Università
Ca'Foscari
Venezia

Corso di Laurea Magistrale

in Economia and Finanza

Curriculum Finance, EM20 Finance

(ordinamento 2018)

Tesi di Laurea

The Decision-Making Process and its application on Supplementary Pension Plans

Relatore
Ch. prof.ssa Caterina Cruciani

Laureando
Tommaso Decataldo
Matricola 858005

PREMISES

It is my duty to dedicate this space of my work to explain why I chose this topic and the reasons why this is so important to me. This thesis is based on a project in which I am personally involved, in fact, thanks to my internship experience, I chose a career in the field of insurance and financial consultancy services. This amazing opportunity helped me to develop professional skills, competences and financial knowledge that is required for the field of financial and insurance advisory. The project of the agency in which I currently work involves an integrated consultancy advisory service which looks at clients in a holistic way. Within the agency, my professional figure covers the role of the protection advisor specialized to the branch of Supplementary Pension Plans. This pushed me to enhance my interest about the topic. Therefore, I decided to base my thesis on this personal job experience, in particular, the way individuals behave in front of such a financial decision choice concerning their future economic wealth.

I learnt that a fundamental part of the role of the advisor is to make people aware of responsible choices they can make, especially concerning their future. Supplementary Pension Plans concern everyone, in particular young people whose necessity to develop great amount of savings is a compelling issue considering the poor public pension forecasts nowadays. The focus of my thesis addresses individuals' financial decision process and, in particular, it investigates the role of bias and behavioral aspects that people have toward this type of financial choice. The way to becoming an advisor is extremely tough. Indeed, dealing with clients' emotion and mental errors made me experiencing part of the topics I will present in the first place.

I want to dedicate this work to the people who have contributed, with their tireless support, to its realization. A special thanks to my colleagues at the Stocchero & Partners, especially to engineer Vittorio and Sabrina for their help in improving my professional career. Thanks also to all my friends who have always supported me, Laura, Angelica, Martina, Valentina, Gennaro, Francesco and Mattia. Last but most important, I dedicate this work to Patrizia and Cosimo who love me and constantly give me the strength to go on no matter what.

INDEX

INTRODUCTION..... 6
FIRST PART: Behavioral Finance, from the investor to the advisor..... 8
CHAPTER 1: Investors' Behavior..... 9
1.1 Introduction 9
1.2. The Decision-Making Process 9
1.3. Behavioral Finance: The Non-Rational Investor 11
1.3.1. Intertemporal Choices and Hyperbolic Discounting..... 13
1.3.2. Emotions and Moods 16
1.3.3. Heuristics and Biases..... 19
1.3.4. Heuristics Alternative Approach 25
1.5. The Prospect Theory..... 27
1.6. The Portfolio Theory 31
1.7. Conclusion..... 34
CHAPTER 2: Financial Literacy..... 35
2.1 Introduction 35
2.2. The Importance of Financial Literacy in The Market..... 35
2.3. Measuring Financial Literacy..... 37
2.2.1. Financial Literacy: the geographical factor..... 39
2.2.2. Financial Literacy: the age factor..... 40
2.2.3. Financial Literacy: the gender factor 41
2.4. Literacy and Information..... 42
2.5. Costs of Financial Illiteracy 44
2.6. Addressing the lack of Financial Knowledge 45
2.7. Conclusion..... 47
CHAPTER 3: Literature on the Financial Advisor 48
3.1. Introduction 48
3.2. The Advisor as Money Doctor 48
3.2.1. Informational Role..... 51
3.2.2. Defusing Biases Role..... 51
3.2.3. Facilitate Cognition and Overcoming Affective Issues Role 52

3.2.4. Mediating Role 52
3.3. Techniques for the Debiasing Process 52
3.4. The role of Trust 54
3.4.1. Losing Trust in Money Doctor 56
3.4.2. Pandering or Contrasting Investors 57
3.4.3. Practical Capital Allocation 58
3.5. Conclusion 60
SECOND PART: Behavioral Theory on Supplementary Pension Plans 61
CHAPTER 4: Supplementary Social Security 62
4.1. Introduction 62
4.2. Pension Plans in Italy 62
4.3. Italian Regulation on Supplementary Social Security 65
4.4. Forms of Supplementary Social Security 67
4.5. Advantages of Supplementary Pension Plans 70
4.5.1. Fiscal Benefits 70
4.5.2. Tax Benefits 71
4.5.3. Higher Returns and Costs 72
4.6. Cash Out Operations 73
4.7. Transfer Operations 74
4.8. Advances Operations 75
4.9. Conclusion 77
CHAPTER 5: Behavioral Considerations of Supplementary Pension Plans 78
5.1. Introduction 78
5.2. Supplementary Pension Plans and Biases 78
5.3. Present Bias and Self-Control 79
5.4. Home Bias and Familiarity 81
5.5. Myopic Loss Aversion and Mental Accounting 84
5.6. Overconfidence 85
5.7. Herd Behavior 86
5.8. Conclusion 87
THIRD PART: Empirical Analysis on Supplementary Pension Plan 89
CHAPTER 6: Empirical Analysis 90
6.1. Introduction 90
6.2. Survey descriptive analysis 91
6.2.1. The objective of the survey 93

6.2.2. Demographic information 94
6.2.3. Financial literacy 97
6.2.4. Financial risk tolerance 101
6.2.5. Heuristics and bias 104
6.2.6. Choice of Supplementary Pension Plans 110
6.3. Empirical Observations 120
6.3.1. Gender and supplementary pension plans 122
6.3.2. Income and supplementary pension plans 123
6.3.3. Financial knowledge and its relation with biases and propension to risk 124
6.3.4. Repercussion on the choice of supplementary pension plan 126
6.4. Consideration of the empirical work 130
CONCLUSION 132
BIBLIOGRAPHY 137

INTRODUCTION

When people find themselves in front of a situation where they have to make a choice, whether it is a financial one or not, there are several factors, psychological, emotional, and also patterns related to the knowledge, which characterize their final decision. Therefore, the study of choices in situations of uncertainty touches upon a multitude of spheres that combined help individuals to come up with solutions to their problems. This observation is acceptable for financial choices too. Indeed, uncertain situations perfectly mirror financial decisions which individuals are likely to take throughout their lives. In particular, maybe the most fundamental financial choice concerns where to allocate savings for the future. As for every financial choice, people tend to follow their guts and, most of the time, they misperceive important opportunities that can provide higher results.

This work aims to identify behavioral errors and to analyze the usefulness of financial education in correcting these errors that influence individuals' choices. It is now commonly thought that investors do not behave fully rationally during the process of asset allocation. Individuals do not follow classical utility theory axioms following the perfect rationality and respecting the principles of the perfect efficiency of the markets. Instead, individuals seem to be victims of cognitive and emotional errors, biases, and heuristics, which push them away from an optimal financial choice. In classical utility theory, this optimal choice would translate into the homo economicus who is perfectly rational and able, by definition, to correctly use all the information available to make decisions that maximize his objective function. This utopian figure has been exploited by economists to formulate elegant theories on financial choices in conditions of uncertainty. Classical theories have little consistency with reality, namely, these are far away from the daily representation of financial decision-making process.

A relatively new field called Behavioral Finance developed, over the years, a new approach based on empirical pieces of evidence and cognitive foundations which have allowed economists to explain attitudes and behaviors of investors inside the market. Empirical data denied the possibility of individuals to be perfectly rational and thus,

classical economic theories reduce to just a portrait that provides guidelines to what people would theoretically do in a perfect world. Behavioral Finance bases its work on the different ways individuals consistently violate rational reasoning.

This thesis will discuss the crucial role of biases that affect individuals' decisional process and it will address these cognitive mistakes toward a very fundamental kind of financial decision. The retirement planning and supplementary pension plan decision are extremely relevant, especially in Italy. Indeed, the combination of demographical and educational patterns is worsening the Italian public pension system. To face this emergency, the government has established regulations on supplementary pensions system which allow individuals to accumulate savings in order to integrate the continuously reduced public pension. Consequently, people who evaluate this financial decision have to deal also with behavioral and cognitive errors making the retirement capital accumulation process biased by several aspects.

The first part of this work will discuss the decisional-making process, behavioral and cognitive errors by considering the detachment from the classical theories. Furthermore, the thesis will also consider the importance of financial knowledge and literacy which are fundamental characteristics that can affect individuals' decisions. Another important topic concerns the role of the advisor who acts such as a doctor who can help decision-makers to make responsible financial decisions.

Next, the second part will be devoted to presenting the Italian regulation on supplementary pension plans and highlighting what are their main advantages and how individuals' cognitive errors may lead people to miss such an important opportunity. In particular, this part will also address principal biases to the saving for retirement decisional process.

Concluding this work, it will be presented a survey based on the analysis of a group of participants focusing on the way these deal with behavioral cognitive errors, their level of financial literacy and whether or not they have a supplementary pension plan. The objective of this survey aims to identify and prove consistency with financial literature about behavioral and emotional aspects that characterize this particular financial choice. The empirical analysis will put in relationship several aspects that this thesis will discuss and it will asses whether it is possible to detect differences between participants who actually adopted a supplementary pension plan and participants who do not.

FIRST PART: Behavioral Finance, from the investor to the advisor

CHAPTER 1: Investors' Behavior

1.1 Introduction

Nowadays, individuals' behavioral aspect under uncertainty and riskiness is a very hot topic concerning the financial world. According to intrinsic characteristics and contextual circumstances, the ways individuals react in front of decisions are extremely different from one to another. This is the case of the financial world in which people are asked to decide whether to invest their personal wealth. These actions involve a *decision-making process* which is the most common thing individuals' do in their every-day lives.

Therefore, the behavior has a fundamental role inside individuals' minds since it is able to affect the way people perceive reality. This first part will discuss the investigation in the field of behavioral finance involving concepts such as emotions and heuristics. Furthermore, this chapter will analyze the most important seminal behavioral theory (*Prospect Theory)* and the way it detaches from the classical economic model (*Expected Utility Theory*). The scope of this first chapter is to provide the reader knowledge about how individuals deal with uncertainty and risky choices, in particular regarding the financial sector where investing is the perfect representation of these types of *decision-processes*.

1.2. The Decision-Making Process

When individuals find themselves in a situation where they must make a choice, there are several factors: psychological, sociological, and related to personal knowledge, which combined together allow the decision-maker to achieve a final decision. The *decision-making process* refers to all those cognitive activities resulting in the selection of a belief or a course of action among several possible available options. The topic of decision-making theory is shared by many disciplines, from mathematics and statistics, through economics and political science, to sociology and psychology *(Kahneman e*

Tversky, 1983). The decision-making process is the result of a mental activity inside individuals' minds when they are asked to choose one option with respect to another one. This discipline bases its analysis on the decision-maker (the individual) which, in finance, translates with the term investor. In particular, the financial decision-making process gathers psychology and economics under one single roof by focusing on situations of risk and uncertainty. Nonetheless, financial choices are mainly characterized by risk, making investors unsure about the possible outcomes they can have in the future.

