real monetary incentives are better able to predict actual risk behavior, and therefore provide more accurate results in assessing the impact of risk preferences on entrepreneurial decisions. By using different "games" to measure risk preferences, the results increase the reliability of the research results.

This paper contributes to the literature by its use of experimental methods to directly measure two key variables in the entrepreneurial decision-making process: risk preference and actual entrepreneurial decisions. This approach is relatively rare in the entrepreneurship literature, offering a novel contribution to the field. By employing controlled laboratory experiments, this paper provides unique insights into the causal relationship between risk attitudes and entrepreneurial behavior.

The organization of the paper is as follows: Section 1 presents motivations for this study. Section 2 provides the literature review. In Section 3, we describe the model specifications and experimental process. Section 4 presents the experiment and regression results, and Section 5 concludes this study.

2. Literature Review

It is common knowledge that entrepreneurial activity involves uncertainty, and the rewards of entrepreneurship are more than wages of employment [8]. Entrepreneurs must make risky decisions to identify and exploit the opportunities or create a new venture in an uncertain environment. Theoretically, more risk-averse people are less likely to become entrepreneurs. For example, in the model of occupational choice, Kanbur [20] and Kihlstrom and Laffont [21] hypothesize that individuals' risk preferences is one of the essential factors in their career choice to become an entrepreneur or wage earner.

The point that a person with lower risk aversion prefers to start a new business than work as a wage earner is empirically tested and confirmed by recent studies (for instance, [22,23]). The study of Cramer et al. [19] is one of the first empirical studies to find the negative effect of risk aversion on entrepreneurship. By using three different measures of risk aversion—reservation pricing transformation, Arrow–Pratt, and lottery participation—their results suggest that those who self-select into entrepreneurship have lower levels of risk aversion. Later on, subsequent studies consistently found a significant association between risk aversion and entrepreneurial intention [1,11]. Ahmed et al. [24] showed the mediative role of risk aversion to predict entrepreneurial intention. In particular, they found that risk aversion fully mediates the relationship of neuroticism and openness to experience with entrepreneurial intention. Ilevbare et al. [6] indicated that risk-taking may predict the entrepreneurial intention of undergraduates, but there was not a very high degree of correlation.

Recent studies emphasize the important role that risk preferences play in shaping career choices. Barber [13] showed that entrepreneurial individuals invest in risky assets more than those who are non-entrepreneurial. A risk-averse person is less likely than the risk-prone to be self-employed and choose risky professions [25,26]. As a result, a

high level of risk aversion can directly influence an individual to limit risky decisions. Individuals who dislike risk may be less likely to recognize business opportunities to start a venture [27]. Nowiński et al. [9] found that attitude to risk has a great positive association with entrepreneurial intention among US students. Baluku et al. [11] assessed the impact of risk aversion on entrepreneurial attitude and intention among final year students and established their employment status after graduation. Their results show that there are negative effects of risk aversion on both entrepreneurial attitude and intention. In a study about massive earthquakes, risk aversion, and entrepreneurship, de Blasio et al. [5] showed that individuals who had experienced an earthquakes were significantly more risk averse, and risk aversion has a significant negative impact on the decision to become an entrepreneur.

Regarding the risk preference measurement, the predictive efficacy of incentivized and non-incentivized risk elicitation methods in research findings remains inconclusive [28–30]. In the area of utilizing risk preferences to predict entrepreneurial behavior, the majority of empirical studies have used survey questionnaires, employing non-experimental methods to elicit risk preferences (refer to a recent study, for instance, [17]).

While questionnaires offer a simple and straightforward approach to gathering data on risk preferences, they typically lack direct incentivization. Without proper incentivization, responses to survey questionnaires may be influenced by factors such as social desirability bias or response scale ambiguity, potentially compromising the reliability and validity of the data collected. Consequently, there is considerable uncertainty surrounding whether the risk preferences elicited reflect an individual's attitudes toward risk, especially concerning financial decision-making. However, a recent study found that no significant differences in behavior were observed among subjects both between and within the incentivized and non-incentivized regimes [31].

Many scholars have also applied incentivized experimental methods to obtain more robust results about the impact of risk preferences on entrepreneurial decisions. The study of Elston et al. [32] is one of the earlier experimental works that used a standard Holt and Laury multiple price list (HL) to elicit the risk preferences of entrepreneurs and non-entrepreneurs. The result confirmed the theory that full-time entrepreneurs are less risk-averse compared to part-time entrepreneurs and the control group. Barber [13] used a simple investment game to measure risk preferences and suggested that entrepreneurial individuals were more likely to invest at a higher rate into a risky asset when compared to non-entrepreneurial individuals.

