

BEHAVIORAL FINANCE: A Study on Investments Decisions

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ABSTRACT

Considering the relevance of studying Behavioral Finance and having human behavior on investment decisions as subject, this article propose to analyze the behavior of the graduate students of Economics from University of Taubaté on investments decisions. In order to do so, the methodology adopted was a quantitative survey with a random sample from 65 students of Economics at University of Taubaté. The primary research data were obtained through a closed questionnaire that consisted of two parts. Part 1 featured eight categorical questions, referring to the predetermined variables of the interviewee and Part 2 presented sixteen questions based on the article Prospect Theory: An Analysis of Decision under risk, written by Kahneman and Tversky (1979). The data obtained from the survey were tabled in a Microsoft Excel spread sheet, and the chi-square test was obtained with the Statistical Package for the Social Sciences (SPSS) software. The results found in the study were satisfactory and surprising. The biases of the Prospect Theory were proven in the used sample, which reinforces the importance of behavioral studies for the training of investors, helping them handle the called "behavioral traps" that interfere with new investors staying in the market. Concerning the tested hypotheses, there was no significant influence, at least statistically, of any pre-determined variables chosen for this study on the agents' behavior on investment decisions.

Keywords: Finance. Behavior. Economy. UNITAU

1. INTRODUCTION

Empirical studies on the behavioral aspect of decision making process gained greater notoriety in 2002 with the award of the Nobel Prize in Economics to Daniel Kahneman and Vernon Smith awarded for innovations in the fields of economic psychology and experimental economics respectively (Anache; Laurencel, 2013). Behavioral Economics, strongly supported and grounded in works such as Prospect Theory: An analysis of decision under risk of Israeli psychologists Daniel Kahneman and Amos Tversky (1974) and Association for Investment Management and Research by economist Richard Thaler (1999), is an alternative model of analysis of individuals' decision-making which questions the neoclassical assumption of unlimited rational choices made by economic agents (Silva et al., 2008).

Economic research often assumes that people are primarily motivated by material incentives and make rational decisions. It is considered that they evaluate the economy's state and their behavior effect evaluating all available information. This approach has been formulated categorically through the named Expected Utility Theory, which is the predominant economic theory for decisions made under uncertainty. In researches on human behavior based on surveys and experiments, Daniel Kahneman and other psychologists have questioned the predominance of economic rationality in some decision situations. Those that should make decisions in the real world often don't seem to make decisions according to the Expected Maximization Utility Theory (Vaz, 2002).

The development of studies that identify in the most plausible way the investors' behavior facing decisions under risk has become more and more important since it is necessary to understand the behavioral abnormalities not explained by Modern Finance (Melo, 2008). According to Nóbrega et al (2014), the capital market allows capital flow from savers to those who need resources for productive investment. Also, according to the author, economic development depends on the continuous expansion of production capacity, and this expansion comes from investments that produce productive capital accumulation and increase productivity.

Developed countries or in accelerated development process show high savings rates, highlighting the connection between economic development and supportive elements for savings making and their intermediation that makes it accessible to anyone who wants to invest. Therefore, the investments, and how they are made, are the root of the development process (Nóbrega et al, 2014).

Given the importance of the development of capital markets for the growth of an economy, studies on the profile of investors become relevant to understand the behavior of markets and agents that constitute it, and it can also work as tool for investors' education (Melo, 2008). The study is also justified by the fact that the study field of Behavioral Finance is a new area that offers many opportunities for research and academic analyses. Based on the above, the objective of this research is to analyze the behavior of the graduate students of Economics from University of Taubaté on investments decisions.

2. THEORETICAL REFERENCE

2.1 Behavioral Economics

Given the interest to understand how humans make decisions, Cognitive Psychology appeared in the early 1970s, which began to test economic theorems about human decision-making behavior (Anache; Laurencel, 2013).

According to Anache and Laurencel (2013), in view of Cognitive Psychology human behavior in decision-making is adaptive, dependent of context and conditions available, suffering interference from emotions, tendencies, memories of earlier decisions and individual peculiarities.

Because of signs of wear on the Modern Finance Model, between the 1980s and 1990s, economists have been developing behavior models for economic agents that incorporate more realistic assumptions about the rationality and decision making, consolidating the area of study called Behavioral Economy (Pindyck, Rubinfeld, 2009). The development of this area, also called Psychological Economics or Economic Psychology, is owed to the neoclassical apparatus inability to absorb a series of consumption behaviors and investment observed in the empirical reality (Fonseca; Muramatsu, 2008).

According to Camerer and Loewenstein (2004),

[...] at the heart of behavioral economics is the belief that increasing the realism of psychological assumptions of economic analysis will improve economics itself – leading to theoretical insights, improving the forecasting of economic phenomenon and suggesting better policies (Camerer, Loewenstein, 2004, p.1).

According to Brabazon (2000), the field of behavioral economics is not exactly new, has been a while since many investors consider that psychology is an important key to determine markets behavior.

According to Ferreira (2007), the concept of "Economic Psychology" was first used by the French social scientist Jean-Gabriel Tarde, who, in 1902, published a book called *La Psychologie Economique*. In the second half of the nineteenth century, according to Ferreira (2007), the so-called Austrian Psychological School, led by Karl Menger, have sought psychological foundations for the behavior of economic agents. However, only in recent times, the issue has been approached with utmost care and dedication.

The border area of expertise between psychology and economics, which studies the economic behavior of individuals, presented a significant growth in the second half of the twentieth century, becoming part of the curriculum of various European and American universities with research programs, annual conferences, specialization courses and publications (Ferreira, 2007).

The main motivation of a behavioral economist, according to Coelho (2013), is the interest in aspects of economic behavior from daily observation, which often confront the postulate of the neoclassical orthodox economic theory.

Concepts from sciences as Economics, Finance and Cognitive Psychology offer subsidies to Behavioral Finance, looking to build a model with a more realistic description of human behavior in financial markets, sustained,

above all, on the idea that agents are subject to bias behavior changes that can keep them away from a decision centred on rationality (Anache; Laurencel, 2013).

Below are presented some of the most quoted authors in academic work on behavioral economics area and their contributions to finance studies:

- **Andrei Shleifer and Robert W. Vishny:** First to formulate the idea of arbitrage limits, analyzing that arbitrage is not efficient when it is not possible to make profit through strategies that purchase and sell over and under evaluated assets, due to the difficulty on finding assets that work as perfect substitutes for other assets of the operation (Borges, 2007).
- **Daniel Kahneman and Amos Tversky:** Winners of the Nobel Prize in Economics in 2002. Authors of the called Prospect Theory, which main conclusion is that people have loss aversion. Reasoning that to avoid losses humans take risks that make losses impossible, and when it comes to gaining they choose the option that offers greater certainty (Melo, 2008).
- **Herbert Simon:** Winner of the Nobel Prize in Economics in 1978. He introduced the theory of bounded rationality, opposing the neoclassical view of decisions based on profit maximization. Reasoned that one should consider that decision makers quit searching for a great alternative as soon as they find a satisfactory alternative (Balestrin, 2002).
- **Richard Thaler:** according to his line of reasoning, there are two classes of investors in the market: the fully rational and semi-rational, the latter try to make good investment decisions, but makes mistakes due to interference of intrinsic human motivations (Thaler, 1999).

2.2 Investor's Behavior according to Behavioral Finance

Given the importance of the development of capital markets and investment funds for the growth of an economy, studies on the profile of investors become relevant to understand the behavior of markets and agents that are part of it (Melo, 2008).

According to Frankfurter and McGoun (2000), at first, the theories of behavioral finance suffered marginalization, common reaction to a theory that intends to break paradigms. But the growing production of academic papers on the subject has stand out and has been consolidating the behavioral study in finance in recent years, in an attempt to improve the modern model. For Anache and Laurencel (2013), the main objective of the authors working in the field of behavioral finance is to recognize the investor rationality limits, which occur with considerable frequency and cause significant economic results.