In the past, economists have developed economic models that prescribed the way individuals choose under conditions of risk and uncertainty. Traditional economic theories assume that individuals' choice is based on final states. According to the Utilitarian vision of the world, individuals would not follow fictional constructions, but rather, they would act according to precise axiomatic rules and fixed preference structures. The founder of Utilitarianism *(J. Bentham, 1789)* defines the *Utilitarian Ethical Theory* as a way to determine right from wrong by focusing on outcomes. In fact, with Utilitarian terms, the concept of right directly translates to the idea of rationality which enables economic models to define how individuals should act inside the economic environment.

Economists Modigliani and Miller provide an interesting description of the rational investor. According to the authors, rational investors always prefer more wealth to less. For this reason, the rational decision-maker is indifferent to an increment of its wealth due to the form of cash payments or to an increase in the market value of their holdings of shares *(Miller and Modigliani, 1961).* Thus, it can be inferred that rational investors' only objective is to get to the desired wealth level without taking into consideration the way or even the means to get this result.

Rationality is the central theme of classical models concerning decision-making. Neumann and Morgenstern (1944) on the *Expected Utility Theory* (EUT) and *Measurement Theory* is maybe the most known classical economic model used to assess decisions under risk. This model describes situations concerning individuals' preferences with regard to choices that have uncertain outcomes. EUT works straightforwardly. Indeed, the rational decision-maker has a fixed set of preferences which are also known axioms. These allow the individual to compare all available options leading to a unique choice that maximizes his/her utility. The whole model is based on utility maximization, which simply refers to an index number that represents the level of satisfaction the rational decision-maker has

to select that choice. The model takes advantage of the personal preferences of the individual by also taking into consideration the relative probability of that outcome.

EUT can allow for graphical representation of the choice made. The *utility function* is the formal tool that can represent the values of the maximum level of Utility obtain by choosing that option. Moreover, according to the risk propensity of the individuals, it is possible to identify three main ways of approach risk. Being risk-averse refers to the situation in which individuals tend to shy away from risky options and stick with what is surer. Risk-neutrality is the situation in which individuals are indifferent between the risky option and the safer one. Risk-seeking is the exact opposite of risk-averse individuals, which might be identified as the gambler. This powerful model represents both a normative and descriptive theory. Normative, because it can be used as a tool to define benchmarks of optimal behavior according to rationality and also. Descriptive, because it allows us to build up, through a series of parameters, a model that represents the main characteristics of the individual's choice.

This classical economic theory bases on axiomatic rules making the decision-making process linear and easy to compute. Indeed, the easiness of Utility Maximization comes extremely useful when the EUT constraints are observed. However, this axiomatic structure, which will better be discussed later, started to be challenged. In *1953*, *Maurice Allais*' empirical investigation started to question the consistency of EUT assumptions by making room for new ways to approach the valuation of decisions under uncertainty.

As a consequence, an increasing interest in the investigation concerning individuals' deviations from classical models took off during the 50s. Both psychologists and economists started to assess through empirical evidence new aspects of individuals' perception of risk and the way they choose their optimal choice. This gave birth to the field called Behavioral Economics and Behavioral Finance.

1.3. Behavioral Finance: The Non-Rational Investor

Nowadays, Behavioral Finance (BF) is a relatively new field that incorporates different perspectives drawn from psychology and economics. BF attempts to explain investors' behavior and to provide answers concerning investors' decision-processes including several implications that affect the financial market. This subject focuses on investors' deviations from Utilitarian models. In fact, over the years, BF has proved

through empirical pieces of evidence that investors are principally driven by intrinsic human features that make them fail the classical approach of decision-making.

BF has introduced a very deep detachment from the full rationality prescribed by classical models. According to behavioral theories, two fundamental laws govern the behavior of the rational agent: *The law of large numbers* and the *Bayes rule*. These two laws are the two cardinal pillars of a full rational behavior since they allow to prescribe a correct inference from a statistical perspective. The law of large number asserts that true inference on an event can only be made when the sample size is very large or close to the number of the actual population. Instead, the Bayes rule represents how rational agents should process the information. This latter refers to the way individuals should refine a probabilistic estimate as more evidence or information becomes available. Thus, BF first questioning exactly started from the empirical analysis on the observation of these two laws concerning individuals' decision-making.

Consequently, behavioral scholars started to hypothesize whether individuals follow these two probabilistic theories or whether there was more take into consideration. Psychologists such as *Kahneman and Tversky (1971)* asserted that empirical evidence points out that systematic human violations lead individuals to act in a non-completely rational way demonstrating that reality is completely detached from classical economic models. Evidence reveals that classical theory does not consider psychological benefits and costs the human mind feels under uncertainty. *Statman (2019)* explains that possession of wealth that makes us financially comfortable and economically wealthy does not necessarily provide peace of mind. This implies that individuals' necessity to be free from the pressure of uncertainty is an essential condition that justifies systematic violations in the real world.

A great contribution to behavioral theories was given by the seminal work of Kahneman and Tversky during the 1970s. The authors collected empirical evidence proving that individuals do not need statistical rules to select their choice. Evidence proves that people do not rely upon statistical inference and complex calculations to achieve the outcome.

The chapter will continue the discussion about individuals' systematic violations experienced during their decisional process by analyzing a very fundamental aspect starting with the concept of non-constant time discounting and the way decision-makers face intertemporal choices.

1.3.1. Intertemporal Choices and Hyperbolic Discounting

The idea behind intertemporal choices is that individuals, given two similar prizes, tend to assess different values depending on how much time separates these two. Empirical evidence shows that decision-makers prefer the reward which arrives sooner rather than the one that arrives later. Thus, intertemporal decisions imply tradeoffs between current and future rewards. A typical example represents young workers who need to save part of their income to boost their quality of life during retirement. In fact, retirement planning is a typical representation of intertemporal choice and it is also a concrete problem for young individuals nowadays.

As an implication, individuals confront a wide range of choices that involve tradeoffs on a time horizon. To evaluate such a tradeoff between today's consumption and future savings, decision-makers compare the costs and benefits of activities that occur at different dates in time *(Laibson, 2003)*.

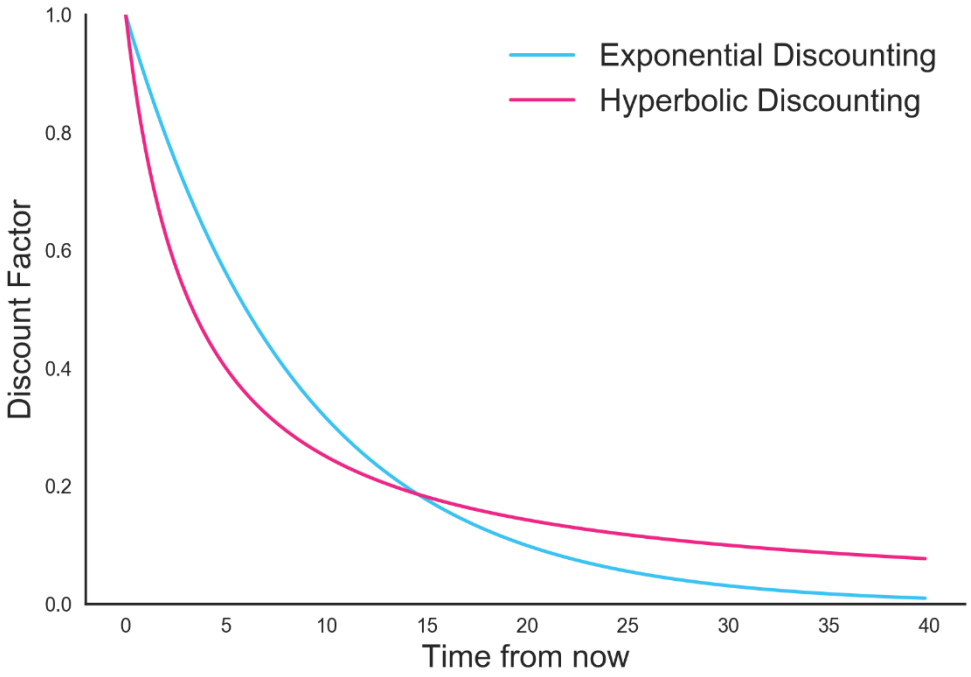
A typical pattern that characterizes an intertemporal choice consists of the *d*elay effect. Indeed, a delayed prize might result riskier since the decision-maker has a higher chance to die before the prize is experienced. Moreover, delayed rewards are more abstract than current rewards, hence, a decision-maker may not be able to appreciate or evaluate their full impact in advance *(Laibson, 2003)*.

From the early twentieth century, economists implemented the theory of *Discounted Utility*[1] to study this typology of the decision-making process. This theory provides several models that evaluate such delayed payoffs between two or more available choices. *Hepburn and Duncan (2010)* assert that Intertemporal Discounting Models formalize these tradeoffs by quantifying the values of delayed payoffs. According to *Laibson (2003)*, the Discounted Utility Model has a normative and positive content. It has been proposed as both a description of what people should do to maximize their well-being and to describe what people do when facing intertemporal decisions. Therefore, according to Discounted Utility Model, as the financial market discounts gains and losses over an amount of time, decision-makers evaluate the pleasure and pain resulting from the choice they are going to adopt. This Discounting Utility Model, as in financial models,

[1] *The discounted utility is the utility (desirability) of some future event, such as consuming a certain amount of a good, as perceived at the present time (Samuelson, 1937).*

adopts the economic *Exponential Discounting*[2] which implements a constant discount rate. Exponential discount is time-insensitive, indeed, given an infinite time divided by N equal intervals, the discount rate would decline by a half period by period (*Figure 1.1).*

Figure 1.1. Exponential Discounting function versus the Hyperbolic Discounting function



The graph represents the exponential discounting function. On the x-axis, there is the time horizon and on the y-axis the discount rate. This representation shows the constant declining trend the exponential discounting function has over time. It continues toward infinite approaching but not touching zero. Instead, the Hyperbolic function does not approach toward zero, it declines slowly because of inconsistency in preferences.

Conventionally, classical discounted utility models like *Samuelson's (1937)* use *the constant discount rate* (exponential) to assess the value of the choice. Over the years, pieces of empirical evidence and analyses on this topic doubted the validity of this assumption. Indeed, the hypothesis of constant discounting has been gradually substituted by the literature on hyperbolic discounting.

The Hyperbolic Discounting Approach *(Figure 1.1.)* rose because of several critiques the exponential one received over the years. The most important critique

[2] *Exponential discounting implies that the marginal rate of substitution between consumption at any pair of points in time depends only on how far apart those two points are. Its main assumption is the property of dynamic consistency, namely, preferences are constant over time (The New Palgrave Dictionary of Economics).*

concerns the fact that in very long-time events people have showed inconsistency in making their choice about the reward. If decision-makers would implement an exponential discount factor to an environmental long lead time, there will be no rationale by which they would make significant sacrifices today for benefits that do not show up until several generations later. According to the Hyperbolic Discounting method, valuations fall relatively rapidly for earlier delay periods but then fall more slowly for longer delay periods *(Hepburn and Duncan 2010).*

Hyperbolic Discounting has a great impact on temporary preferences. Pieces of evidence detected biases, indeed, individuals using hyperbolic discounting reveal that they tend to do inconsistent choices over time. Because of a non-constant discounting factor, they select choices today that they would not have made in the future, despite holding the same information *(Hepburn and Duncan, 2010).*

There must be great attention regarding timing valuation and intertemporal decision-making process. As previously reported, retirement planning mirrors exactly the problem that concerns this topic. The fact that individuals might underestimate its importance is a form of bias that is captured by a misperception of value over time. The Hyperbolic discounting makes individuals present bias, thus, today's rewards (even if it is lower) have a higher weight with respect to future rewards. However, discounting inconsistency shows that when it is offered two rewards (with little difference between these two and the one with the greatest value a day after the other one) in a year from now, decision-makers will choose the higher reward, hence, waiting a year and a day. Thus, this makes their decision inconsistent with what they would choose in the present. This descriptive example can be implemented in several other similar representations and the conclusion would be always the same.