On the other hand, some experimental studies show effects to the contrary. MacKo and Tyszka [33] conducted a laboratory experiment on three categories of subjects: (1) students without any intention of starting their own business, (2) students who had participated in a specialized course for future entrepreneurs, and (3) students who became entrepreneurs before graduating. They found that there were no differences between the three groups of students in their risky choices. The experiment failed to confirm a hypothesis that would indicate a greater propensity for risk in students who are would-be entrepreneurs or actual entrepreneurs than in students with no intention of starting a business. Sandri et al. [34] applied HL multiple price list in order to elicit risk preferences and concludes that the risk preferences between entrepreneurs and non-entrepreneurs are not significantly different. In a study about entrepreneurs' time allocation, Burmeister-Lamp et al. [35] focused on hybrid entrepreneurs who maintain a wage job while starting new enterprises to explore how they allocate their working hours between these two activities. By applying the experiment with monetary incentives, their study provided evidence that risk preferences do not explain much the entrepreneurs' time allocation. Koudstaal et al. [36] also tested the behavior of entrepreneurs under risk and uncertainty via a field experiment using the HL multiple price list and survey-based measures. Based on the self-assessment method, entrepreneurs assessed themselves as less risk-averse compared to managers and employees. However, in the experimental measure, there was no difference between entrepreneurs and managers

on their level of risk aversion and there was a significant difference when the comparison was between entrepreneurs/managers and employees.

According to the existing literature, we propose the hypothesis as below:

H1. *Individuals with higher risk aversion will choose to become wage earners, while those with greater risk-taking tendencies will choose to start a new business.*

Regardless of the different research results, experimental methods provide valuable insight in exploring the risk preferences of entrepreneurs and non-entrepreneurs and their impact on career choice.

Experimental methods offer a good approach for measuring variables such as risk preferences and entrepreneurial decisions due to their ability to provide controlled environments that simulate real-world scenarios. Unlike standard survey questionnaires, which are prone to limitations such as response bias and lack of incentivization, experimental designs offer greater precision and reliability in capturing individuals' decision-making processes. By structuring decision tasks within a game-based framework, we can elicit more authentic responses from participants while controlling for confounding variables.

Experimental methods have become more commonplace in the last 10 to 20 years, and especially in entrepreneurship research, they provide a more valid look at questions of causality than survey methods [37]. Although experimental methods are costly and complicated to conduct, Williams et al. [38] encouraged researchers to use experimental methods in their future research as a way of making an important contribution to the field of entrepreneurship research.

3. Research Design and Methods

To evaluate the impact of risk preferences on entrepreneurial decision, firstly, we construct an economic model that shows factors that affect entrepreneurial decision (Section 3.1). Risk preferences are key determinants. After establishing the mechanism, we present the methods for measuring variables in the model (Section 3.2)—economic experiments with real monetary incentives to elicit individual risk preferences as well as hypothetical scenarios that included two career choices to measure entrepreneurial decision.

3.1. The Model

The entrepreneurship decision of an individual can be explained by considering their risk preferences and various socioeconomic factors. Individual risk preferences are crucial, as entrepreneurship inherently involves taking on uncertainty and potential financial loss. Additionally, socioeconomic characteristics often provide a comprehensive understanding of an individual's capability, motivation, and access to resources, all of which are vital for making informed entrepreneurial decisions. As modeled in Fossen et al. [17] and Chanda and Unel [4], we build Equation (1), which integrates these elements to capture the above nature of entrepreneurship.

$$Y_i = \beta_0 + \beta_1 Risk_i + \beta_2 X_i + \varepsilon_i \quad (1)$$

The equation represents a linear regression model where entrepreneurial decision Y_i is explained by risk preference $Risk_i$, independent variables (X_i), and an intercept term (β_0). The coefficients (β_1 and β_2) indicate the magnitude and direction of the relationship between the predictors and the dependent variable, while the error term (ε_i) accounts for unexplained variability in Y_i .

The dependent variable Y_i represents for entrepreneurship. In this study, entrepreneurship is proxied by two variables: entrepreneurial decision and entrepreneurial participation. The entrepreneurial decision refers to the decisions made by participants in the career choice scenario, with a value of 1 indicating the choice to initiate a new business and 0 representing the decision to opt for a fixed-wage job in the scenario. The entrepreneurial participation variable indicates whether the individual has participated in any business activities, as

reported through a questionnaire. Participation in this study context means ownership or joint ownership of a business. This variable takes on a value of 1 if the person owns a business either individually or jointly, and 0 otherwise. Using these entrepreneurship variables in two equations allows for us to check the stability of the estimated results.