This is a response, at least in part, to the empirical difficulties faced by modern finance, merging economic, sociological and psychological concepts to explain facts of real economic life (Thaler; Mullainathan, 2000).

By recognizing that individuals are not identical, as well as information not being perfect, the Behavioral Finance seeks to fill the supposed gaps of the modern finance hypotheses, highlighting the behavior of agents that comprise the market and its main ideological pillar, cognitive psychology, that considers the interactive decision-making process and influenced by several non-trivial factors (Anache; Laurencel, 2013).

In general, the studies in this field analyze the named "cognitive illusions", which are the systematic error tendencies of agents in the decision-making process; opposed to the modern finance assumption that investors only make random errors and, therefore, don't interfere with market efficiency (Kahneman; Riepe, 1998).

Behavioral Finance considers the influence of cognitive biases in the agents' behavior, due to human frailties, such as overconfidence, greed, fear and regret, also called "intrinsic motivations". Therefore, it characterizes the opposition to the, until then, ruling paradigm that the individual analyses all available information and considers all viable alternatives to solve a problem (Anache; Laurencel, 2013).

According to Milanez (2003), it can be said that the behavioral study in Finance relies basically on two deductions: the existence of limits to arbitration and the limitations of human rationality in decision making under risk. Milanez (2003) states that the existence of "noise traders", investors who base their decisions on inconsistent beliefs and feelings with economic theories, makes it impossible for the economic agents to formulate operational strategies without risk. Studies in the area show that in an economy where there is interaction between rational and irrational agents, irrationality can significantly influence asset prices (Anache; Laurencel, 2013).

According to Anache and Laurencel (2003):

The dynamics of financial markets can become quite complex, sometimes leading to extended periods of absence of prices in relation to those that would be sustained by

the business conditions and the economy in general, i.e. economic agents' non rational attitudes may impact, in a uniform and consistent manner, the behavior of financial variables. (Anache; Laurencel, 2003, p.89).

According to Halfeld and Torres (2001), considering that the man of Behavioral Finance is not fully rational, their decisions are often influenced by emotions and cognitive errors that give understanding to the same problem in different ways depending on how it is analyzed. Therefore, it is important to identify how emotions and cognitive errors can establish effective changes in the market (Halfeld; Torres, 2001).

According to Shefrin (2000), Behavioral Finance works with three main themes: heuristic bias, subordination to the form and inefficient markets. About heuristic bias and the subordination to the form, according to the author, it is recognized that financial agents use heuristic assumptions to process information, which leads them to accept assumptions that may cause errors, and that the way a problem is structured influences the perception of the agents on risks and returns (LIMA, 2003). According Shefrin (2000), such errors and different problem structures are covered in the theme of inefficient markets being responsible for the deviation of market prices with respect to fundamental values.

Studies by Kahneman and Tversky (1974) show that agents tend to simplify the decision making process in an attempt to make it faster and easier, making use of "mental shortcuts" or "heuristics", originated from their experiences, which reduce the complexity of the situation in question (Anache; Laurencel, 2013).

Another feature of human behavior also works for Behavioral Finance; it is the fear of regret. According to Odean (1998), this concept focus on the fact that it is very painful for investors to take on their errors, which leads them to make decisions that do not provide the highest profit possible on a transaction if it prevents from reporting a loss. An example used by Statman (1995), is the behavior of investors who are reluctant to sell papers for a price lower than the purchase, holding them for long periods and consciously compromising its liquidity.

According to Halfeld and Torres (2001), other investors' behavioral characteristics highlighted by studies of behavioral finance are excessive self-confidence (believe they have ability above the market average and that their information is more reliable), difficulty in understanding the concept named Return on Average (according to which the price of all paper tends to converge to an average value) and the reaction to new market trends.

Besides from the already mentioned, Barberis and Thaler (2003) identify as examples of heuristics used in the upgrade process of investor beliefs, conservatism, perseverance, anchoring and availability, and the great challenge of this area of study is showing that said behaviors are predictable and affect the market effectively.

For Thaler (1999), the forecast for the future of finance is that economists will get used to think about the influence of human behavior in the trajectory of stock prices and investment options, making the term Behavioral Finance redundant, and the lack of behavior observation an irrationality.

Researchers of Behavioral Finance intend to get the attention of the academic community to the behavioral deviations that are not covered by pillars of Modern Finance. But recognizing that theories such as the Expected Utility and Efficient Markets are fragile undermines the credibility of a wide range of economic knowledge developed from these bases. Therefore, there is still no consensus among researchers about which theory is weak or if both of them are (Melo, 2008).

According to Melo (2008), by admitting the existence of limits on economic agents' rationality there is a tendency to develop more descriptive than prescriptive work. Economic analyses would then be more focused on how humans behave (Behavioral Finance) rather than how they should behave (Modern Finance). One of the pillars on which the Behavioral Finance stands lies in the work of two psychologists and Israeli teachers: Daniel Kahneman and Amos Tversky. Their studies, over the 1970s and 1980s, are very important for the investors' behavioral analysis.

2.3. *Prospect Theory*

In contrast to the Expected Utility Theory (EUT), developed by Daniel Bernoulli in 1954, psychologists Daniel Kahneman and Amos Tversky have proposed the called Prospect Theory, widely known due to the article Prospect Theory: an analysis of decision under risk published in *Econometría* in 1979 (Melo, 2008). This study investigated human behavior and the way decisions are made in risky situations.

To summarize, the main conclusion from Kahneman and Tversky in their empirical studies is that people have loss aversion. According to Köbberling and Wakker (2005), the conclusion is that to avoid losses, the human being is able to take risks that make losses impossible, therefore being averse to losses. And when it comes to gaining they choose the option that offers greater certainty, with that, being averse to risks in gains.

According to Halfeld and Torres (2001), in their early researches, Kahneman and Tversky (1974) raised the following issues to a group of people, as shown in Table 1 below.

Situation 1	Option A	Option B
Apart from everything you own, you got \$1.000. You must choose:	Certain gain of another \$500	A 50% chance of gaining another \$1.000 and 50% chance of not getting anything.
Situation 2	Option A	Option B
Apart from everything you own, you got \$2.000. You must choose:	You loose \$500.	A 50% chance of loosing \$1.000 and 50% of not loosing anything.

Table 1: Issues by K&T.
 Source: Halfeld e Torres (2001)

When analyzing the results of the stated problems above, it was found that 84% of the interviewees chose the certain gain of \$ 500 in the first situation and 69% opted for the 50% chance of losing \$ 1,000 and 50% chance of not loosing anything in the second situation. The two problems are identical to the total variation in the level of wealth, but they were interpreted in different ways due to the way they were formulated (Halfeld; Torres, 2001). Given these results, Kahneman and Tversky studies' show that people take risks just for the chance to skip the loss. When it comes to gains, people prefer the certainty of a smaller value then to take risks for a higher value. In losses, people prefer to take risks intending to avoid losses (Fama; Henrique, 2002).

Kahneman and Tversky (1979) noticed that, in experiments with risky prospects, agents often chose alternatives with lower expected value, unlike the assumption adopted by Markowitz (1952) in his Portfolio Theory and the supporters of Expected Utility Theory (Anache; Laurencel, 2013).

The Prospect Theory can be defined in three concepts: certainty effect, reflection effect and isolation effect. In the certainty effect concept, people overestimate results that are taken as granted. In the reflection effect, people react a certain way in a gaining situation and another way in a loss situation. As for the isolation effect the concept is that people simplify the decision-making process disregarding part of the information that is common to investment alternatives (Faveriet al., 2013).