Therefore, intertemporal decisions are very crucial concerning topics such as savings choices. Individuals show indifference in their decision when a long-time horizon is considered. Additionally, there are other systematic violations individuals experience during their decisional process. The emotional sphere represents a building block that will help to define the way individuals act and react when they are facing uncertainty and risk.

1.3.2. Emotions and Moods

Emotions are defined as a set of conscious mental reactions subjectively experienced as strong feelings. The *Oxford Dictionary* adds that emotions derive from one's circumstances, moods, instead, are responses to significant internal and external circumstances. The Darwinian Evolutionary Theory defines emotions as a genetic heritage that human beings developed over the centuries. Thus, the way individuals behave and act refers to the direct result of all intrinsic features individuals developed over the years to survive this world.

Benjamin Graham (1949) in his book *"The intelligent investor"* asserts how enthusiasm may have an extremely positive effect in accomplishing real-life problems. However, as the author stated: "*enthusiasm and Wall Street invariably leads to disaster*". People harshly perceive features such as enthusiasm as an extremely harmful tool when they consider an investment option rather than another one. Indeed, negative implications occur when emotions are involved in the decision-making process.

For instance, enthusiasm has the power to make individuals see through rose-colored glasses, thus it may lead to a misperception of reality making individuals more prone to undertake risky choices. An example might refer to the situation in which an individual buys a winning lottery ticket. The emotional sphere will come into place and the enthusiasm will lead him/her to choose to risk again. From this general example, it is not possible to explain why this happens. Everyone at least once experienced this situation, however, to give an answer, psychologists and medicine can help.

Thanks to the advances in medicine, neurologists such as *Antonio Damasio* developed analyses and carried out experiments on the impact the emotional sphere has on human brains and the decision process. Behavioral neurologists focus on all the processes that happen inside the human brain, especially the focus on the neural systems which underlie emotions, memory, decision-making, language and also consciousness. *The Somatic Marker Hypothesis* provided by *Damasio et al. (2000)* explains how bioregulatory signals, including those that constitute feelings and emotions, are fundamental for the decision process. More specifically, individuals learn back from previous experiences by building a *factual-emotional set*[3] in which inventors remember

[3] *A. Bechara, H. Damasio and A.R. Damasio (2000). Emotion, Decision Making and The Orbitofrontal Cortex, pp 297.*

what they learned and emotions are part of their future choice in accordance with their experiences. As *Damasio et al. (2000)* proposed, economic theory is modeled without any influence of the emotional sphere. Instead, the *Somatic Marker Hypothesis* argues that emotions play a critical role in the ability to make fast, rational decisions in complex and uncertain situations.

However, with no external triggers, there would be no emotions playing inside humans' brains. Behavioral Economists *G. Lowenstein and J.S. Lerner* emphasizes on the way external factors may affect individuals and the implications these involve during the decision process. *Immediate emotions*[4] affect investors' behavior without directly interacting with their cognition. *Loewenstein et al. (2003)* described how immediate emotional consequences may affect the decision-making process which can also be related to the current environment or the *dispositional affect*[5], which refers to the tendency to see things in a positive or negative way. Immediate emotions are usually very intense since they tend to negate the probability of the possible outcome. For instance, a person who is afraid to take the plane decides to travel by car even though air safety statistics empirically show that air travel is statistically less likely to be involved in an accident. For this reason, immediate emotions provoke a high influence on individuals' decisions, affecting probabilities and influencing the overall final outcome.

In contrast, *Lowenstein et al. (2003)* analysis introduces also the anticipated or expected emotions which provide striking insights concerning investor attitude toward decision processes. Expected emotions have a fundamental implication that directly affects individuals during the decision-making process. This refers to *regret aversion*[6] which describes the way individuals expect or anticipate negative feelings because of the result of the choice they took. Characteristics of the expected emotions reflect in the *relief-regret dichotomy*. Indeed, when individuals anticipate something, they will experience regret for a missed opportunity, however, on the other hand, they will feel relieved in the case in which good future outcomes occur due to their past choices. For instance, this is the case where an individual chooses a safer investment with low returns rather than a

[4] *Lowenstein, G., & Lerner, J.S. (2003). The role of affect in decision making. In R. Davidson, K. Scherer, & H. Goldsmith (Eds.), pp. 619-642.*
[5] *Barsade, S.G., & Gibson, D.E. (2007). Why does affect matter in organizations? Academy of Management Perspectives, 36-59.*
[6] *Loomes, G.; Sugden, R. (1982). "Regret Theory: An alternative theory of rational choice under uncertainty", pp 805–824.*

riskier one with higher returns. If at the end of the observation time, the riskier investment outperformed the safer one, the individual would experience regret for his/her choice. The counterfactual comparison individuals do is a natural reaction resulting from their choice and thus the uncertainty of the outcome may provoke relief, in case of good sensation deriving from the choice, or regret, in case bad sensation deriving from the choice.

Emotions are not the only factor able to affect investors' decisions. Moods are affective states, associated with investors' behavior, which are usually not consciously perceived by individuals. As the opposite to emotions, moods are less specific and these usually tend to last for an unknown period of time.

Hirshleifer and Shumway (2003) showed that mood may affect the whole financial market trade and their influence depends on external factors independently related to trading. Moreover, moods are unpredictable since they specifically affect investors in different ways through the subconscious. In general, a good mood relates to positivity and happiness. The authors pointed out that when investors are happy, they tend to buy stocks in the market and vice-versa. This implies that external factors such as a sunny day or winning a football match might be able to affect investors' subconscious and impact trading.

While emotions act in a cognitive frame by making people make choices based on experiences and feelings, moods work in the opposite way. In fact, moods induce investors to follow the flow of their subconscious and even though a sunny day and a stock purchasing seem not to be related to each other *(D. Hirshleifer and T Shumway, 2003).*

These peculiarities characterize investors' minds and their attitudes toward risky decisions. Most of the time, it is essential for investors to adjust their behavior by taking the right precautions since emotions and moods have the power to distort reality. However, it is fundamental to keep in mind that BF does not assert that these are necessarily bad for investments, but rather, BF provides explanations that are upon investors' actions and it tries to give to investors consciousness about how to deal with them.

1.3.3. Heuristics and Biases

BF teaches that data and information are processed under the influence of heuristics. Commonly defined as shortcuts or rules of thumb, *heuristics*[7] are methods individuals use to solve problems by finding practical ways of dealing with them, learning from experience. The nature of these shortcuts derives from rules that the human mind develops in order to obtain good results in a short time. Originally, heuristics come from *Herbert A. Simon (1957)* who coined the term *satisficing*, which stands for a situation in which individuals seek solutions. More specifically, *Herbert A. Simon (1957)* asserts that individuals make choices that are good enough to fulfill their scope, even though these could be improved or optimized.

Through the evolutionary process of the human species, heuristic tools have been developed and implemented by individuals in order to meet the necessity to adapt to environmental issues this world concerns. Heuristics are, by definition, simple and fast tools individuals' minds follow. However, these can mislead rational reasoning and thus they can make individuals adopt sub-optimal decisions. Heuristics are not properly negative ways to deal with problems. In fact, in some cases heuristic allow individuals to get to the best outcome without processing too much information or making difficult computations.

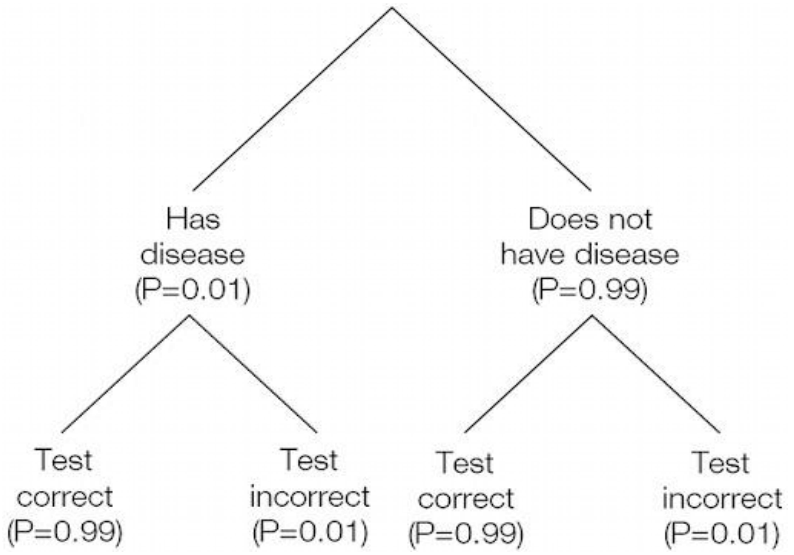
Heuristics practice may lead individuals to fall into *cognitive biases* which refer to a systematic pattern of deviation from rationality in judgment that influences directly the way people think. During the 1970s, psychologists Kahneman and Tversky started their research Program on Heuristics and Biases in order to figure out the way individuals come up with solutions when they are dealing with a concrete problem that involves uncertainty, ambiguity, or scarcity of information. For instance, *Kahneman et al. (1971)* demonstrate through pieces of empirical evidence that individuals do not need to rely on very large samples of data to infer what they observe (contrasting the Law of Large Numbers). What individuals perceive during the observation of facts is embodied in the decision-making process and combined with prior expectations.

Kahneman and Tversky work on seminal biases and heuristics during the '70s based on the general idea that individuals have issues in implementing and dealing with

[7] The term was d*eveloped ad explained by Kahneman and Tversky during their seminal works. However, the origin of the term comes from the work on bounded rationality provided by Herbert A. Simon in 1957.*

probabilistic rules. For instance, regarding probabilistic thinking, the authors introduced the concept of base rate fallacy. *Kahneman and Tversky (1985)* assert that the base rate misapplication is strictly related to the inability of individuals to ignore the related base rate information (the general information) and focus on the specific one (the specific information) concerning only to a certain case. Because of heuristics, individuals tend to overestimate their ability to forecast likelihood events and thus get mistaken with probability *(Kahneman and Tversky, 1985)*. Indeed, individuals tend to follow heuristics rather than use probability theory causing systematic mistakes in probability reasoning.

Figure 1.2. Medical use of Base Rate Theorem.