The $Risk_i$ variable represents individual risk preferences, derived from data collected through two experiments: the risk game and the entrepreneurial game. In the entrepreneurship equation, i.e., Equation (1), we have three variables for the individual risk preferences, namely, “Safe choices”, “Risk averse”, and “Risk invest”.

From the risk game, we created a variable named “Safe choices” based on the number of safe options a participant selected before crossing over to the risky option. To test the robustness of the results from this count-based variable, we created a binary variable, “Risk averse”, assigned a value of 1 if the range of safe choices is 5 to 9 and 0 if the safe choices range from 0 to 4. Additionally, we introduced a variable named “Risk Invest”, representing the amount of money that subjects invested in the first round of the entrepreneurial investment game. It suggests that participants who invest more in risky decisions tend to have higher levels of risk-taking behavior. The investment amount provides a good metric for capturing variations in individuals’ attitudes toward risk. The generation of this variable is inspired by the research conducted by Charness and Gneezy [39] and Barber [13].

The vector X represents a set of control variables, including gender, family employment status, opportunity recognition, individual’s self-assessment of knowledge and skill for entrepreneurship, and attendance of business training courses. Definitions of these variables can be found in Table 1.

Table 1. Definitions of all variables in Model 1.

Variables	Definition
Entrepreneurship	
Entrepreneurial decision	1 = start a business; 0 = choose a fixed-wage job
Entrepreneurial participation	1 = individually or jointly own a business; 0 = other
Risk preferences	
Safe choices	Risk classification based on the number of safe choices in the MPL risk game
Risk averse	1 = risk-averse; 0 = risk-taking or risk-neutral
Risk invest	The amount of money that participants invested in the first round of the entrepreneurial investment game
Other variables	
Gender	1 = male; 0 = female
Opportunity recognition	1 = recognition of any opportunity for starting a new business; 0 = none
Self-efficacy	1 = have knowledge and skills to start a business (self-assessment); 0 = none
Business training	1 = attend any business course; 0 = none
Family background	1 = family member engaged in self-employment; 0 = none

3.2. The Experiments

We used experimental methods with real monetary incentives to elicit individual risk preferences. To measure entrepreneurial decision, particularly in the context of starting a new business, we designed hypothetical scenarios that included two career options—opting for traditional employment as a wage earner or pursuing self-employment. These scenarios were tailored to align with students’ common career choices after graduation. Additionally, we collected sociodemographic data using a survey questionnaire.

Experiments with an entrepreneurial context have often been set in classrooms as a controlled setting for laboratory experiments (for a comprehensive review, see [40], where lab experiments with students predominate). Although the classroom context may not perfectly reflect the uncertainties in real-life entrepreneurial decisions and outcomes, it offers significant advantages. Economic lab experiments allow for highly a controlled

setting, allowing for researchers to minimize external influences. For students, lab experiments help reduce noise factors from real-world complexities. The controlled nature of lab experiments enhances the replicability of a study. In addition, a classroom setting allows for low-cost initials with small-scale experimental designs [40]. In this study, we decided to select students as subjects in our laboratory experiment because they have not yet chosen employment pathways, either self or wage employment, which helps to avoid potential biases of occupational choice [41,42].

Participants were recruited randomly—regardless of their identity factors such as gender, socioeconomic status, or major—from the University of Economics Ho Chi Minh City (UEH). Two hundred and twenty-six senior students participated in the experiment voluntarily over five days. The experiment consisted of 15 sessions with a maximum of 20 subjects per session, and each subject was only allowed to participate in one session. The first day of the experiment was conducted on 20 March 2023. Therefore, initially, each subject received a show-up fee of VND 50,000 and had an equal opportunity to earn extra income based on their decisions regarding risks and allocation of resources (In 2023, at the time of the experiment, students typically earned between 22,000 and 24,000 VND per hour from part-time jobs. An average participation time of 2 h was required for our experiment).

All the participants were instructed to arrive around 15 min before the scheduled time and guided to gather in a spacious classroom. They were then arranged to sit apart from each other; we also ensured that only two participants sat at one table. Doing this prevented them from contacting each other or affecting each other's decisions.

The experiment included four main parts: (1) a scenario about career choices, (2) an entrepreneurial investment game, (3) a risk game, and (4) a questionnaire. At first, we provided the experimental instruction in Vietnamese, and once the coordinator finished the instruction part, subjects completed questions designed to assess their understanding of the game. The games and questionnaires were designed and implemented using the Survey Solutions, a survey management and data collection system developed by the World Bank. The subjects participated in the experiment using their mobile phones, accessing each game only with a passcode provided in advance to facilitate progress tracking. The order of the games was alternated across sessions. The amount of money they received in each game would be kept confidential. To prevent potential bias in subjects' investment decisions for subsequent sessions due to knowing their earnings after each game, we provided information on their total earnings individually at the end of the experiment.