In the article Prospect Theory: an analysis of decision under risk, Kahneman and Tversky (1979) described a series of choice question that were presented to different groups of people so they would make investment decisions based on the suggested gains or losses. The results refer to the Israeli currency, and were relevant to point out that the average net monthly income of an Israeli family at the time was about 3,000 Israeli pounds (Kahneman, Tversky, 1979). The intervieweestook the questionnaire anonymously, and were informed that there was no "correct" answer to the questions, as the goal was to find out how people deal with risky choices perspectives (Kahneman, Tversky, 1979).

According to Anache and Laurencel (2013), the experiments made by Kahneman and Tversky were performed with a group of 95 individuals which were exposed to the following conditions: one alternative A (x, p) and B (y, q), x and y being gains or losses, and p and q their occurrence probabilities; and another with the C or D alternatives, also with gains/losses and probabilities.

The certainty effect was analyzed by Kahneman and Tversky (1979) according to the experiment shown in Table 2 below.

Situation 1	Options	% that chose option A	% that chose option B
	A (+4.000; 0,80) ou B(+3.000; 1,00)	20	80
Situation 2	Options	% that chose option C	% that chose option D
	C (+4.000; 0,20) ou D (+3.000; 0,25)	65	35

Table 2: K&T experiment for analysis of certainty effect with results in percentage.
 Source: Kahneman and Tversky (1979).

In situation 1, it can be concluded that agents are more risk averse, because the majority of interviewees chose the option B, even with the expected value of this option being less than of option A. However, in situation 2, most interviewees did not keep their level of risk aversion based on probability, with option C being the most chosen one (Kahneman, Tversky, 1979).

Certainty is overvalued because the group analyzed tended to give excessive focus to high-probability events (B's probability is of 100%). Since the values of the two situations were the same, the scenario in situation 1 influenced the choices in the second scenario, due to the difference in reduced probability. These results contradict two axioms of the Expected Utility Theory (EUT): replacement and independence, respectively (Anache; Laurencel, 2013).

Reflection effect was analyzed by Kahneman and Tversky (1979) according to experiment shown in Table 2 below.

Situation 1	Options	% that chose option A	% that chose option B
	A (-4.000; 0,80) ou B(-3.000; 1,00)	92	8
Situation 2	Options	% that chose option C	% that chose option D
	C (-4.000; 0,20) ou D (-3.000; 0,25)	42	58

Table 3: K&T experiment for analysis of reflection effect with results in percentage.
 Source: Kahneman and Tversky (1979).

This time the choice should be made between negative prospects. In this case, 92% of interviewees opted for option A and 58% by D (the reverse of what happened in the experiment with positive prospects). According to these results, and comparing them with those found in the previous experiment, subjects tend to be risk averse with positive prospects and risk-prone with negative prospects of the same magnitude. This preferences reversal when changing only the plus sign (with expected utility remaining the same) is named by Kahneman and Tversky (1979) as reflection effect (Faveri et al., 2013).

The isolation effect was analyzed by Kahneman and Tversky (1979) according to experiment shown in Table 4 below.

Experiment	Options	% that chose option A	% that chose option B
In a game with two stages, there is a 75% chance to end the game with no gain and 25% to move to the second stage, in which must choose, before knowing the outcome of the first stage, between A or B.	A (4.000; 0,80) ou B (3.000; 1,00)	22	78

Table 4: K&T experiment for analysis of isolation effect with results in percentage.
 Source: Kahneman and Tversky (1979).

In this experiment, as shown in the table above, 78% of interviewees opted for option B for the second part of the game. The explanation, according to Kahneman and Tversky (1979), is that people tend to disregard (isolate) the common component of options A and B in the decision, that is, the first part of the game. When considering only those elements that differentiate two alternatives, the isolation effect is identified on agents' behavior (Anache; Laurencel, 2013).

In opposition to the risk utility curve of the Utility Theory (Figure 1), which assumes that the investor assesses the risk of an investment according to the change that it provides in their level of wealth, the Prospect Theory suggests a new utility-risk curve (Figure 2), which would be the representation of behavioral method for assessing the risk of an investment (Silva et al., 2008).

According to Silva (et al., 2008), the risk utility curve has the following characteristics,
 [...] the discontinuity at the origin (determining the origin of the Cartesian system as a reference point in assessing the risks of an investment) and the decline of the curve after that point (representing that investors feel more pain in the loss than pleasure in gain) (Silva et al., 2008, p. 4).

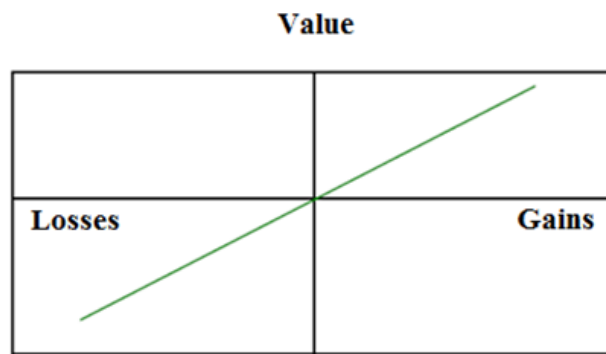


Figure 1: Utility Curve.
 Source: Adapted from Tversky (1995)

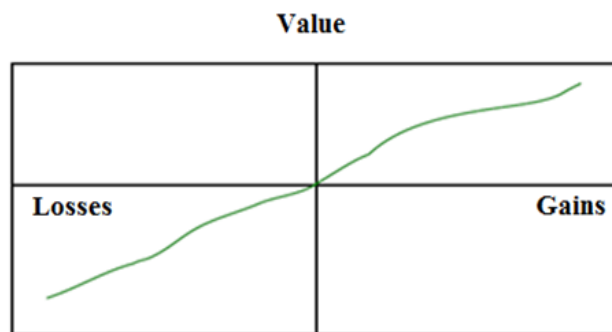


Figure 2: Risk Utility Curve.
 Source: Adapted from Tversky (1995)

3. METHODOLOGY

The work presented a descriptive feature. The descriptive feature is justified due to the study being developed from a literature review consisted of bibliographic research, consulting books, dissertations, theses and articles related to the Behavioral Finance and Economics Behavioral topic. The purpose of this review is to structure a knowledge base capable of helping to understand the search results and support the theme and its relevance. To meet the research purpose sit was turned to the study of investment decisions among undergraduate students of Economics in UNITAU during 2014, making use of the data analysis approach described below.

To analyze the data obtained in this research the quantitative and qualitative approach were used as a complementary manner. The quantitative approach is justified by the phenomena and/or variables measurement in numerical terms. Thus, the numbers enables the creation of descriptions that can be arranged in variables and embedded in models used to test possible connections between them to explain certain phenomena (Berni 2002).

The qualitative approach is justified by the development of categorizations and creation of nominal and ordinal variables. Such variables can be "crossed" with each other or with interval and ratio variables to perform statistical tests, most of them being derived from the chi-square distributions logic (Berni 2002).

Based on the data provided by the Board of the Department of Economics, Accounting and Administration from the University of Taubaté, the undergraduate in Economics have a universe of 68 students enrolled in the four years of course. This study's sample was probabilistic and finite, that is, considering a sampling error of 3.5% and

a confidence level of 99%, a sample of 65 students of Economics at UNITAU was obtained. This number was reached through the following equation, suggested by Santos (2014):

$$n = \frac{N \cdot Z^2 \cdot p \cdot (1 - p)}{Z^2 \cdot p \cdot (1 - p) + e^2 \cdot (N - 1)}$$

Where:

- n - calculated sample;
- N - population;
- Z - normal standard variable associated with the level of confidence;
- p - true probability of the event;
- e - sampling error.