This graph represents the Base Rate theorem in the medical field. Base rate theorem is a way to assess probability which is erroneously misunderstood by people. If you have the test, and the result of the test is positive, what is the chance that you have the disease? If you think the answer is 99% then you are incorrect; this is because of the base rate fallacy, you have failed to take the base rate (of the disease) into account. (http://wordpress.mrreid.org/2012/03/10/).

Figure 1.2. embodies the true essence of the Bayes Rate Theory represented under a medical approach. This classical representation demonstrates how individuals should reason under probabilistic terms. However, in most cases, mental shortcuts prevail over Bayesian theory. Most people forget to consider the base rate, the overall likelihood of being positive (have the disease) or being negative (do not have the disease) when they make a judgment about a specific case. Making the error of neglecting the *base rate* can

lead to the conclusion of trusting the test when in many cases it can be more likely that the test is wrong even if the test is accurate.

As a result, Kahneman and Tversky's seminal articles on heuristics approach introduced striking ideas on problematics such as affecting the way individuals approach the probabilistic issue. Most importantly, the authors introduced the classification of heuristics and the way they work.

1.3.3.1. The Heuristic of Representativeness

Representativeness refers to the result of giving too much weight to sample data. This heuristic influences the probability assessment during the evaluation. Individuals can overestimate or underestimate an event likelihood because something has a very rare or very common property. This refers to the *Base rate fallacy*. Thus, representativeness explains how human judgments break the laws of probability. When individuals make judgments concerning probability issues of uncertain events, they might be wrong by attaching a higher probability to an event that is more representative than others. In this sense, the *Base rate fallacy* comes in place leading individuals to mistakes during the decision-making process.

Kahneman and Tversky in their seminal work on heuristics reported striking pieces of evidence on representativeness. The authors showed that even though individuals dispose of the frequency of the different categories of the population, they would base their decision on other additional information (e.g., stereotypes) that makes them fail their valuation. This refers to the situation in which individuals are provided with some information, for instance, personal preferences or characteristics of the subject, and they are asked to infer something about it, for example, his/her job. This heuristic occurs because the human mind links what it knows and thus representative pieces of information are those that are more relevant for individuals to make these inferences.

Concerning the financial field, representativeness might be extremely dangerous for investors in the market. The fact that investors are more prone to choose what their mental linkages recall makes them underestimate the importance of fundamental values of that investment. *Hersh Shefrin (2008)* presents a simple asset pricing model and the direct impact of representativeness its equilibrium. In this model, state prices are

proportional to subjective probability beliefs. Consequently, errors in probability due to representativeness affect equilibrium prices. The author refers to Bayesian-based beliefs as the probability which expresses the degree of a belief in an event, thus, they are error-free. In this sense, state prices associated with Bayesian-based beliefs can correspond to the fundamental value in the model.

In finance, representativeness plays a role when investors might want to invest in equities of good companies only because they assume that good companies are good investments. In fact, the firm image in investment decisions makes the difference since particular characteristics are subjectively important for the investors. This is the case of eco-friendly firms, which leverage the preferences of investors who care about the environment. Moreover, as it was said before, representativeness refers to the result of giving too much weight to sample data. Investors might use data from short periods to forecast future earnings. These estimates can difficultly represent the exact value of the fundamentals of the stock. Thus, investors might mistake to extrapolate good past performance from one stock without taking into consideration a wider period for the exact valuation.

1.3.3.2. The Heuristic of Anchoring

On the other way, anchoring refers to not paying too much attention to sample data. Individuals tend to anchor to a piece of information or specific estimates rather than examining other data. This is the case when individuals tend to accept and rely on a first significant piece of information before actually being involved in a decision process. Individuals know and probably relate to that piece of information, the anchor effect, making them sure about their final decision.

The anchoring effect has an extremely heavy incidence during the decision-making process. For instance, this might be the case when an investor is searching for home insurance and he/she does an online evaluation first. Through websites, he/she finds out the possible price for a home insurance policy depending on the size of the house and the related risks linked to the location. However, when the subject decides to get an estimate provided by a professional insurer, he/she might find out that the price would be lower than what he/she thought. The anchoring effect takes place making the individual more

likely to purchase the insurance offered by that professional just because lower than the online offer.

1.3.3.3. The Heuristic of Availability

Finally, the availability heuristic refers to those events in which individuals make their decisions depending on the easiness with which information can be recalled to mind. recency and salience biases are the direct implication of the easiness investors extrapolate data. *Kahneman and Tversky*'s seminal article *(1973)* suggests that, like other heuristics, the availability of information occurs unconsciously responding to individuals' knowledge about the topic. Indeed, according to the authors, this heuristic follows a fundamental principle: "*if you can think of it, it must be important*"[8]. For this reason, what comes up to individuals' minds must be more likely, thus distorting individuals' perception of probability.

Things that come to mind more easily are believed to be far more common and more accurate reflections of the real world. The authors provided an example of availability through an English text survey: "*Is it more likely that the word starts with a K, or that K is its third letter?*". According to Kahneman and Tversky, people answer such a question by comparing the availability of the two categories, by assessing the ease with which instances of the two categories come to mind (*Kahneman and Tversky, 1973.)* Availability helps individuals' processing since there the fact that it is easier to think about words starting with the K letter with respect to words with K as the third letter.

1.3.3.4. Relevant Biases

Through the seminal work conducted by Kahneman and Tversky, the authors classified some other important biases that were detected during their experimental analyses. The *framing effect* is a cognitive bias that describes a situation where individuals select their choice based on the way options are presented, both with positive or negative connotations *(Kahneman and Tversky, 1979)*. In this sense, the attractiveness of the choice

[8] *Kahneman and Tversky, (1973), Availability: A Heuristic for Judging Frequency and Probability, pp. 207-233.*

depends on the way it highlights the positive or negative aspects. For instance, individuals have to choose whether to save ten people out of a hundred or to let die ninety out of a hundred. The outcome is the same but because letting die ninety people sounds extremely bad, individuals would avoid this option.

Another important bias is mental accounting, which refers to the process that describes the way individuals code, categorize, and evaluate economic outcomes. *Thaler (1985)* was the first to identify this bias. According to Thaler, individuals think of value in relative terms rather than in absolute terms. According to the mental accounting theory, individuals treat money not in the same way for every expense. Depending on different factors such as the origins of the money and intended use, individuals do not think in terms of "bottom line" like formal accounting but rather they give higher weight to a certain type of expenses *(Thaler, 1999).*

An additional bias is the *disposition effect* that describes a situation where investors tend to sell assets that have increased in value while keeping assets that have dropped in value. This effect has been detected in several empirical analyses. *Shefrin and Statman (1985)* recognize this tendency among investors pointing out a very important implication. Indeed, the fact that investors do not want to recognize losses makes them sell losing assets too early making them miss a possible growth of these.

Investors may also be affected by *overconfidence* bias which can be extremely dangerous during the investing decisional process because it can lead to a miscalibration of subjective probabilities. The home bias is referred to the situation in which investors prefer to invest in what they perceive closer both considering their geographical position or their affections.

The other two important biases are the status quo bias which represents the tendency to prefer the current state of affairs and the loss aversion which defines the idea that the negative impact of losing a sum of money is greater than the pleasure of gaining the same sum *(Tversky and Kahneman, 1979).*

Despite the incredible appreciation of Kahneman and Tversky's seminal works on biases and heuristics, an alternative approach proposed by the famous German psychologist Gigerenzer triggered a harsh debate during the 1980s. In the next paragraph, it will be discussed the contrasting vision of the German psychologist regarding the interpretation of heuristics and the way these must be implemented.

1.3.4. Heuristics Alternative Approach

During the 1980s, German psychologist Gerd Gigerenzer provided an important contribution to heuristics theory, which turned out to be very different than the way Kahneman and Tversky interpreted them. Indeed, Gigerenzer criticized Kahneman and Tversky's Seminal analysis attacking on the normative level. Gigerenzer argues that it is inappropriate to characterize biases as errors. Alternatively, an analysis on heuristics by *Gigerenzer et al. (2001)* asserts that it represents somehow an *ecological rational approach* that individuals adopt in order to get through the decision-making process. In fact, through the concept of *ecological rationality*[9], Gigerenzer represents heuristics as the result of the adaptive fit between the human mind and the environment. In this sense, rationality fits in an ecological way since it is in accordance with the circumstances that surround the decision-maker.

Peter B.M. Vranas (2000) published an interesting paper on Gigerenzer's normative critique of Kahneman and Tversky. The author describes Gigerenzer's reasons and he tries to collect the pieces that describe the point of view of the German psychologist. Gigerenzer mainly critiqued based on the use of the term "bias". At a superficial level the dispute is indeed terminological, however, at a deeper level what matters is Gigerenzer's reason for objecting to the use of the term bias. According to Gigerenzer, Kahneman and Tversky may be comparing the performance of the participants in their experiments with inappropriate norms. The topic of judgments under uncertainty is not exhausted by describing the relevant cognitive processes. According to Gigerenzer, the investigation will have to be primarily conceptual rather than empirical. He focused on the idea that rationality is an adaptive tool that is not identical to the rules of formal logic or the probability calculus. Gigerenzer conceived the idea that shortcuts are ways to make effective decisions or "*fast and frugal*" alternatives to achieve the outcome. In fact, the "*fast and frugal"* feature is typical to the effort reduction which makes this tool an appealing way for investors' decision-making process. *Gigerenzer et al. (2001)* sum up his vision with "*less can be more*", in fact, heuristics is a way choose without being drowned by thousands of pieces of information that would interfere with the decision path.

[9] *Gigerenzer Gerd and Goldstein D. G. (2002), Psychological Review, Vol. 109, No. 1, Models of Ecological Rationality: The Recognition Heuristic, 75–90.*

As a consequence of his vision, *The Adaptive Toolbox* developed by Gigerenzer is essentially what brings investors to survive in the market. It includes a learning mechanism process that allows an adjustment of the tools when the environment changes. According to *Gigerenzer et al. (1999),* the Toolbox promotes a specific vision of bounded rationality which bases on three main premises:

1. *Psychological Plausibility* specifies the main purpose of the Gigerenzer's program which addresses to a model of bounded rationality on cognitive, emotional, social, and behavioral patterns that characterize individuals. This model works along with all-natural constrains individuals have during the decision-making process.
2. *Domain Specificity,* in which the toolbox provides specialized heuristics (in contrast to Kahneman and Tversky's vision of "domain general heuristics") which can be modeled as building blocks for a subjective composition of new heuristics.
3. *Ecological Rationality,* in which simply points out that the objective of the toolbox is not the optimization but rather the consistency with the environment.

The main goal of the Adaptive Toolbox is to achieve what Gigerenzer calls "*proximal goals"*[10] which individuals wish by including learning mechanisms that allow for adjustments depending on the different changes of the surrounding environment. Thus, the Adaptive Toolbox can be implemented also in the financial environment in which investors adopt different heuristics building blocks to achieve their goal.

The investigation provided by a behavioral approach confirmed the detachment from a classical economic view. Many economists in the past such as Thorstein Veblen, John Maynard Keynes, and Herbert Simon criticized the *homo oeconomicus* approach addressing the importance of behavioral patterns in the economy, thus allowing for individuals to be not fully rational. Although oppositely, psychologists such a Kahneman, Tversky, and Gigerenzer provided insights that completely detach from the utility maximization process and leaves space for more complex models.