The career choice scenario

Taking inspiration from Bonilla et al. [43]'s argument that the self-selection of occupations mirrors the decision of choosing between lotteries, this study employs a hypothetical experiment to capture subjects' entrepreneurship decisions. The outcomes from this scenario serve as the dependent variable "Entrepreneurship decision" in the entrepreneurship equation. The scenario on career choice is designed based on students' common career choices after graduation. It consists of two options, requiring participants to choose between conventional employment with a fixed monthly wage or pursuing self-employment to start a new business. Participants were required to select one option from the list:

- A. You have a fixed-wage job of VND 8,000,000 per month. You will earn a total of VND 96,000,000 in a year.
- B. You decide to invest VND 100,000,000 to start a new business. If you succeed, you will earn VND 300,000,000 per year (when using the 50/50 chance, we need to have the reward of VND 300,000,000 per year in order to ensure that both options A and B offer similar expected values). Otherwise, you will lose all if the business fails. The probability is 50/50 (The decision to use 50/50 probability in this study aims to simulate real-world investment uncertainty while ensuring experimental control and replicability. This probability reflects the unpredictable nature of entrepreneurships and simplifies the decision-making process for participants, making the experiment clearer and more accessible. By maintaining a consistent probability distribution, this study enhances the robustness and reliability of empirical research, allowing for

easier replication and validation of findings. Despite real-world variations, 50/50 probability provides a practical framework for examining the relationship between risk preferences and entrepreneurial behavior).

The expected value of option A (EV(A)) is VND 96,000,000. The expected value of option B is calculated as follows:

$$EV(B) = 300,000,000 \times 0.5 + (-100,000,000) \times 0.5 = \text{VND } 100,000,000$$

While both options have nearly identical expected values, certainty is assured only with option A. Option B is typically considered riskier than Option A. The setup of this career choice enabled us to investigate whether an individual's risk preferences can predict entrepreneurial behavior.

The entrepreneurial investment game

We used this game to measure the risk preferences of the subjects. This game was designed following the entrepreneurial investment game of Shahriar [44]. The game is structured into multiple repeated rounds. In the first round, subjects were informed that they would be granted a loan of VND 100,000,000. We used an interest-free loan rate to maintain simplicity in the experiment and facilitate easy comprehension of the rules for participants. The subjects were required to decide the amount they wished to invest in their new business. The remaining sum was earmarked for personal consumption. Although they had the option to keep the remaining amount at the end of the game, it could not be used for loan repayment.

The invested amount leads to two potential outcomes. The business status is determined depending on a randomized selection with a one-half probability. If the business succeeds, the invested amount is tripled. If the returns exceed VND 100,000,000, the loan is repaid. The excess return can be kept at the end of the experiment. Once participants repay the loan, they can receive another same-size loan, and the process is repeated. Conversely, participants lose all the money they invested if the business fails. If the business fails or the business return value is less than VND 100,000,000, the game is terminated. The money subjects earned was converted to real currency with an exchange rate of 100,000,000 VND (experimental currency) for 50,000 VND (real currency). The process of each round is presented in Figure 1.

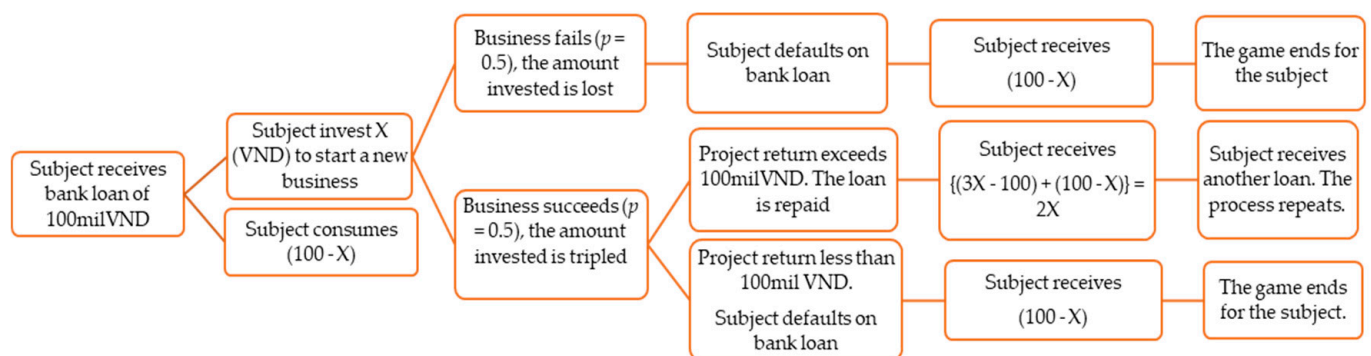


Figure 1. The sequence of the entrepreneurial investment game.