The primary research data were obtained by closed questionnaire, applied in October 2014, which consists of 2 parts. Part 1 presents eight categorical questions relating to the interviewee predetermined variables (gender, age, occupation, experience in financial activity and level of income), looking to better meet the specified goals. Part 2 presents sixteen questions based on the article of Prospect Theory: an analysis of decision under risk, by authors Kahneman and Tversky (1979), which presents a questionnaire template where participants must make decisions on hypothetical certainty or uncertainty alternatives. Each question in Part 2 has two alternatives as answers, exposing interviewees to hypothetical investment decisions under certainty, uncertainty, gains or losses situations.

The data obtained from the survey replies were tabled in Microsoft Excel spread sheet, and the chi-square test was obtained by the Statistical Package for the Social Sciences (SPSS) software, version 22. Each question in the questionnaire is an experiment, adapted from the questionnaire developed by Kahneman and Tversky (1979).

4. ANALYSIS OF RESEARCH HYPOTHESES

This work is limited to analyzing the behavior on investment decisions among undergraduate students of Economics at UNITAU, enrolled in the four years of the course during 2014, according to the data provided by the Board of the Department of Economics, Accounting and Administration of the University. From the 68 students enrolled, 95.6% agreed to participate in the study, providing a total of 65 completed questionnaires.

The questionnaire consists of sixteen (16) questions, which aimed to identify the investment decisions of the interviewees according to the three topics of the Prospect Theory (certainty effect, reflection effect and isolation effect), as shown in Table 5 below.

Question	Which experiment is represented
P.2 - Q1	Certainty Effect
P.2 - Q2	Certainty Effect
P.2 - Q3	Certainty Effect
P.2 - Q4	Certainty Effect
P.2 - Q5	Certainty Effect
P.2 - Q6	Certainty Effect
P.2 - Q7	Certainty Effect
P.2 - Q8	Certainty Effect
P.2 - Q9	Reflection Effect
P.2 - Q10	Reflection Effect
P.2 - Q11	Reflection Effect
P.2 - Q12	Reflection Effect
P.2 - Q13	Isolation Effect
P.2 - Q14	Isolation Effect
P.2 - Q15	Isolation Effect
P.2 - Q16	Isolation Effect

Table 5: Part 2 questions from the questionnaire used for the research.

Each question presented alternatives A and B as answers, each featuring a hypothetical investment option with the possibility of percentage gain/loss and the amount of return on investment.

4.1 Hypothesis Related to Certainty Effect

The hypotheses of this study related to the certainty effect of the Prospect Theory aimed to verify if the interviewees' predetermined variables influenced (H1) or not (H0) individuals behavior on overvaluation of results considered guaranteed indecisions on investment under risk.

In order to achieve such goal, crosses were made between the data obtained in the Part 1 of the questionnaire (P.1-Q1, P.1-Q2, P.1-Q3, P.1-Q4, P.1-Q5, P.1-Q6, P.1-Q7 e P.1-Q8) with those obtained by the answers concerning the experiment about the certainty effect in Part 2 (P.2-Q1, P.2-Q2, P.2-Q3, P.2-Q4, P.2-Q5, P.2-Q6, P.2-Q7 e P.2-Q8), using the SPSS software.

As described in the methodology of this study, the rules used for hypotheses analysis were as follows:

$$\left\{ \begin{array}{l} \text{p-value} \leq 0,05; \text{ disregarding } H_0 \\ \text{p-value} > 0,05; \text{ considering } H_0 \end{array} \right.$$

4.1.1 Gender * Certainty Effect

To analyze the gender influence (P.1-Q1) in the certainty effect of the experiment (P.2-Q1, P.2-Q2, P.2-Q3, P.2-Q4, P.2-Q5, P.2-Q6, P.2-Q7 e P.2-Q8), the following hypotheses were defined:

- H0: Gender does not influence the behavior of overvaluation for the results taken as granted.
- H1: Gender influences the behavior of overvaluation results taken as granted.

Table 6 shows the results of the chi-square test, given the answers received in the survey, at each crossing.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q1 * P.2-Q1	2,616	0,106	0,0%
P.1-Q1 * P.2-Q2	3,097	0,078	0,0%
P.1-Q1 * P.2-Q3	1,597	0,206	0,0%
P.1-Q1 * P.2-Q4	4,816	0,028	0,0%
P.1-Q1 * P.2-Q5	2,120	0,145	50,0%
P.1-Q1 * P.2-Q6	5,824	0,016	0,0%
P.1-Q1 * P.2-Q7	1,163	0,281	0,0%
P.1-Q1 * P.2-Q8	2,820	0,093	0,0%

Table 6: Chi-square test - Gender * Certainty Effect.

According to Field (2009), for the chi-square test on SPSS to be considered completely reliable the expected frequency must be higher than 5% in each cell (that is, 0% of the cells with counting lower than 5%). Up to 20% of the expected frequencies less than 5% is acceptable, depending on the size of the table used, but with proper loss of statistical power of the result (Field, 2009). Thus, the result of the chi-square test of P.1-Q1*P2-Q5 crossover is considered statistically unreliable. In the other crossings it is observed that in only two cases, from the seven considered valid in the analysis, a p-value (significance) smaller than the significance level adopted (0.05) was obtained.

Given the p-value obtained in the results in the crosses between the answers of P.1-Q1 and answers for P.2-Q1, P.2-Q2, P.2-Q3, P.2-Q7 and P.2-Q8 of this research, the predetermined gender variable did not influence the behavior of overvaluation of the results taken as granted. Therefore, in these cases, H0 can be accepted. The results obtained in crosses between the responses of P.1-Q1 question and answers of P.2-Q4 and P.2-Q6, the predetermined gender variable influenced the behavior of over valuation of the results taken as granted. Therefore, in these questions, H1 can be accepted.

4.1.2 Age Range * Certainty Effect

To analyze the age influence (P.1-Q2) in the certainty effect of the experiment (P.2-Q1, P.2-Q2, P.2-Q3, P.2-Q4, P.2-Q5, P.2-Q6, P.2-Q7 e P.2-Q8), the following hypotheses were defined:

- H0: Age does not influence the behavior of overvaluation of the results taken as granted.
- H1: Age influences the behavior of overvaluation results taken as granted.

Table 7 shows the results of the chi-square test, given the answers received in the survey, and each crossing.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q2 * P.2-Q1	0,538	0,764	0,0%
P.1-Q2 * P.2-Q2	1,597	0,450	0,0%
P.1-Q2 * P.2-Q3	0,247	0,884	0,0%
P.1-Q2 * P.2-Q4	2,443	0,295	0,0%
P.1-Q2 * P.2-Q5	2,934	0,231	25,0%
P.1-Q2 * P.2-Q6	2,213	0,331	0,0%
P.1-Q2 * P.2-Q7	7,965	0,019	25,0%
P.1-Q2 * P.2-Q8	0,802	0,669	0,0%

Table 7: Chi-square test - Age Range * Certainty Effect.

In this case, the results of the chi-square test in P.1-Q2*P.2-Q9, P.1-Q2*P.2-Q11 crossing were considered statistically unreliable. The results for the crossings between the answers obtained in P.1-Q2 and those obtained in P.2-Q10 and P.2-Q12 did not show a p-value lower than the significance level (5%). We may then conclude that age did not influence the loss aversion behavior in this research, and we can accept H0.

4.1.3 Occupation * Certainty Effect

To analyze the influence of occupation (P.1-Q3) in the certainty effect of the experiment (P.2-Q9, P.2-Q10, Q11-P.2 P.2 and-Q12), the following hypotheses were defined:

- H0: Occupation does not influence the behavior of overvaluation of the results taken as granted.
- H1: Occupation influences the behavior of overvaluation results taken as granted.

Table 8 shows the results of the chi-square test, given the answers received in the survey, at each crossing.