[10] *Gigerenzer, G., & Todd, P. M. (1999), Fast and frugal heuristics: The adaptive toolbox, pp. 40.*

1.5. The Prospect Theory

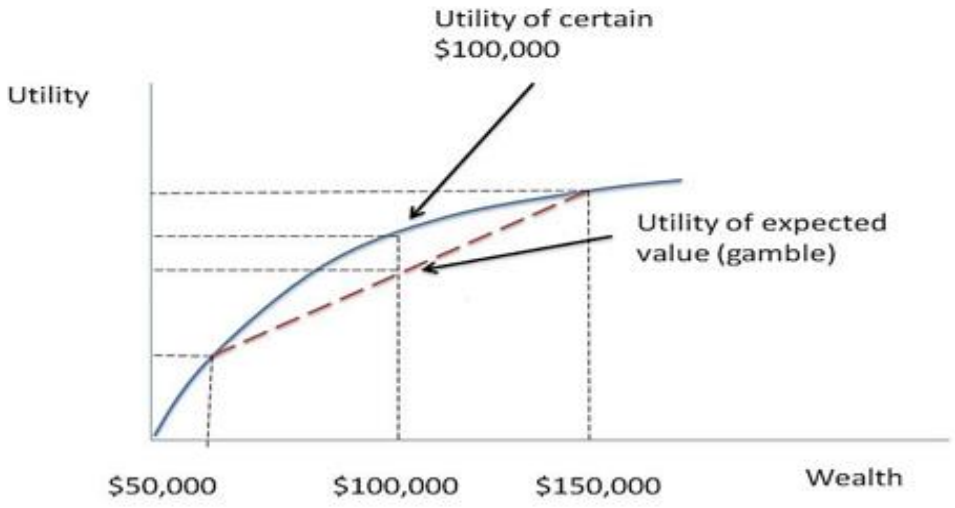
Classical economic theories assert that the decision-making process is based on fixed preference structures by totally excluding possible external framing that could affect individuals' possibilities. However, due to the risk and uncertainty the financial market is characterized, the emotional aspect and heuristic biases, investors' decision-making process is very distant from the concept of rationality.

Expected Utility Theory (EUT) is defined as the conventional economic model that prescribes all the actions that the rational decision-maker follows. The whole EUT has both a descriptive and normative interpretation which allows individuals to identify the optimal level of maximization of their utility curve. EUT axioms define strict rules that individuals' preferences must follow, indeed, according to EUT, in order to be able to draw the Utility Function, preferences must follow principles of order, continuity, and independence. *Figure 1.3.,* The Utility Function represents preferences which, if it is possible, are assigned to real numbers for each alternative. In this way, a hypothetical alternative A has a greater number than alternative B if, and only if, the individual prefers A to B. In this situation, an individual that selects the most preferred alternative available is necessarily also selecting the alternative that maximizes the associated utility function.

However, like any mathematical model, EUT is an abstraction and simplification of reality, thus, not considering the inconsistency prescribed by behavioral work Kahneman and Tversky provided.

EUT does not allow for preferences to change, thus, the whole theory assumes that individuals cannot freely express their preferences in a more fluid way. For instance, fallacies such as cyclicality of preferences break down EUT fixed structures making room for a completely new approach toward the decision-making process. An important contribution was given by Maurice Allais who was known for his proposal on the inconsistency of the EUT axiomatic structure. *Allais (1953)* introduced his famous paradox based on empirical observations of EUT systematic violations resulting in the discrepancy between classical decision-making models and how real individuals' decision-making works. *Allais paradox* attacks EUT rigidity in preference selection; indeed, his seminal work shows how much the discrepancies between probabilities and outcomes consequently affect the final individuals' decision.

Figure 1.3. Graphical representation of Utility Function.



The Graph represents the classical function for a Risk-Averse Investor (concave function). The rational individual selects the outcome with the highest expected utility. Given the Utility function (blue line), the line is concave because of the decreasing marginal utility. The dashed red line is the Utility line for the gamble between 50,000 dollars and 150,000 dollars. According to EUT, the individual would have a higher utility with a certain amount of 100,000 dollars.

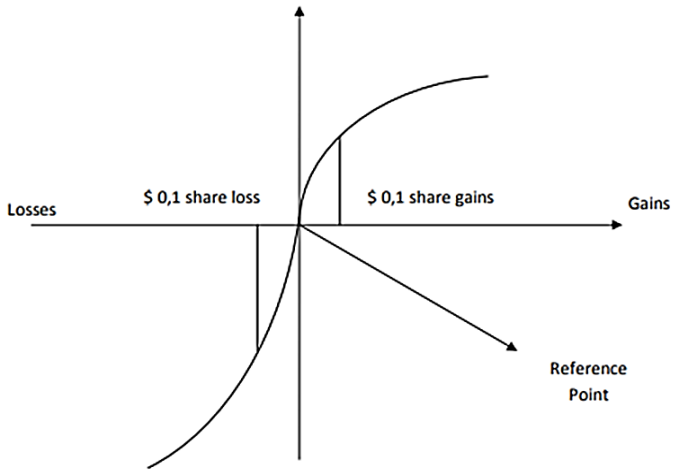
Thanks to Allais' contribution, heuristics seminal work founders, Kahneman and Tversky, developed the descriptive model called *Prospect Theory* (PT). The model is based on insights emerged from experimental investigations regarding the validity of rational models that show the ways in which individuals differ from the rational approach introduced by EUT. According to PT, preferences are reference-dependent, meaning that individuals' preferences depend only on their current reference point. Concerning EUT, preferences are different in PT because take into consideration the current wealth of the individuals and not the absolute level of wealth. Mainly, there are two main differences between Utility and Value: first, Utility has a linear in the probabilities while value does not, and secondly, the utility is dependent on final wealth while value on current wealth.

The central theme of PT concerns individuals' tendency to react differently depending on whether they are facing losses or gains. *Kahneman et al. (1979)* introduced the Value Function which demonstrates the higher propensity to risk aversion in the domain of gains and the opposing risk-seeking in the domain of losses. The curve is graphically very close to the utility function of EUT but the main difference is that the propensity of risk aversion changes according to the amount of gain or loss the individual is facing. *Figure 1.3.* The *Value Function* in PT is very similar to the utility function in EUT,

indeed, as the Utility function, it helps to attach outcomes to a value. However, with respect to EUT, which assumes a constant degree of risk aversion, the Value Function interacts with the reference point (the starting point for the valuation) to determine two different risk profiles: the domain of gains and the domain of losses.

The Value Function *(Figure 1.4.)* has an asymmetrical s-shape with a concave part on the positive area and a convex form in the negative one. The convexity reflects the risk-aversion individuals have when facing gains, this will result in lower expected utility but higher certainty in the outcome. On the other hand, the convex part represents the risk-seeking preference of individuals when they face losses, resulting in solutions that lead to a lower expected utility as long as it has the potential to avoid losses.

Figure 1.4. The graphical representation of the Value function.



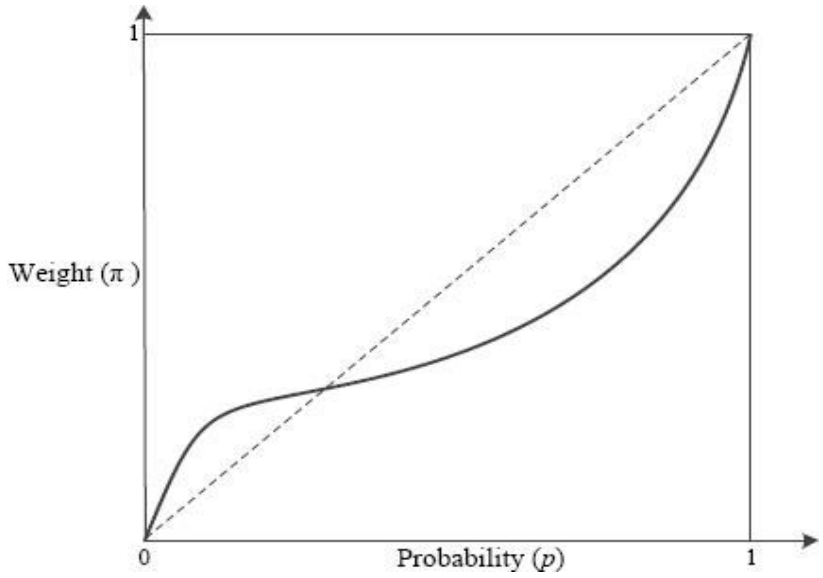
The graph below shows a hypothetical value function. The particular slope of the curve, steeper in the domain of losses than in that of gains, clearly highlights how individuals attribute a greater value in terms of utility to a loss suffered by a stock, for example of $ 0.1, compared to an increase of equal value in the price of the aforementioned security. Kahneman and Tversky (1979).

In general, from the *Value function,* it can be inferred that individuals are risk-averse in the domain of gains and risk lovers in the domain of losses. An additional version of loss aversion is the *Myopic loss aversion* that occurs when investors looking at their investments, thus, being strongly focused on the short term and leading them to react too negatively to recent losses, which may be at the expense of long-term benefits *(Benartzi S. and Thaler R. H., 1997).*

PT value function allows us to explain the reason why individuals would take an insurance policy and at the same time buy a lottery ticket. The two opposite purchases perfectly reflect the inconsistency during individuals' choice, namely, representing the value function in which losses looms larger than gains. This domain representation of gains and losses implies that depending on the reference point, individuals will adopt different risk profiles. This attitude refers to the certainty effect in which during the valuation of the prospect, a situation that is completely devoid of risk has an extra value in terms of final utility. The certainty effect comes in place, indeed, even considering small amount of gain, individuals act risk-averse since the prefer the certainty of the gain. As the opposite, in a risky lottery prospect, a certain loss makes individuals being risk lovers because they want to bet for the best outcome possible *(Kahneman and Tversky, 1986)*.

The authors presented another important curve in their seminal work. The Weighting Function shows how people deal with probabilities according to the model prescribed. This represents the implication of the overall misperception of probabilities.

Figure 1.5. The graphical representation of the Weighting function.



The dotted line represents the EUT approach through which rational individuals attach probabilities. Instead, the dark line represents how, according to PT, individuals typically associate probabilities. The properties of the weighting function identified by Kahneman and Tversky included over-weighting of small probabilities, underweighting of large probabilities.

The Weighting function captures the idea that people tend to overreact to small probability events and, on the other hand, underreact to large probabilities. For this reason, when individuals face the gain domain with an outcome that has a low probability to occur, they would prefer to act risk-seeking and vice-versa concerning the domain of losses *(Kahneman and Tversky, 1979)*. *Figure 1.5.* (Weighting function) shows the comparison between the EUT (dotted line) and PT matching of real probability events with individuals' weights on occurring events.

Prospect theory answers to behavioral finance questions regarding individuals' attitude under the risk and uncertainty field. The whole analysis of PT is able to incorporate all the different patterns that characterize the detachment from a classical point of view.