The risk game

Risk preferences are elicited using a specific type of risk game, the multiple price list (MPL) design following procedures in Holt and Laury [45]. This measurement, widely used by researchers, allows for the comparison of risk preferences across diverse contexts and environments [46].

Participants are presented with a list of 10 decisions. Each decision is paired between "Option A" and "Option B", as in Table 2. Participants then choose their preferred choice from each pair by picking either Option A or B. The decisions follow a consistent format,

with the sole distinction being an increase in the probability of a high payoff. For example, there is only a 1/10 chance of receiving a high payoff in each option (VND 20,000 with option A and VND 38,500 with option B). Moving down, the probability of receiving VND 20,000 in option A or VND 38,500 in option B is more substantial. In the 10th decision, the highest payoff is ensured in each option, so participants choose between VND 20,000 or VND 38,500. If participants clearly understand the instruction, those with risk aversion typically choose option A in the first decision. By contrast, risk-takers are more likely to choose option B because they have a chance to achieve higher monetary gains. There exists a point at which participants switch their choice from option A to option B. This switching point serves to measure the participants' risk preferences.

Table 2. Decision task.

Decision No.	Option A	Option B	Expected Payoff Difference
1	10% to receive VND 20,000 and 90% to receive VND 16,000	10% to receive VND 38,500 and 90% to receive VND 1000	VND 11,650
2	20% to receive VND 20,000 and 80% to receive VND 16,000	20% to receive VND 38,500 and 80% to receive VND 1000	VND 8300
3	30% to receive VND 20,000 and 70% to receive VND 16,000	30% to receive VND 38,500 and 70% to receive VND 1000	VND 4950
4	40% to receive VND 20,000 and 60% to receive VND 16,000	40% to receive VND 38,500 and 60% to receive VND 1000	VND 1600
5	50% to receive VND 20,000 and 50% to receive VND 16,000	50% to receive VND 38,500 and 50% to receive VND 1000	VND −1750
6	60% to receive VND 20,000 and 40% to receive VND 16,000	60% to receive VND 38,500 and 40% to receive VND 1000	VND −5100
7	70% to receive VND 20,000 and 30% to receive VND 16,000	70% to receive VND 38,500 and 30% to receive VND 1000	VND −8450
8	80% to receive VND 20,000 and 20% to receive VND 16,000	80% to receive VND 38,500 and 20% to receive VND 1000	VND −11,800
9	90% to receive VND 20,000 and 10% to receive VND 16,000	90% to receive VND 38,500 and 10% to receive VND 1000	VND −15,150
10	100% to receive VND 20,000	100% to receive VND 38,500	VND −18,500

The results from the above ten selection decisions of individuals are used to determine a range of values for their risk aversion coefficient r . This range is calculated through a utility function that reflects how individuals derive satisfaction from different levels of wealth, incorporating their risk aversion. The commonly used utility functional form in economic models to understand decision-making under uncertainty that captures the trade-off between higher rewards and the risks involved is modeled as follows as in various studies (e.g., Holt and Laury [45]) with the pioneering works by John von Neumann and Oskar Morgenstern on expected utility theory and Frank Knight on risk and uncertainty.

$$U(Y) = \frac{Y^{1-r}}{1-r} \quad (2)$$

where r is the risk aversion coefficient of individuals and Y is the value of the reward that they can receive. For example, if an individual chooses the safe option (Option A) in the first three decisions and changes to the risky option (Option B) in the remaining decisions, then the value of the coefficient r will be in the following range:

Lower limit:

$$0.3 \cdot \frac{2^{1-r}}{1-r} + 0.7 \cdot \frac{1.6^{1-r}}{1-r} = 0.3 \cdot \frac{3.85^{1-r}}{1-r} + 0.7 \cdot \frac{0.1^{1-r}}{1-r} \Leftrightarrow r \equiv -0.49$$

Upper limit:

$$0.4 \cdot \frac{2^{1-r}}{1-r} + 0.6 \cdot \frac{1.8^{1-r}}{1-r} = 0.4 \cdot \frac{3.85^{1-r}}{1-r} + 0.6 \cdot \frac{0.1^{1-r}}{1-r} \Leftrightarrow r \equiv -0.15$$

In this case, the value of the coefficient r is less than 0, so this individual is considered a risk-seeker (risk-loving). Conversely, if the coefficient $r > 0$, the individual is risk-averse and $r = 0$ means they are risk-neutral. Table 3 shows the risk preferences classification based on lottery choices.

Table 3. Risk classification based on lottery choices.