Table 8: Chi-square test - Occupation * Certainty Effect.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q3 * P.2-Q1	0,251	0,617	16,7%
P.1-Q3 * P.2-Q2	0,004	0,950	16,7%
P.1-Q3 * P.2-Q3	1,502	0,220	16,7%
P.1-Q3 * P.2-Q4	0,126	0,722	0,0%
P.1-Q3 * P.2-Q5	1,027	0,311	50,0%
P.1-Q3 * P.2-Q6	1,866	0,172	0,0%
P.1-Q3 * P.2-Q7	0,393	0,530	16,7%
P.1-Q3 * P.2-Q8	2,160	0,142	16,7%

In this case, the result of the chi-square test obtained in the P.1-Q3*P.2-Q5 crossing was considered statistically unreliable. The crossing of the question concerning the occupation of the interviewee (P.1-Q3) with the P.2-Q1, P.2-Q2, P.2-Q3, P.2-Q7 e P.2-Q8 questions generated results of low reliability, but that can still be considered in the analysis. According to the values presented in Table 6, no experience presented p-value lower than the significance level. Thus, one can accept H0 in all these experiences, that is, the occupation of interviewees did not influence the behavior of overvaluation of the results considered certain.

4.1.4 Semester * Certainty Effect

To analyze the influence of the current semester (P.1-Q4) in the certainty effect of the experiment (P.2-Q1, P.2-Q2, P.2-Q3, P.2-Q4, P.2-Q5, P.2-Q6, P.2-Q7 and P.2-Q8), the following hypotheses were defined:

- H0: The current semester does not influences the behavior of overvaluation results taken as granted.
- H1: The current semester influences the behavior of overvaluation results taken as granted.

Table 9 shows the results of the chi-square test at each crossing.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q4 * P.2-Q1	0,698	0,403	0,0%
P.1-Q4 * P.2-Q2	0,103	0,749	0,0%
P.1-Q4 * P.2-Q3	0,035	0,851	0,0%
P.1-Q4 * P.2-Q4	0,540	0,816	0,0%
P.1-Q4 * P.2-Q5	0,290	0,590	25,0%
P.1-Q4 * P.2-Q6	0,004	0,951	0,0%
P.1-Q4 * P.2-Q7	2,391	0,122	0,0%
P.1-Q4 * P.2-Q8	1,294	0,255	0,0%

Table 9: Chi-square test - Current Semester * Certainty Effect.

In this case, only the result of the chi-square test crossing of P.1-Q4*P2-Q5 was considered statistically unreliable. For all crossings p-value was greater than the significance level of 5%. Therefore, we can conclude that, according to the data obtained in this study, the course semester of Economics in UNITAU where the interviewee was enrolled in the period in which the survey was conducted did not influence the behavior of overvaluation the results taken as granted. We can accept H0 in all experiments.

4.1.5 Professional Experience * Effect Sure

To analyze the influence of professional experience in financial activity (P.1-Q5) in the experiment of certainty effect (P.2-Q1, P.2-Q2, P.2-Q3, P.2-Q4, P.2-Q5, P.2-Q6, P.2-Q7 and P.2-Q8), the following hypotheses were defined:

- H0: Professional experience with financial activity does not influence the behavior of overvaluation of the results taken as granted.
- H1: Professional experience with financial activity does influence the behavior of overvaluation results taken as granted.

Table 10 shows the results of the chi-square test at each crossing.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q5 * P.2-Q1	3,275	0,070	0,0%
P.1-Q5 * P.2-Q2	0,293	0,588	0,0%
P.1-Q5 * P.2-Q3	4,196	0,041	0,0%
P.1-Q5 * P.2-Q4	8,490	0,357	0,0%
P.1-Q5 * P.2-Q5	0,012	0,912	50,0%
P.1-Q5 * P.2-Q6	0,119	0,730	0,0%
P.1-Q5 * P.2-Q7	0,049	0,824	0,0%
P.1-Q5 * P.2-Q8	2,750	0,097	0,0%

Table 10: Chi-square test - Professional experience in financial activity * Certainty Effect.

In this case, only the result of the chi-square test crossing of P.1-Q5 * P.2-Q5 was considered statistically unreliable. The crossing between the answers obtained for P.1-Q5 with the ones for P P.2-Q1, P.2-Q2, P.2-Q4, P.2-Q6, P.2-Q7 and P.2-Q8 the results of the p-value was higher than the level of significance. Therefore, in these experiments was possible to accept H0, i.e. the professional experience in financial activity of the interviewee did not influence the behavior of overvaluation the results considered as certain. The result of the chi-square test in crossing for P.1-Q5*P.2-Q3 showed p-value lower than 5%, so in that case, H1 can be accepted.

4.1.6 Owning Financial Investments * Certainty Effect

To analyze the influence of owning financial investments (P.1-Q6) in the certainty effect of the experiment (P.2-Q1, P.2-Q2, P.2-Q3, P.2-Q4, P.2-Q5, P.2-Q6, P.2-Q7 e P.2-Q8), the following hypotheses were defined:

- H0: Owning some sort of financial investment does not influence the behavior of overvaluation of the results taken as granted.
- H1: Owning some sort of financial investment influences the behavior of overvaluation results taken as granted.

Table 11 shows the results of the chi-square test at each crossing.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q6 * P.2-Q1	0,402	0,526	0,0%
P.1-Q6 * P.2-Q2	0,288	0,591	0,0%
P.1-Q6 * P.2-Q3	0,961	0,327	0,0%
P.1-Q6 * P.2-Q4	0,293	0,588	0,0%
P.1-Q6 * P.2-Q5	0,663	0,415	25,0%
P.1-Q6 * P.2-Q6	2,829	0,093	0,0%
P.1-Q6 * P.2-Q7	3,265	0,071	0,0%
P.1-Q6 * P.2-Q8	0,077	0,782	0,0%

Table 11: Chi-square test – Owning some sort of Financial Investments * Certainty Effect.

In this case, the P.1-Q6*P.2-Q5 crossing failed to produce a result that can be considered statistically reliable in the chi-square test. According to Table 9, no crossing presented a p-value lower than the significance level of 5%. Therefore, we accept H0 in all experiments, that is, we can conclude that the owning financial investments did not influence the behavior of overvaluation of the results taken as granted.

4.1.7 Financial Dependents * Certainty Effect

To analyze the influence of having financial dependents (P.1-Q7) in the certainty effect of the experiment (P.2-Q1, P.2-Q2, P.2-Q3, P.2-Q4, P.2-Q5, P.2-Q6, P.2-Q7 e P.2-Q8), the following hypotheses were defined:

- H0: To have financial dependents does not influence the behavior of overvaluation of the results taken as granted.
- H1: To have financial dependents influences the behavior of overvaluation of the results taken as granted.

Table 12 shows the results of the chi-square test at each crossing.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q7 * P.2-Q1	3,949	0,047	50,0%
P.1-Q7 * P.2-Q2	4,099	0,043	50,0%
P.1-Q7 * P.2-Q3	0,021	0,885	50,0%
P.1-Q7 * P.2-Q4	2,497	0,114	50,0%
P.1-Q7 * P.2-Q5	0,871	0,351	50,0%
P.1-Q7 * P.2-Q6	0,128	0,720	50,0%
P.1-Q7 * P.2-Q7	0,691	0,406	50,0%
P.1-Q7 * P.2-Q8	1,655	0,198	50,0%

Table 12: Chi-square test - Has Financial Dependents * Certainty Effect.

In this case, no results of the chi-square test were considered statistically reliable. We believe that this result was due to the fact that only three of the 65 questionnaires filled reported having financial dependents as response to the question P.1-Q7.

4.1.8 Family Income Level * Certainty Effect

To analyze the influence of the family income level (P.1-Q8) in the certainty effect of the experiment (P.2-Q1, P.2-Q2, P.2-Q3, P.2-Q4, P.2-Q5, P.2-Q6, P.2-Q7 e P.2-Q8), the following hypotheses were defined:

- H0: The income level does not influence the behavior of overvaluation of the results taken as granted.
- H1: The level of income influences the behavior of overvaluation of the results taken as granted.