This innovative model represents a key pillar for behavioral finance studies introducing a radical change in the way individuals' preferences are understood with respect to the classical economics models. Through these studies, it is possible to demonstrate that people are very conscious of little changes in their wealth making them deviate from the rational path. A better understanding of individuals' decision-making process is fundamental in order to mitigate the influence of behavioral biases. Prospect theory has found a strong appeal in behavioral finance, as it can explain several important phenomena that occur in financial markets.

1.6. The Portfolio Theory

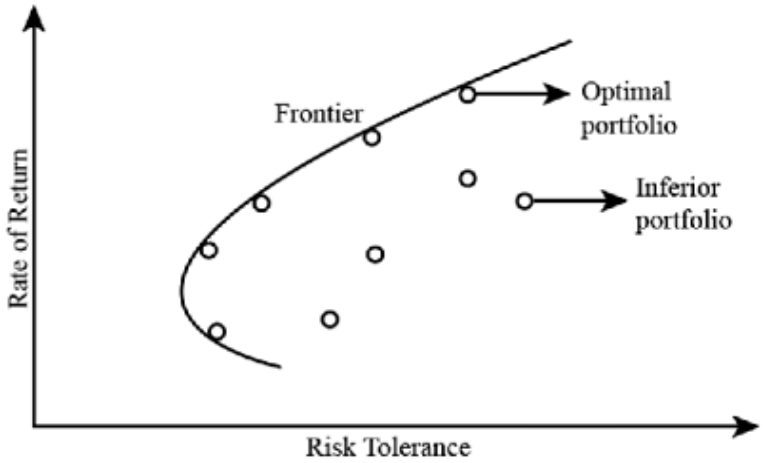
As last point of this chapter, it is fundamental to mention also that over the years, portfolio theory completely updated according to the behavioral approach. Deriving from Classical theories, traditional finance bases on *Markowitz's Portfolio Theory*[11] which is centered on the concept of mean-variance. This theory bases on the *EMH*[12]*.* According to Markowitz' Portfolio theory, every security can be described by the combination of expected return and risk. The idea behind the *MPT*[13] is that investors are able to find out their optimal combination of assets (portfolio) by looking at the expected return of that

[11] *Markowitz, H.M. (March 1952). "Portfolio Selection". The Journal of Finance. Vol. 7, No. 1.*
[12] *The efficient-market hypothesis (EMH) is a hypothesis in financial economics that states that asset prices reflect all available information.*
[13] *Modern Portfolio theory (Markowitz, H.M, 1952)*

particular combination and its risk (variance). Therefore, MPT assumes that investors are risk averse, for this reason, given two portfolios with the same expected return, investors will prefer the one with lower level of volatility (less risky).

In a rational way, investors will consider to take higher risk only if compensated by higher expected returns *(Figure 1.6.).*

Figure 1.6. Modern Portfolio Theory - Efficient frontier



According to MPT, the efficient frontier is the set of optimal portfolios that offer the highest expected return for a defined level of risk or the lowest risk for a given level of expected return – it is depicted by the black line in the graph. Portfolios that lie below the efficient frontier are called "sub-optimal" because these do not provide enough return for the level of risk. Portfolios that cluster to the right of the efficient frontier are sub-optimal because they have a higher level of risk for the defined rate of return.

The greatest pillar which the MPT bases is the concept of diversification of the portfolio. Thus, an investor can reduce portfolio risk simply by holding combinations of instruments that are not perfectly positively correlated (perfect diversification is ρ=-1). In other words, investors can reduce their exposure to individual asset risk by holding a diversified portfolio of assets. However, from inconsistency between classical theory and reality in the composition of portfolios, it follows that diversification is not implemented as prescribed from classical model *(Linciano N., 2010).* It is well known that investing in assets from other countries, thus applying international diversification, makes portfolios more efficient. The reality, however, is quite different, as individuals show what is defined as home bias previously mentioned. They tend to combine all their investments in domestic securities, even favoring those of the company for which they work. The preference for domestic titles is linked to the familiarity heuristic. In fact, investors

consider themselves to be more informed than what happens for foreign stocks and this increases the confidence placed in their decision-making abilities, thus also fueling the phenomenon of overconfidence. Overconfidence bias represents the tendency of individuals to overestimate their own forecasting ability, as well as the accuracy of their information, and to underestimate the risk of financial instruments, thus leading to very risky portfolios *(Skala, 2008).* Skala (2008) asserts also that the main evidence of the manifestation of overconfidence in the financial markets is provided by the tendency of investors to excessively modify the composition of their portfolios. As already discussed, also emotions play an important role in financial decisional process making experienced investors always seeking for new assets.

With a completely different approach, according to behavioral economics theories, the choice of the portfolio takes place within a boundary delineated between expected wealth and probability. Indeed, as in the Prospect theory, the idea is to keep wealth always at least equal to that objective. In doing so, according to a behavioral approach, investors have several aims and they try to create and investment portfolio that not only reflect pure risk and expected returns, but it must also include other goals. *Shefrin and Statman (2000)* developed a behavioral portfolio theory (BPT) in which investors choose portfolios by considering expected wealth, desire for security and potential, aspiration levels, and probabilities. The authors presented their models in two versions: BPT-SA (SA- single account), where the portfolio is integrated into a single mental account and BPT-MA (MA- multiple account), where the portfolio is segregated into multiple mental accounts, therefore, covariances among mental accounts are overlooked. For instance, the main difference from MTP and BPT, in particular BPT-MA, is that investors might place foreign and domestic stocks in different mental accounts. Investors might consider foreign stocks highly risky because they overlook the effect of the covariance between foreign and domestic stocks exerts on the risk of the portfolio, viewed as an integrated single account *(Shefrin H., Statman M., 2000).*

In particular, BPT-MA shows patterns that investors tend to follow during their financial choices. They balance mental accounts with goals which, in the BPT-MA model, are two: the low aspiration level and the high aspiration level. *Shefrin and Statman (2000)* two-layered model portfolios presents low aspiration layer designed to avoid poverty and a high aspiration layer designed for a shot at riches. Since BPT-MA investors overlook covariance between layers, they might combine a short position in a security in one layer

with a long position in the same security in another layer. Contrary to classical theory, these two mental accounts are not *integrated*[14]. As a result, in BPT-MA model, investors may take offsetting positions, borrowing for leverage in their high aspiration accounts, while they lend in their low aspiration accounts.

1.7. Conclusion

This chapter has introduced a wide explanation concerning Behavioral Finance and its implication in the field of decisions-making theory. Behavioral Finance has brought an enormous impact on the overall perception of risky prospects.

From this first part, it can be concluded that numerous psychological factors play inside investors' minds. Economic agents cannot fall under the *homo economicus* category since preferences do not follow axiomatic rules. Additionally, other factors (biases and emotions) distort the perception of the real world. Therefore, individuals are not considered fully rational but bounded rational.

Behavioral advances brought about important results which help to comprehend and learn the processes individuals implement during their financial decision. Emotions, heuristics, and biases are part of individuals' heritage developed by humankind over the centuries and its application to the financial world is essential in order to analyze the impact these have on the decision-making process. Its application pushes beyond economic models, indeed, behavioral practice achieved outstanding results because of the empirical analysis and pieces of evidence economists and psychologists provide throughout the years. In particular, the behavioral portfolio theory but also the prospect theory which incorporated behavioral aspects that characterize individuals throughout their decisional process.

The next chapter will address another important topic that is strictly connected to the way investors carry out their financial decisions. Indeed, the discussion will continue investigating the ability of individuals to manage their assets and the knowledge they hold to deal with financial decisions.

[14] *Consistent with the hedonic editing hypothesis (Thaler, 1985), individuals prefer integrating losses and segregating gains. While classical theory dose not distinct between gains and losses, instead, individuals should only integrate their different level of wealth.*

CHAPTER 2: Financial Literacy

2.1 Introduction

The previous chapter introduced how individuals carry out the decision-making process when facing uncertainty. The whole behavioral theory made huge advances in explaining how investors behave in the market. Moreover, the behavioral approach completely detaches from classical theories and it makes room for deeper analysis of the financial decision-making process.

This second chapter addresses the degree of literacy and information collection among individuals. In fact, along with behavioral issues, the decisional process is strictly related to the way people collect and process information too. This part will be questioning the degree of financial knowledge among the population. In particular, thanks to the contributions provided by Annamaria Lusardi and Olivia S. Mitchell who introduced several fundamental researches in the field of financial literacy and its impact on the financial decision-making process.

This chapter will consider empirical analyses about the degree of financial literacy and it will consider also several features that characterize individuals such as geographical area, gender, and age, by always addressing the importance of information and literacy inside the financial field. This topic is extremely relevant since it will allow the reader to be aware of the implications of financial illiteracy and the costs the non-information brings to individuals.

2.2. The Importance of Financial Literacy in The Market

As discussed in the Chapter 1, Behavioral Finance has a huge impact on the ability to define investors' decision process. However, the mere behavioral patterns are not enough in order to investigate the reasons behind individuals' choices. Deciding under risk frame is part of the daily routine, for this reason, financial knowledge and

understanding financial issues are qualities required in order to deal with the pressure uncertain prospects convey.

Because of the exponential spread of the complexity of financial products and free access to the retail marketplace, unsophisticated households bear a huge responsibility during their financial decision process. Moreover, studies on the extent of financial literacy are extremely important to the legislator because these allow policymakers to collect information, make policies, and implement educational programs aimed to sustain investors' lack of financial knowledge.

Lusardi et al. (2014) describe financial literacy as the ability to comprehend and implement financial concepts and personal financial management such as budgeting and investing. It is a necessary tool that helps individuals to be self-sufficient and to achieve financial stability. The degree of information and literacy about the financial world may allow individuals to make better decisions concerning personal money management.

Lusardi et al. (2014) state that financial markets around the world have become increasingly accessible to small investors and the ability to process economic information and make informed decisions has a direct impact on the degree of literacy. In addition, in order to benefits individuals and investors, financial literacy is also needed in order to advance the financial services industry. For this reason, financial literacy will create a chain effect that will boost the use of financial products and services, and consequently, it will be able to increase profits and push for the innovation of more varied financial products and services *(S.M. Damayanti, I. Murtaqi, H. A. Pradana 2018).*

As a consequence, financial literacy is a fundamental topic that is strictly correlated to the overall economic growth, thus, important for both policymakers and financial institutions. Therefore, the overall improvement of financial literacy in the population is directly proportional to both micro and macro-economic development, thus, good financial literacy will create smart consumers who will be able to deal with money management and build-up plans for the future *(S.M. Damayanti, I. Murtaqi, H. A. Pradana 2018).*

The *Organization for Economic Co-operation and Development* (*OECD)* papers on this topic evaluate and compare financial individuals' level of financial knowledge through questionnaires and surveys. The overall OECD's works are able to inform the regulators about what are the main lacks investors hold when facing financial decisions, concerning topics of financial attitude such as thinking before making a purchase, paying

bills on time and budgeting, saving, and borrowing. OECD measures the level of literacy among countries suggesting useful advice to governments.

In particular, the paper of *OECD (2017)* on *"Report on adult financial literacy in G20 countries"* asserts that the overall understanding of concepts like diversification and compounding rates is very weak among the surveyed population. These two concepts are essential for people in order to recognize the consequences of financial decisions such as paying the minimum repayment on credit cards or to manage their increasing responsibility for personal financial security in retirement.