Number of Safe Choices	Range of Relative Risk Aversion	Risk Preferences Classification	Percentage of Choices in Experiments
0–1	$r < -0.95$	Highly risk loving	5.12
2	$-0.95 < r < -0.49$	Very risk loving	8.37
3	$-0.49 < r < -0.15$	Risk loving	14.88
4	$-0.15 < r < 0.15$	Risk neutral	20.93
5	$0.15 < r < 0.41$	Slightly risk averse	19.53
6	$0.41 < r < 0.68$	Risk averse	14.88
7	$0.68 < r < 0.97$	Very risk averse	10.23
8	$0.97 < r < 1.37$	Highly risk averse	3.26
9–10	$1.37 < r$	Stay in bed	2.79

We illustrated ten decisions using visuals to help participants in understanding and choosing between Options A and B. An example of one such visual can be found in Appendix A.

After the participants had made all their choices, we rolled a ten-sided die twice to determine their earnings. The first throw was used to select one of the ten decisions as a reference, and the second throw determined the payoff for the option they had chosen.

The survey questionnaire is referenced from the study of Shahriar [44] and presented in Appendix B.

4. Results and Discussion

We excluded responses from 10 subjects who made inconsistent choices. For instance, the responses of participants who chose Option A for a fixed payoff of VND 20,000 instead of the higher payoff of VND 38,500 available in the 10th decision were excluded. Additionally, we dropped individuals who inconsistently switched back and forth between lotteries A and B within the dataset.

Table 4 provides descriptive statistics for all variables used in the estimation. The majority of subjects in the sample are female, comprising 73 percent of the total. This resembles the proportion of female students within the university. Our sample includes 51 percent of risk-averse participants, and the average number of safe choices in the MPL risk game that can be proxied for the subject's risk preferences is 4.6 on the scale from 1 to 9. This finding aligns with previous research results, notwithstanding variations in risk measurements, as in Meissner et al. [47], wherein the majority of subjects were identified as risk-averse. Male and female participants have no significant difference in risk aversion (Mann–Whitney test: $z = 1.233$, $p = 0.278$).

Forty-four percent of participants, totaling 96 individuals, opt for Option B to start a new business instead of receiving a fixed salary. On average, these participants invest VND 54.6 mil in the new venture creation in the first round of the investment game.

Table 4. Descriptive statistics.

Variables	Mean	Std.Dev	Min	Max
Entrepreneurship				
Entrepreneurial decision	0.44	0.49	0	1
Entrepreneurial participation	0.32	0.46	0	1
Risk preferences				
Safe choices	4.6	1.87	1	9
Risk averse	0.51	0.50	0	1
Risk invest	54.6	18.92	20	100
Other variables				
Gender	0.27	0.44	0	1
Opportunity recognition	0.42	0.49	0	1
Self-efficacy	0.61	0.48	0	1
Business training	0.17	0.37	0	1
Family background	0.72	0.44	0	1

Table 5 shows the correlation among the variables described in Table 1. There exists a correlation between the entrepreneurial decision variable and main independent variables, including risk averse, safe choices, and risk invest. On the other hand, entrepreneurial participation presents no correlation with variables related to risk preferences. Among the three risk variables, risk averse and safe choices show a high correlation, amounting to 0.81. Overall, there is no noticeable correlation among the independent variables.

Table 5. Correlation matrix.

Variables	1	2	3	4	5	6	7	8	9	10
1 Entrepreneurial decision	1.00									
2 Entrepreneurial participation	0.21 *	1.00								
3 Risk averse	−0.18 *	−0.13	1.00							
4 Safe choices	−0.21 *	−0.13	0.81 *	1.00						
5 Risk invest	0.16 *	−0.00	−0.05	−0.06	1.00					
6 Gender	−0.02	−0.09	−0.08	−0.00	0.09	1.00				
7 Opportunity recognition	0.19 *	0.28 *	0.00	−0.00	0.04	0.02	1.00			
8 Self-efficacy	0.20 *	0.23 *	−0.05	−0.11	0.03	0.13	0.27 *	1.00		
9 Business training	0.03	0.13	0.02	0.02	0.07	−0.03	0.13	0.06	1.00	
10 Family background	0.06	0.09	−0.12	−0.03	0.07	0.02	0.08	0.01	0.08	1.00

Note: * $p < 0.05$.

We ran six logit models to test the relationship between risk preferences and entrepreneurship. Models 1, 2, and 3 were for entrepreneurial decision with safe choices, risk-averse, and risk invest as proxies for risk preferences. Models 4, 5, and 6 addressed entrepreneurial participation with the same pattern of risk preferences. The regression results are presented in Table 6.