Table 13 shows the results of the chi-square test at each crossing.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q8 * P.2-Q1	0,830	0,362	0,0%
P.1-Q8 * P.2-Q2	0,001	0,975	0,0%
P.1-Q8 * P.2-Q3	4,221	0,040	0,0%
P.1-Q8 * P.2-Q4	0,934	0,334	0,0%
P.1-Q8 * P.2-Q5	0,008	0,929	25,0%
P.1-Q8 * P.2-Q6	0,031	0,859	0,0%
P.1-Q8 * P.2-Q7	0,269	0,604	0,0%
P.1-Q8 * P.2-Q8	0,077	0,782	0,0%

Table 13: Chi-square test - Family Monthly Income Level * Certainty Effect.

In this case, the results of the chi-square test in the P.1-Q8*P.2-Q5 crossing were considered statistically unreliable. We can see that the results of the chi-square test found in the crossings between the answers obtained in P.1-Q8 and the ones obtained in P.2-Q1, P.2-Q2, P.2-Q4, P.2-Q6, P.2-Q7 e P.2-Q8, have a p-value greater than the significance level of 5% in all these experiences. Therefore, we accept H0 in these cases, concluding that the family income level did not influence the behavior of overvaluation results taken as granted. But in the P.1-Q8 * P.2-Q3, the p-value showed was less than 5%. In this experience, we can accept H1, and conclude that the family income level influences the agentbehavior in this matter.

4.2 Hypotheses Related to Reflection Effect

The hypotheses of this study related to the reflection effect of the Prospect Theory aimed to verify that the interviewees' predetermined variables influenced (H1) or not (H0) the behavior of individuals to loss aversion facing decisions on investment at risk. To achieve this goal, the data obtained in the crossings were made between the answers of the Part 1 of the questionnaire (P.1-Q1, P.1-Q2, P.1-Q3, P.1-Q4, P.1-Q5, P.1-Q6, P.1-Q7 e P.1-Q8) with those obtained in the questions concerning the experiment of the reflection effect on Part 2 (P.2-Q9, P.2-Q10, P.2-Q11 e P.2-Q12) using the SPSS software.

4.2.1 Gender * Reflection Effect

To analyze the influence of gender (P.1-Q1) in the reflection effect of the experiment (P.2-Q9, P.2-Q10, P.2-Q11 e P.2-Q12), the following hypotheses were defined:

- H0: Gender does not influence the loss aversion behavior.
- H1: Gender influences the loss aversion behavior.

Table 14 shows the results of the chi-square test at each crossing.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q1 * P.2-Q9	0,519	0,417	50,0%
P.1-Q1 * P.2-Q10	0,979	0,323	0,0%
P.1-Q1 * P.2-Q11	1,206	0,272	0,0%
P.1-Q1 * P.2-Q12	0,134	0,714	0,0%

Table 14: Chi-square test - Gender * Reflection Effect.

In this case, the results on the chi-square test for P.1-Q1*P.2-Q9 crossing were considered statistically unreliable. No results presented a p-value lower than the significance level of 5%. Therefore, all experiments can accept H0, concluding that gender did not affect the loss aversion behavior.

4.2.2 Age Range * Reflection Effect

To analyze the age influence (P.1-Q2) in the reflection effect of the experiment (P.2-Q9, P.2-Q10, P.2-Q11 e P.2-Q12), the following hypotheses were defined:

- H0: Age does not influence loss aversion behavior.
- H1: Age influences loss aversion behavior.

Table 15 shows the results of the chi-square test at each crossing.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q2 * P.2-Q9	1,419	0,492	50,0%
P.1-Q2 * P.2-Q10	3,076	0,215	0,0%
P.1-Q2 * P.2-Q11	0,416	0,812	25,0%
P.1-Q2 * P.2-Q12	2,008	0,366	0,0%

Table 15: Chi-square test - Age Range * Reflection Effect.

In this case, the results of the chi-square test for the P.1-Q2*P.2-Q9, P.1-Q2*P.2-Q11 were considered statistically unreliable. The results for the crossings between the answers obtained in P.1-Q2 and those obtained in P.2-Q10 and P.2-Q12 did not show a p-value lower than the significance level (5%). We can then conclude that age did not influence the loss aversion behavior in this research, and we can accept H0.

4.2.3 Occupation * Reflection Effect

To analyze the influence of occupation (P.1-Q3) in the reflection effect of the experiment (P.2-Q9, P.2-Q10, P.2-Q11 e P.2-Q12), the following hypotheses were defined:

- H0: Occupation does not influence loss aversion behavior.
- H1: Occupation influences the loss aversion behavior.

Table 16 shows the results of the chi-square test at each crossing.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q3 * P.2-Q9	0,062	0,803	50,0%
P.1-Q3 * P.2-Q10	1,892	0,169	16,7%
P.1-Q3 * P.2-Q11	0,134	0,714	16,7%
P.1-Q3 * P.2-Q12	1,296	0,255	16,7%

Table 16: Chi-square test - Occupation * Reflection Effect.

In this case, the result of the chi-square test for P.1-Q3*P.2-Q9 crossing was considered unreliable, and the other results were considered of low reliability. The results did not show a p-value lower than the significance level (5%). Thus, we can accept H0, concluding that the occupation did not influence the behavior of loss aversion when facing investment decisions in this research.

4.2.4 Semester * Reflection Effect

To analyze the influence of the course semester (P.1-Q4) in the reflection effect (P.2-Q9, P.2-Q10, P.2-Q11 e P.2-Q12), the following hypotheses were defined:

- H0: The course semester influences the loss aversion behavior.
- H1: The course semester does not influence the loss aversion behavior.

Table 17 shows the results of the chi-square test at each crossing.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q4 * P.2-Q9	3,300	0,069	50,0%
P.1-Q4 * P.2-Q10	1,280	0,258	0,0%
P.1-Q4 * P.2-Q11	2,014	0,156	0,0%
P.1-Q4 * P.2-Q12	0,000	0,987	0,0%

Table 17: Chi-square test – Course Semester * Reflection Effect.

In this case, the results of the chi-square test for the P.1-Q4*P.2-Q9 crossing were considered statistically unreliable. The results did not show a p-value lower than the significance level (5%). According to the data showed in Table 15, we can accept H0, concluding that the course semester the interviewee was enrolled in during the time of the research did not influence the risk aversion behavior.

4.2.5 Professional Experience * Reflection Effect

To analyze the influence of professional experience in financial activity (P.1-Q5) in the reflection effect (P.2-Q9, P.2-Q10, P.2-Q11 e P.2-Q12), the following hypotheses were defined:

- H0: Professional experience in financial activity influences the loss aversion behavior.
- H1: Professional experience in financial activity does not influence the loss aversion behavior.

Table 18 shows the results of the chi-square test at each crossing.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q5 * P.2-Q9	2,497	0,114	50,0%
P.1-Q5 * P.2-Q10	1,545	0,214	0,0%
P.1-Q5 * P.2-Q11	3,382	0,066	0,0%
P.1-Q5 * P.2-Q12	1,147	0,284	0,0%

Table 18: Chi-square test – Professional Experience in Financial Activity * Reflection Effect.

In this case, the results of the chi-square test for the P.1-Q5*P.2-Q9 crossing were considered statistically unreliable. According to the data presented in Table 16, none of the results showed a p-value lower that the 5% significance level. Once again, we accept H0, noting that, in this research, professional experience in financial activity did not influence the loss aversion behavior in investment decisions.

4.2.6 Owning Financial Applications * Reflection Effect

To analyze the influence of owning financial investments (P.1-Q6) in the experiment of reflection effect (P.2-Q9, P.2-Q10, P.2-Q11 and P.2-Q12), the following hypotheses were defined:

- H0: Owning some sort of financial investment does not influence their loss aversion behavior.
- H1: Owning some sort of financial investment influences the loss aversion behavior.