2.3. Measuring Financial Literacy

Measuring individuals' financial knowledge is not that easy. *Huston (2010)* on *"Measuring Financial Literacy"* underlines the fact that there is a lack of standardized rules for the measurement of financial literacy. Huston (2010) argues that lack of conceptualization or contents, but also the differences in the interpretation of the measuring instruments concerning financial topics hinders a univocal way to measure the extent of the individuals' degree of knowledge.

For instance, *Lusardi and Mitchell (2011)* tried to apply statistical models to capture the relationship between borrowing and the borrower's demographics, financial literacy, and also financial behavior. Moreover, *Lusardi, Michaud, and Mitchell (2011)* developed a *stochastic life cycle model* to assess the impact of financial literacy on households' wealth. However, because of the inability to implement a univocal way to assess financial literacy, measuring it is not a straightforward approach.

Researchers such as *Lusardi et al. (2011)* used the *self-assessed* approach defined as the involvement of learners in making judgments about their achievements and the outcomes of their learning. Unfortunately, as *Lusardi and Mitchell (2014)* report, this kind of approach creates a mismatch between the self-assessed knowledge reported from the analysis and actual knowledge, implying that participants are more likely to overstate their knowledge.

Surveys on financial knowledge usually base their questions on issues such as personal money management or retirement plans which are the main objectives households take care of during their lives. *Lusardi et al. (2014)* elaborated measurements

on saving and investment decision making based on the *2004 Health and Retirement Study (HRS)* data. They selected three main concepts to assess investors' ability to understand financial issues:

1) Numeracy and capacity to do calculations related to interest rates;
2) The understanding of the concept of inflation;
3) The understanding of risk diversification.

In order to optimize the survey efficiency, *Lusardi et al. (2014)* analysis is characterized by several important features: simplicity, brevity, relevancy, and ability to differentiate the level of people. These elements are essential in order to assess the capacity of individuals to implement basic concepts of finance. Along with other studies that implemented their same surveys, A. Lusardi compared results of financial literacy around the world.

Table 2.1. The Economic Importance of Financial Literacy: Theory and Evidence.

AUTHORS	COUNTRY	ALL 3 CORRECT	AT LEAST 1 CORRECT	POPULATION TEST
Lusardi and Mitchell (2011)	USA	30.2%	42.4%	1,488
Bucher-Koenen and Lusardi (2011)	GERMANY	53.2%	37.0%	1,059
Fornero and Monticone (2011)	ITALY	24.9%	44.9%	3,992
Beckmann (2013)	ROMANIA	3.8%	75.5%	1,030

The table shows the ability of four selected populations to answer (all three, at least one or at least one) of the previous topics proposed by Lusardi et al. (2014). The listed authors proposed the same questions to the population test. Through this way, it is possible to make a comparison among different countries. Lusardi et al. (2014).

Table 2.1. provides outcomes from the HRS test of some selected countries From *Lusardi et al. (2014)* - the USA, Germany, Italy, and Romania - representing four very different environments. This short example shows how directly and quickly results from survey analysis can be read. Concerning the outcomes, there is a disappointing trend in both the four selected countries. The worst data come from Romania since only *39* individuals out of *1,030* were able to answer correctly to all the topics the survey

proposed. Less disappointing, Germany ranks at the top with about half of the population test, *563* people out of *1,059*, able to respond correctly. Only about half of the population being able to answer correctly is not an optimum result, thus, confirming that the overall lack of financial literacy is a real problem all over the world. *Table 2.1.* cross-country comparison confirms that the degree of financial literacy tends to be quite low despite all possible features that characterize the differences among financial markets and their development. Thanks to the *2004 Health and Retirement Study (HRS)* data, these questions have been quite common in the process of financial knowledge assessment and, even though similar variants are available, this model brought a common denominator in the financial measuring practice.

Besides, other factors may affect the extent investors' financial knowledge. In fact, age and gender are two important variables that are able to affect the degree of individuals' financial literacy. The process of disaggregating financial literacy might be extremely effective for the legislator which can address specific education programs to the categories that mostly require help.

2.2.1. Financial Literacy: the geographical factor

The geographical factor in financial literacy points out how unevenly financial knowledge is distributed across the world. Studies observe the differences exist not only among countries (national level), but differences persist also within countries (internal level).

Fornero and Monticone (2011) report substantial financial literacy dispersion across regions in Italy. The authors observe the Italian case in which the reforms of the pension system attempted to improve its long-term sustainability. Two main important characteristics marked these reforms: the shift from Defined Benefits to Defined Contribution system and the increasing role of the pension funds and participation of voluntary pension plans *(Fornero and Monticone, 2011).* These new reforms have enhanced, especially to younger individuals, a higher degree of responsibility concerning the accumulation and the management of their retirement wealth. As a consequence, differences within Italians' attitude toward financial decisions must be linked to their degree of knowledge about financial matters.

Fornero and Monticone (2011) analysis on Italian geographical distribution of financial literacy focuses on the Banks of Italy data on household's consumption, income and, wealth for a representative sample of the Italian population. To assess the degree of literacy in Italy, the authors selected three financial questions that were very similar to the ones devised for the US Health and Retirement Study (HRS) by *Annamaria Lusardi and Olivia Mitchell (2011).* Results concerning Italian regional disparities in financial knowledge are pretty noticeable. In fact, the typical Italian peculiarity (north-south dichotomy) has repercussions also in financial literacy. Indeed, the authors pointed out that as many other important economic and social indicators, such as employment rates, income per capita, average education, financial literacy is not an exception (*Fornero and Monticone, 2011).*

In the same way, *Bumcrot, Lin and Lusardi (2011)* reported the degree of disparity in financial literacy in the US. The authors assessed financial literacy using five questions covering important concepts of everyday life economics and finance. These concerns calculations about interest rates and inflation, the workings of risk diversification, the relationship between bond prices and interest rates, and the relationship between interest payments and maturity in mortgages.

Bumcrot, Lin and Lusardi (2011) evaluated the degree of literacy by computing how many questions the respondents get right by building up a financial literacy indicator. The geographic representation of the financial literacy index in the USA for each state points out that northern-west and west states included Alaska and Hawaii have a higher degree of financial knowledge than the eastern southern states.

Reasons behind this huge discrepancy lie in the fact that financial literacy highly correlates with five important indicators: poverty, foreclosures, unemployment, bankruptcy rate, and public assistance *(Bumcrot, Lin and Lusardi, 2011).*

2.2.2. Financial Literacy: the age factor

Lusardi and Mitchell (2014) provide pieces of empirical evidence showing that American respondents (age 50 and over) were not able to answer basic financial literacy questions about inflation, interest rates, and risk diversification. Outcomes point out that only about *34.3%* of the whole sample were able to respond correctly to all three questions, while individuals who responded correctly to at least one question was about

46.9%. The rest of the sample made at least two incorrect choices suggesting a quite disappointing level of literacy.

Despite the poor results, it must be stressed out that this category is the one most involved in financial decisions and engaged in financial transactions over the lifetime. Older individuals have experienced more economic cycles during their lives, they were witnesses of economic crisis and the high peaks of inflation, however, lack of financial literacy still hold. *Finke, Howe, and Huston (2011)* assert that individuals' confidence in their financial decision-making abilities increases with age. *"The older you get, the better you think to understand financial instruments and financial strategies".* It can be the case that *self-assessed* knowledge is a predominant characteristic when individuals get older.

Results considering the younger American population provided by *Lusardi, Mitchell, and Curto (2009)* on *the NLSY97* of the US national representative sample of young population (ranging from 12 years old to 17 years old) were quite disappointing too. In fact, financial literacy was severely lacking among these young adults. Only *27%* of the respondents knew about inflation and risk diversification and accomplished simple interest rate calculations.

One way to overcome this problem would be to increase the support of financial education in high school. Children firstly acquire financial knowledge from parents, relatives, or via interaction with others such as friends. It happens that some groups are not able to benefit from these sources of information because of the low level of education of their parents or for others several contextual reasons. In this respect, financial education in high school may be particularly beneficial to children from disadvantaged backgrounds *(Lusardi, Mitchell and Curto, 2009).*

2.2.3. Financial Literacy: the gender factor

In a very interesting way, gender plays an important role too. *Lusardi et al. (2014)* assert that lack of financial literacy is persistent between genders throughout the dataset. Pieces of evidence show that females tend to be less likely to answer correctly to a financial question, thus, making them more vulnerable to the financial market. Women proved to be the least financially literate, indeed, differences between women and men persisted even after accounting for many demographic characteristics, family background characteristics, and peer characteristics *(Lusardi, Mitchell, 2009).*

Differences between women and men are statistically significant, in fact as *Lusardi et al. (2009)* demonstrate, different analyses on financial literacy and money management proved that the discrepancy between women and men holds across the different analyses. For instance, this pattern has been detected also by Lusardi and Tufano (2009) on who explored debt literacy for a representative U.S. sample, Agnew and Szykman (2005) and Lusardi, Keller, and Keller (2008) in studies of narrower samples and in studies of other countries such as Rooij, Lusardi, and Alessie (2007). As a consequence, there is fairly robust evidence confirming that women do not hold good financial skills in calculations and do not have good knowledge of topics such as inflation and risk diversification. *(Lusardi, Mitchell and Curto, 2009)*

Comparing gender differences, studies on financial knowledge among young individuals conducted by the Program for International Student Assessment *2015 (PISA)* shows that girls perform better than boys in reading in all 15 countries/economies that participated in the financial literacy assessment, while boys perform better than girls in mathematics in 9 of those countries/economies.

Such a huge difference between genders could be explained by cultural beliefs or division of tasks inside the family circle. In a personal opinion, it might be the case that typical stereotypes portrait the man as the one who takes responsibility for financial decisions while women take care of children.

2.4. Literacy and Information

The role of information is strictly connected to the degree of literacy among the population. It refers not only to the quantity but also to the ability to properly collect data during the decision-making process. *Herbert A. Simon (1957)* introduced the concept of bounded rationality in which individuals' decision-making capabilities are limited to the information available. According to *Simon (1957)*, individuals' capacity to evaluate information and process data is "bounded", nonetheless, also the amount of time is a constrain, in this sense, individuals' disposition of limited time hampers their decisional process too. Individuals alone difficultly can collect all relevant data that surrounds them. *Collins (2012)* explains that the access to financial resources and thus the collection of information is part of the puzzle to the overall lack of literacy among people.

One of the main causes connected to individuals' inability to collect all available information concerns the overload of information which refers to the extensive technological development and digitalization progress that obstructs investors' minds with tons of data. Indeed, it is quite usual also for sophisticated investors to be exposed to an overload of information that prevents a fluid decision process. This is also connected to systematic violations of the classical economic models. In fact, individuals' inability to properly collect information needed in order to take financial decisions has very serious implications in the real world.