The results reported in Model 1 show that as an individual's number of safe choices in the game increases, i.e., level of risk aversion increases, the probability of being self-employed decreases. More precisely, each additional safe choice in the MPL risk games is associated with a 5.6% reduction in the probability of choosing to start a business. Similarly, Model 2 reveals the strong linkage between risk-averse and entrepreneurial decisions. The estimated coefficient on "risk averse" is negative and statistically significant at the 1 percent level. Thus, the probability of starting a new business is lower if the participants are more risk-averse than others who are either risk-taking or risk-neutral. Individuals classified as risk-averse are approximately 18.9 percentage points less likely to start a business compared to those who are not risk-averse, holding other variables constant.

As indicated in Model 3, an increase in investment amounts in risky decisions, or, in other words, a higher propensity for risk-taking leads to a higher probability of entering entrepreneurship. A VND 10,000 increase in the amount of money invested in the first round of the entrepreneurial investment game is associated with a 4% increase in the probability of choosing to start a business. This suggests that higher levels of risk-taking are linked to a slightly higher probability of entrepreneurial decision, all else being equal. This result reinforces the relationship between risk preferences and entrepreneurial decision in Models 1 and 2. The goodness-of-fit test shows that our three models fit reasonably well.

Table 6. The logit models for entrepreneurial decision.

	Entrepreneurial Decision		Entrepreneurial Participation			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Safe choices	−0.056 *** (0.019)			−0.029 * (0.017)		
Risk averse		−0.189 *** (0.069)			−0.132 ** (0.065)	
Risk invest			0.004 ** (0.002)			−0.000 (0.002)
Gender	−0.062 (0.079)	−0.079 (0.078)	−0.083 (0.079)	−0.133 ** (0.066)	−0.143 ** (0.065)	−0.133 ** (0.066)
Opportunity recognition	0.150 ** (0.073)	0.153 *** (0.073)	0.143 ** (0.073)	0.215 *** (0.068)	0.221 *** (0.068)	0.214 *** (0.067)
Self-efficacy	0.159 ** (0.073)	0.178 *** (0.072)	0.184 *** (0.072)	0.173 *** (0.066)	0.183 ** (0.065)	0.189 *** (0.064)
Business training	0.024 (0.097)	0.012 (0.096)	−0.010 (0.095)	0.120 (0.094)	0.111 (0.093)	0.107 (0.092)
Family background	0.057 (0.079)	0.038 (0.080)	0.054 (0.079)	0.068 (0.071)	0.056 (0.072)	0.073 (0.070)
Goodness-of-fit test after logistic model						
Pearson chi2	83.68	35.80	122.36	110.41	42.19	111.56
Prob > chi2	0.768	0.571	0.237	0.118	0.294	0.494

Notes: Marginal effects are presented. Standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Our evidence is consistent with the findings of Estelami [48], who provides evidence that individuals with higher degrees of risk-taking have greater entrepreneurial intentions. Vaaramo et al. [22] finds that self-employed individuals without employees score highest in risk-taking and, in the same vein, Koudstaal et al. [36] concludes that entrepreneurs are less risk-averse than employees. Elston and Audretsch [49], in one of the earliest studies on entrepreneurship utilizing the MPL method to measure risk preferences, demonstrated that risk aversion diminishes the likelihood of an individual choosing to initiate a new business venture. De Blasio et al. [5] found a negative effect of risk aversion on the probability of being an entrepreneur in Italy. Specifically, an increase of one standard deviation in risk aversity reduces 6.5 percentage points in the probability of being an entrepreneur. Baluku et al. [11] similarly demonstrates a negative impact of risk aversion on entrepreneurial intention among young people in Uganda and Germany. Chanda and Unel [4] examined the effect of risk-taking on entrepreneurship at country level and found that there is a positive and significant impact of risk-taking on the likelihood of being an entrepreneur. The probability of being an entrepreneur increases 16 percent with a one-standard deviation increase in risk-taking.

An additional robustness check, using entrepreneurial participation as a proxy for entrepreneurship in Models 4, 5, and 6, reaffirms the conclusions observed in Models 1, 2, and

3, which are for entrepreneurial decision. It is important to note that while entrepreneurial decisions refer to career choice scenarios, entrepreneurial participation reflects real behavior, indicating whether an individual owns or jointly owns a business. In Models 4 and 5, the estimated results for safe choices and risk aversion show a similar pattern to that observed in Models 1 and 2.

The estimated coefficients of the control variables remain stable across all models. Opportunity recognition positively affects the decision to start a business. More precisely, participants who responded that they recognize the opportunity for starting a business in the area where they live in the next six months show a higher probability of choosing to start a new business. Similarly, self-efficacy positively influences individual decision-making towards entrepreneurship. The gender variable shows an interesting result: males are less likely to own a business compared to females. Other variables such as business training or family background, i.e., whether a family member engaged in self-employment or not do not influence either entrepreneurial decision or participation.