Table 19 shows the results of the chi-square test at each crossing.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q6 * P.2-Q9	0,021	0,885	50,0%
P.1-Q6 * P.2-Q10	0,484	0,486	0,0%
P.1-Q6 * P.2-Q11	3,302	0,069	0,0%
P.1-Q6 * P.2-Q12	0,118	0,731	0,0%

Table 19: Chi-square test - Owning some sort of Finance Application * Effect Reflection.

In this case, the results of the chi-square test for the P.1-Q6*P.2-Q9 crossing were considered statistically unreliable. As we can see in Table 17, no p-value lower than the significance level adopted in this study was found in the test. Thus, we can accept H0 and conclude that ownership of financial investments did not influence the loss aversion behavior in this study.

4.2.7 Financial Dependents * Reflection Effect

To analyze the influence of having financial dependents (P.1-Q7) in the reflection effect of the experiment (P.2-Q9, P.2-Q10, P.2-Q11 and P.2-Q12) the following hypotheses were defined:

- H0: To have financial dependents does not influence loss aversion behavior.
- H1: To have financial dependents influences loss aversion behavior.

Table 20 shows the results of the chi-square test at each crossing.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q7 * P.2-Q9	0,451	0,502	75,0%
P.1-Q7 * P.2-Q10	1,035	0,309	50,0%
P.1-Q7 * P.2-Q11	2,074	0,150	50,0%
P.1-Q7 * P.2-Q12	3,171	0,075	50,0%

Table 20: Chi-square test – Having Financial Dependents * Effect Reflection.

In this case, all the results of the chi-square test shown in Table 18 were considered statistically unreliable. We believe that this result was due to the fact that only three of the 65 questionnaires filled reported having financial dependents as response to the question P.1-Q7.

4.2.8 Family Income Level * Reflection Effect

To analyze the influence of family income level (P.1-Q8) in the experiment of reflection effect (P.2-Q9, P.2-Q10, P.2-Q11 and P.2-Q12) the following hypotheses were defined:

- H0: The income level does not influence loss aversion behavior.
- H1: The income level influences loss aversion behavior.

Table 21 shows the results of the chi-square test at each crossing.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q8 * P.2-Q9	0,021	0,885	50,0%
P.1-Q8 * P.2-Q10	0,035	0,851	0,0%
P.1-Q8 * P.2-Q11	0,019	0,890	0,0%
P.1-Q8 * P.2-Q12	3,612	0,057	0,0%

Table 21: Chi-square test - Family Monthly Income Level * Reflection Effect.

In this case, the results of the chi-square test for the P.1-Q8*P.2-Q9 crossing were considered statistically unreliable. According to Table 19, no p-value lower than the level of significance was found in the test, and we accept H0. That is, the family income level did not influence the loss aversion behavior in this research.

4.3 Hypotheses Regarding the Isolation Effect

The hypotheses of this study related to the isolation effect of the Prospect Theory aimed to verify that the interviewees' predetermined variables influences (H1) or not (H0) individuals' behavior to simplify investment decisions isolating information. To achieve this objective, the data obtained in the crossings were made between answers from Part 1 of the questionnaire (P.1-Q1, P.1-Q2, P.1-Q3, P.1-Q4, P.1-Q5, P.1-Q6, P.1-Q7 and P.1-Q8) with those obtained to questions concerning the experiment of isolation effect in Part 2 (P.2-Q13, P.2-Q14, P.2-Q15 and P.2-Q16) using the SPSS software.

4.3.1 Gender * Isolation Effect

To analyze the gender influence (P.1-Q1) in the experiment of isolation effect (P.2-Q13, P.2-Q14, P.2-Q15 and P.2-Q16), the following hypotheses were defined:

- H0: Gender does not influence the behavior of simplifying decisions by isolating information.
- H1: Gender influences the behavior of simplifying decisions by isolating information.

Table 22 shows the results of the chi-square test at each crossing.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q1 * P.2-Q13	0,001	0,975	0,0%
P.1-Q1 * P.2-Q14	0,780	0,377	0,0%
P.1-Q1 * P.2-Q15	3,232	0,072	0,0%
P.1-Q1 * P.2-Q16	3,891	0,049	0,0%

Table 22: Chi-square test - Gender * Isolation Effect.

In this case, all the results of the chi-square test were considered statistically reliable. For the crossings between the answers obtained in P.1-Q1 and those obtained in P.2-Q13, P.2-Q14, P.2-Q15 and P.2-Q16, the p-value found in each experiment was greater than the significance level (5%). Thus, we note that, for these crossings, gender did not influence the behavior of simplifying decisions by isolating information. Since the result of the P.1-Q1*P.2-Q16 crossing, the p-value was lower than that (almost equal to) the 5% significance level. Therefore we can accept H1 in this experiment, concluding that in this matter the gender influenced the behavior consisting with the isolation effect.

4.3.2 Age Range * Isolation Effect

To analyze the age influence (P.1-Q2) in the experiment of isolation effect (P.2-Q13, P.2-Q14, P.2-Q15 e P.2-Q16), the following hypotheses were defined:

- H0: Age does not influence the behavior of simplifying decisions by isolating information.
- H1: Age influences the behavior of simplifying decisions by isolating information.

Table 23 shows the results of the chi-square test at each crossing.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q2 * P.2-Q13	0,655	0,721	0,0%
P.1-Q2 * P.2-Q14	0,023	0,988	0,0%
P.1-Q2 * P.2-Q15	3,298	0,192	0,0%
P.1-Q2 * P.2-Q16	0,189	0,910	0,0%

Table 23: Chi-square test – Age Range * Isolation Effect.

In this case, all the results of the chi-square test were considered statistically reliable. According to the data presented in Table 21, no crossing presented a p-value lower than the significance level of 5%. Therefore, we can accept H0 and consider that age did not influence the behavior of simplifying decisions by isolating information.

4.3.3 Occupation * Isolation Effect

To analyze the influence of occupation (P.1-Q3) in the experiment of isolation effect (P.2-Q13, P.2-Q14, P.2-Q15 and P.2-Q16), the following hypotheses were defined:

- H0: Occupation does not influence the behavior of simplifying decisions by isolating information.
- H1: Occupation influences the behavior of simplifying decisions by isolating information.

Table 24 shows the results of the chi-square test at each crossing.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q3 * P.2-Q13	1,534	0,215	16,7%
P.1-Q3 * P.2-Q14	0,003	0,956	16,7%
P.1-Q3 * P.2-Q15	0,011	0,917	16,7%
P.1-Q3 * P.2-Q16	0,008	0,927	16,7%

Table 24: Chi-square test – Occupation * Isolation Effect.

In this case, all the results were considered of low statistical reliability. In none of the crossing a p-value lower than the 5% significance level was found. We can then consider that the occupation did not influence the behavior of simplifying decisions by isolating information, H0 being acceptable.

4.3.4 Semester * Isolation Effect

To analyze the influence of the course semester (P.1-Q4) in the experiment of isolation effect (P.2-Q13, P.2-Q14, P.2-Q15 e P.2-Q16) the following hypotheses were defined:

- H0: The course semester does not influence the behavior of simplifying decisions by isolating information.
- H1: The course semester influences behavior to simplify decisions by isolating information.

Table 25 shows the results of the chi-square test at each crossing.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q4 * P.2-Q13	0,001	0,981	0,0%
P.1-Q4 * P.2-Q14	2,499	0,114	0,0%
P.1-Q4 * P.2-Q15	2,148	0,143	0,0%
P.1-Q4 * P.2-Q16	0,513	0,474	0,0%

Table 25: Chi-square test – Current Semester * Isolation Effect.