5. Conclusions

The main findings of this study, aligning with previous research, reveal that in Vietnam, individuals with a higher degree of risk aversion are less likely to become entrepreneurs. By testing the risk preferences of an individual by different experimental methods at the time he or she makes career choice decisions, this paper sheds light on the complex relationship between risk preferences and entrepreneurship. Specifically, our results show that the probability of starting a new business is lower if the subjects are more risk-averse than others who are risk-taking or risk-neutral. Risk-averse individuals are 18.9 percentage points less likely than their risk-prone counterparts to engage in self-employment.

The findings of this study are important not only for academic purposes but also for students, policymakers, and universities. The impact of risk preferences on career choices, which is shown in this study, provides a deeper understanding of the role of risk attitudes in shaping the entrepreneurial behavior of students. Risk preferences are a very important factor among students who have entrepreneurial intention. Therefore, students should acknowledge that risk as in the nature of business and risk-taking is one of characteristics of an entrepreneur. Our study indicates that students need risk-taking aptitude to start a business. They should fully embrace their own risk preferences and increase their risk-taking aptitude to promote enthusiasm for business as well as to recognize the right time to start a new business.

Our study strongly recommends that universities initiate entrepreneurship programs such as seminars and workshops to boost the entrepreneurial skills of students. Universities may focus on solving the fear of failure or risk aversion of students by organizing meetings with successful entrepreneurs to impart their entrepreneurial spirit and practical experience to students. They can help students enhance their capabilities to recognize business opportunities, supplying knowledge and improving their self-confidence in starting a business.

There are some limitations related to sample size that need to be acknowledged.

The participants of this study were two hundred and sixteen senior students from just one university. The experimental results would be strengthened if the sample size were larger and more diverse. Future research can replicate the research approach of this study to evaluate the impact of risk preferences on entrepreneurial decision-making by collecting data from a wider range of educational institutions.

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Appendix A. Example of a Visual Aid for the Multiple Price List’s Decision Task

Decision 1

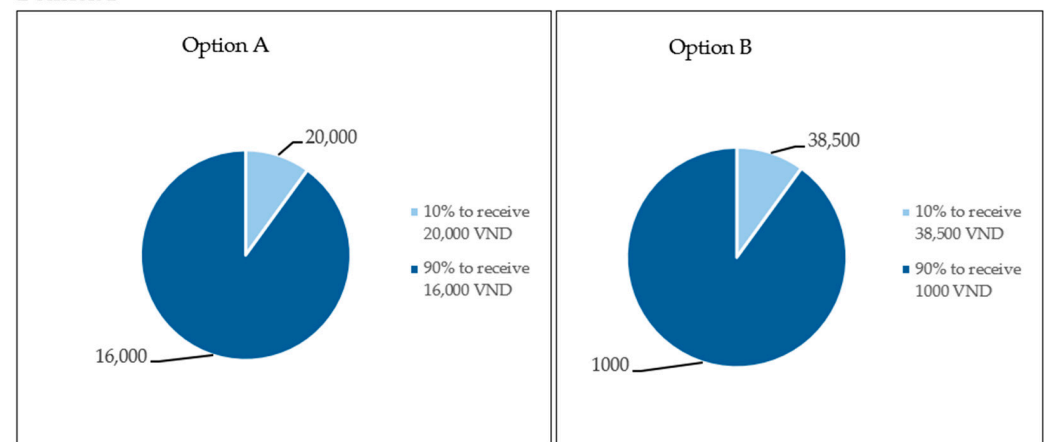


Figure A1. First decision in multiple price list 's decision task.

Appendix B. Survey Questions Related to Variables in the Model

We would like you to answer the questions listed below:

Opportunity recognition

Q1. In the next six months, do you recognize any opportunity for starting a business in the area where you live?

Q2. What is that?

Self-efficiency

Q3. Do you have the knowledge and skills required to start a new business?

Q4. Would fear of failure prevent you from starting a business?

Business training

Q5. Have you ever joined any business courses?

Q6. What's the name of the course?

Entrepreneurship participation

Q7. Do you individually or jointly own a business?

Q8. Do you know someone personally who started a business in the past two years?

Q9. Are you, alone or with others, currently trying to start a new business, including any type of self-employment?

Respondents who answer “yes” to this question were asked:

Q10. Over the past twelve months, have you done anything to help start this new business, such as looking for equipment or a location, organizing a startup team, beginning to save up, or any other activity that would help launch a business?

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