In this case, all results were considered of high statistical reliability. In all crossing were found a p-value greater than the significance level of 5%. We can then consider the semester in which the interviewee was enrolled in the course of Economics at UNITAU during the application period of the questionnaires did not influence the behavior of simplifying decisions b isolating information, accepting H0 in all questions.

4.3.5 Professional Experience * Isolation Effect

To analyze the influence of professional experience with financial activity (P.1-Q5) in the experiment of isolation effect (P.2-Q13, P.2-Q14, P.2-Q15 e P.2-Q16) the following hypotheses were defined:

- H0: Professional experience with financial activity does not influence the behavior of simplifying decisions by isolating information.
- H1: Professional experience with financial activity influences the behavior of simplifying decisions by isolating information.

Table 26 shows the results of the chi-square test at each crossing.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q5 * P.2-Q13	2,870	0,090	0,0%
P.1-Q5 * P.2-Q14	0,308	0,579	0,0%
P.1-Q5 * P.2-Q15	0,027	0,870	0,0%
P.1-Q5 * P.2-Q16	0,056	0,813	0,0%

Table 26: Chi-square test – Professional Experience in Financial Activity * Isolation Effect.

In this case, all the results of the chi-square test were considered statistically reliable. In all crossings a p-value greater than the significance level of 5% was found. In this way, we can accept H0 and consider that professional experience with financial activity did not influence the behavior of simplifying investment decisions by isolating information.

4.3.6 Owning Financial Applications * Isolation Effect

To analyze the influence of owning financial investments (P.1-Q6) in the experiment of isolation effect (P.2-Q13, P.2-Q14, P.2-Q15 and P.2-Q16) the following hypotheses were defined:

- H0: Owning some sort of financial investment does not influence the behavior of simplifying decisions by isolating information.
- H1: Owning some sort of financial investment influences the behavior of simplifying decisions by isolating information.

Table 27 shows the results of the chi-square test at each crossing.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q6 * P.2-Q13	1,597	0,206	0,0%
P.1-Q6 * P.2-Q14	0,031	0,861	0,0%
P.1-Q6 * P.2-Q15	4,485	0,034	0,0%
P.1-Q6 * P.2-Q16	0,830	0,362	0,0%

Table 27: Chi-square test – Owning Some Sort of Financial Investment * Isolation Effect.

In this case, all the results of the chi-square test were considered of high statistical reliability. The p-value found in the P.1-Q6*P.2-Q15 crossing was less than the significance level of 5%, that is, we can accept H1 in this question, and testify that owning some sort of financial investment influenced the behavior consistent with the isolation effect. In the other crossings presented in the table the results of the chi-square test were higher than the level of significance, so we can accept H0 in these experiments.

4.3.7 Financial Dependents * Isolation Effect

To analyze the influence of having financial dependents (P.1-Q7) in the isolation effect of the experiment (P.2-Q13, P.2-Q14, P.2-Q15 and P.2-Q16) the following hypotheses were defined:

- H0: Having financial dependents does not influence the behavior of simplifying decisions by isolating information.
- H1: Having financial dependents influences the behavior of simplifying decisions by isolating information.

Table 28 shows the results of the chi-square test at each crossing.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q7 * P.2-Q13	0,519	0,471	50,0%
P.1-Q7 * P.2-Q14	0,022	0,882	50,0%
P.1-Q7 * P.2-Q15	1,899	0,168	50,0%
P.1-Q7 * P.2-Q16	0,780	0,377	50,0%

Table 28: Chi-square test – Having Financial Dependents * Isolation Effect.

In this case, the results of the chi-square test were considered statistically unreliable. We believe that this result was due to the fact that only three of the 65 questionnaires filled reported having financial dependents as response to the question P.1-Q7.

4.3.8 Family Income Level * Isolation Effect

To analyze the influence of family income (P.1-Q8) in the experiment of isolation effect (P.2-Q13, P.2-Q14, P.2-Q15 and P.2-Q16) the following hypotheses were defined:

- H0: The income level does not influence the behavior of simplifying decisions by isolating information.
- H1: The income level influences the behavior of simplifying decisions by isolating information.

Table 29 shows the results of the chi-square test at each crossing.

Questions	Value	Meaningful Significance (2 sides)	Cells with expected count < 5
P.1-Q8 * P.2-Q13	0,062	0,804	0,0%
P.1-Q8 * P.2-Q14	5,071	0,024	0,0%
P.1-Q8 * P.2-Q15	4,697	0,030	0,0%
P.1-Q8 * P.2-Q16	1,319	0,251	0,0%

Table 29: Chi-square test – Family Monthly Income Level * Isolation Effect.

In this case, all the results of the chi-square test were considered statistically reliable. In the results for the P.1-Q8*P.2-Q13 and P.1-Q8*P.2-Q16 crossings, the p-value was greater than the significance level of 5%. Thus, we can accept H0 in these experiences, and conclude that these questions the family monthly income level did not influence the behavior of simplifying the investment decisions by isolating information. In the results found in the P.1-Q8*P.2-Q14 and P.1-Q8*P.2-Q15 crossings, the p-value was lower than the significance level. Given these results, we can accept H1, whereas the family monthly income level influenced the behavior regarding the isolation effect in these hypothetical investments situations.

5. FINAL REMARKS

The primary function of the economist is to analyze the economic environment that surrounds them. Given the above, we conclude that the study of human behavior in the field of Economics is relevant, so we can understand better and better the actual behavior of economic agents and their influence on the market composed by them. We can also conclude that this research became important to have sought the primary data needed for the analysis of the theoretical content in question from the students of Economics at UNITAU, i.e., among individuals who are academic and professional involved with issues of the economic area.

The findings of the research were satisfactory and surprising. The biases of the Prospect Theory were proven in the sample used, which reinforces the importance of behavioral studies for the training of investors, helping them handle the called "behavioral traps" that interfere with new investors staying in the market. In what regards the hypotheses tested, it was surprising not to find a significant influence, at least not statistically, of the pre-determined variables selected for this study on the behavior of agents facing investment decisions. Perhaps the result has taken place due to the practically homogeneous profile of the sample, if the same tests were made with other samples, different results could be obtained. What is also surprising, since among people with similar profile it was possible to obtain different answers.

Regarding the limitations of the research, it is said that as the survey was conducted in the form of questionnaire, interviewees may not have given the same thought to issues that they would if they were related to real monetary values. Therefore, it is possible that some of the students interviewed would take different decisions when involved with real investments, not hypothetical ones.

Another limitation found in the research was related to the application of the questionnaires. Of the 68 students enrolled in the course of Economics at University of Taubaté in the school year 2014, it was possible to obtain only 65 complete questionnaires. Of the three students who did not participated in the survey, one is the author of this work and two refused to complete the questionnaire.

To contribute to the development of work on Behavioral Finance and the Prospect Theory, this study leaves inquiries for future researches. Thus some recommendations are presented:

- The chi-square test detects if there is a significant association between two predetermined variables; however, it does not determine how strong this association may be (FIELD, 2009). Therefore, it was considered important, for future studies, to consider Φ and Cramer's V in the analysis of the results, to measure the degree of association between the variables if the hypothesis H1 is accepted in some analysis. According to Field (2009), Φ is calculated by the square root of dividing the value of chi-square by the sample size. If the variables have two categories, the values of Φ and Cramer's V are identical, but if a variable has more than two categories, we use the Cramer's V coefficient, restricted between 0 and 1 (FIELD, 2009). These coefficients can also be obtained using the SPSS software.
- It is considered equally important, for future studies, to choose a more heterogeneous sample, which best meets the various categories of predetermined variables such as family income level, age range and responsibility for financial dependents in a most segregated way.

Finally, it is possible to affirm that the present study on Modern Finance and the behavior of individuals facing risky investment decisions was enriching, by producing documentation that may be useful for future researches on the subject and contributed satisfactorily to the production of knowledge in Economics.

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