Another important point concerns the asymmetry of information inside the financial market. Policymakers know that the relationship between financial intermediaries and clients is not equally balanced. Consequently, the reliance on classical models finds several failures which the regulator must always consider. Banks, mutual funds, insurances perfectly know about their financial products or their asset allocation. On the other way, households and investors cannot get to know all the mechanisms behind the portfolio management of big financial firms. In legal terms, it is usually referred to as the uneven level of knowledge inside the contract which defines the weaker part and the stronger part. Oxford English Dictionary refers to asymmetric information as the situation where some participants in an economic transaction have access to more relevant, or better, information than other participants. The asymmetry of information may take the form of a moral hazard. This consists in dishonest and inappropriate behavior one of the two parts has with respect to the other. Moral hazard is associated to the term "lemon" which comes from the theory of the lemons problem which was put forward in a research titled "the Market for Lemons" by George A. Akerlof in 1970. Another form is adverse selection in which individuals are not able to choose a better option among all possible options, thus, pushing out of the market high-quality services. For instance, when investors do not have complete information about the product or the quality of the service and thus, he/she prefers to buy the lower quality service at a lower price *(J. Vanek and J. Botlik, 2013).*

The degree of asymmetric information is still a concrete issue to take into consideration when dealing with financial literacy and knowledge. *Vanek and Botlik (2013)* in their report on *"education and information asymmetry"* concluded that one way to reduce information asymmetry on the client-side is by increasing their competences, thus increasing the client's ability to process information. They suggest that investors

should learn to overcome information barriers, thus, they refer to an improvement both to education and skill acquisition that would allow them to obtain greater results inside the financial world.

2.5. Costs of Financial Illiteracy

Lusardi and Mitchell (2014) explain that financial knowledge alone is able to capture more than half the observed wealth inequalities among the population. As discussed before, financial literacy has a very significant impact on the economy, not only at the micro-economic level but also at the macro-economic level. This is such an important consideration since it implies that illiteracy brings costs and these costs directly result in the overall population wealth.

Illiteracy costs are not only related to savings and investments; indeed, they also influence how consumer manage their liabilities, retirement, and pensions. *Lusardi and Mitchell (2014)* explain that United States investors, during their financial activities, foregone substantial equity returns because of trading costs, fees, and expenses for the active management attempting to "beat the market". In fact, the major indicator that represents these types of costs explicitly refers to the high expenses the investors bear because of lack of sufficient education in financial products, but it also may be due to lack of proper information or simply negligence on money management (*Lusardi and Mitchell, 2014).*

Campbell (2006) in his article *"Household Finance"* detected that households with lower income bear higher costs with respect to literate ones. Due to the cyclicality of economic periods, educated investors tend to take advantage of lower interest rates of the market, however, non-educated households, instead, do not dispose of this ability and this lack makes them missing opportunities that the market offers. Also, another research provided by *Lusardi and de Bassa Scheresberg (2013)* examined high-cost borrowing in the US and the results were consistent with all previous researches. Indeed, their analysis bases on high-cost borrowing methods such as payday loans, pawnshops, auto title loans, and others, concluded that the less financially literate individuals (mostly adults within 25-34 years of age) were substantially more likely to adopt these kinds of methods.

Moreover, another aspect relates to the costs of retirement and pension systems. Indeed, more financially endowed individuals when dealing with retirement decisions are

better informed about pension system rules, pay lower investment fees in their retirement accounts, and diversify their pension assets *(Lusardi and Mitchell, 2014).* Supplementary pension schemes represent the classic one-off purchase that individuals are asked to make at least once in their lives. Because of low literacy, biases, and misinformation, investors tend to shy away from these kinds of decisions or even worse to using *informal advice*[15] which usually is provided by non-competent people.

It is evident that lack of proper financial knowledge has a harmful effect on individuals engaging in financial activities, both concerning missed opportunities that the market offers but also because of the negligence in selecting the right option available that optimally suits individuals' necessities. In a particular way, low-income households struggle with these problems since pieces of evidence show that these bear higher costs with respect to wealthier ones.

2.6. Addressing the lack of Financial Knowledge

The necessity to overcome the general lack of financial knowledge is important for both individuals and regulators. Financial consulting and education programs have the potential to help less-literate individuals to fulfill all financial necessities they have.

Collins (2012) in his article on *"Financial Advice: a substitute for financial literacy"* argues that literate individuals are those who follow financial advice the most. In fact, empirical evidence suggests that seeking professional advice is frequent among financially literate individuals rather than less literate. Moreover, *Collins (2012)* reports also another important pattern that characterizes this trend. According to the author, financial knowledge is also correlated to access to financial resources or wealth, and therefore, the lower is the level of resources, the less likely they would use external help during their financial decisions. For this reason, according to Collins, advice and literacy can be considered complements rather than substitutes. In addition, thanks to his work on financial literacy, *Collins (2012)* detected also a positive relationship between the use of advice and income, confirming the complementary function between advisory and financial education.

[15] *40% of investors use so-called informal advice. E.g.. the advice of friends and relatives. Consob, Report on financial investments of Italian households (2019).*

Moreover, evidence on the advisory educational benefits was provided by the authors *Calcagno and Monticone (2011)*, who developed an economic model for the market of financial advisory. Their model exploits European household data making a comparison among more and less sophisticated investors. *Calcagno et al. (2011)* pointed out that households with low financial literacy are those with the lowest demand for financial advice, thus confirming *Collins'* previous analysis.

Despite the fact that the evidence reports a complementarity between advisory and literacy, professionals such as financial and insurance advisors have the ability to sustain individuals to engage in financial practices by supporting longer-term financial security. For instance, concerning retirement planning or alternative investment opportunities, it is usually required expert advice to successfully achieve optimal financial goals. Indeed, advisory services are extremely powerful tools that provide concrete advantages to investors in the market. In conclusion, *Collins (2012)* points out that the literature is not clear about the effectiveness of the advisory service to individuals. Collins sustains that the effectiveness of the financial advice model to individuals' lack of financial literacy is not quite supported by data, suggesting that more research is needed in order to better define and measure the impact of advisory to the population.

Another possible solution to overcome the lack of literacy would be the implementation of higher effective educational programs in schools, especially for those young individuals which must be considered the main target for policy-makers. Moreover, in order to be effective, financial education programs must take into consideration many differences among individuals, not only economic circumstances but also individuals' preferences. *Lusardi et al. (2009)* also discuss cognitive ability as a strong predictor of financial literacy. Those with higher cognitive ability (from *ASVAB - Armed Services Vocational Aptitude Battery* – test) were more likely to display higher financial knowledge as young adults *(Lusardi, Mitchell and Curto, 2009)*. *Lusardi et al. (2009)* state that several other variables remained statistically significant after accounting for cognitive ability, thus, there is actually a high degree of heterogeneity in financial literacy, even when examining a narrow age group in the population.

However, financial literature does not hold a clear position regarding the benevolence of educational programs bring to investors. Main issues concern difficulties in precisely evaluating several changes educational programs would bring to the population, thus, it is not easy to make a clear estimation on their positive effects.

2.7. Conclusion

This chapter investigated the topic of financial literacy and all the aspects that concern investors' ability to adopt optimal financial decisions. Pieces of evidence proved that, according to several characteristics such as personal skills and education, individuals' financial decisions are extremely affected from their degree of literacy.

Moreover, the chapter quoted empirical analyses which shows patterns that address several characteristics that systematically differentiate across individuals in the field of financial literacy. Geography, gender, and age are all discriminants that cluster the population. This clustering helps the policymaker to address educational programs and to sustain the financial literacy improvement among the population. In fact, policymakers are probably the first agents whose interest is to concretely assess the degree of financial knowledge in order to adopt strategies that would sustain individuals to positively participate in the financial market. Moreover, another part of the story is determined by the skills of individuals to gather information. Unfortunately, because of the high level of sophistication of financial market, it is very hard to come up with a single solution due to the high offer. Therefore, individuals might encounter difficulties in the choice and they could bear high costs given by the inability to acquire all the necessary information.

In any case, financial literacy is extremely hard to estimate, this is because of the lack of standardized rules for the measurement of financial literacy makes it difficult to assess the level of the impact of educational programs on the population. Therefore, it is not easy to make a clear estimation of their positive effects because of the inability to get a univocal way to measure financial knowledge.

CHAPTER 3: Literature on the Financial Advisor

3.1. Introduction

The previous two chapters discussed about classical compared to behavioral approach on financial decision, the ways individuals deviate from rational, and the importance of financial knowledge. In particular, the ways investors collect and process information are fundamental aspects that characterize the decisional making process. Behavioral approach captures many different aspects about the way investors adopt risky decisions and it contributes to better explain investors within the market. As a consequence, the topics introduced earlier might turn out to be useful tools for financial advisors in order to help investors throughout their financial decisions. The role of the financial advisor becomes extremely helpful during the selection of financial decisions, such as a physician who helps patients to achieve a greater level of wealth.

This chapter will dive into several roles of the financial advisor and the principal benefits advisors offer during the consulting process. It will provide a wide understanding about their main competences and the way they build their relationship and support their clients, especially concerning non-monetary benefits. These are maybe the most important features that concern the field of advisory in financial literature. By addressing a series of studies in the advisory financial literature, this chapter will present valid argumentations that will underline the importance of being advised during the investment decision process.

3.2. The Advisor as Money Doctor

The advisor is defined as a professional who, for compensation, engages in the business of advising others either directly or through publications or writings *(John A.*

Haslem, 2010). In financial terms, the role of the advisor is to provide expertise to clients concerning personal finances, investments, retirement plans, and all those activities related to money management. Professional advice represents the most important mean available in the market through which investors can receive shaped and fitted solutions to their financial problems. In general, the role of the advisor aims to support investors in order to take a clear picture of what their expectations are and lead them toward their personal goals. Financial advisors' objective is to help individuals to improve investors' management of their assets, to ensure their current wealth, and to develop potential growth in the future. Moreover, the profession of the financial advisor may deal also with supplementary social security plans, which will be introduced later in the second part of the thesis.

Financial advisory service is a relatively new practice and it is continuously evolving along with financial market trends. Starting from the second half of the twentieth century, this topic has increasingly captured the interest of economists. In fact, the importance of financial advice has been addressed to the field of financial literature which still provides empirical results on the effectiveness of this profession inside the financial market. Consequently, economists have developed convincing theories on this topic by focusing on what are the main gears that allow individuals to be engaged with these professionals. The main reasons that gave birth and helped for the development of the practice of financial advice concerns the lack of literacy on financial topics, but also cognitive and emotional errors (behavioral biases) which make individuals financially unprepared to undertake complex decision about money. Therefore, the necessity of a financial advisor arises from the fact that investors lack part of the knowledge required to make these decisions might be extremely dangerous for the investor him/herself. Consequently, behavioral techniques can be useful to advisors. Part of their activity is to correct investors' inability to decide under risk and uncertainty. Indeed, despite the improvement they are able to bring to clients' management of their assets, the ability of the financial advisor to educate investors. In this sense, financial advisors' role is very close to the figure of the educator *(Meir Statman, 2002).* Therefore, their main goal is to provide guidance to their clients through an educational process regarding their best financial decisions. In order to support investors, this figure has to improve the quality of investors' asset management. By focusing on clients' fears and aspirations by providing them downside protection and upside participation*, Statman (2002)* asserts that financial

advisors must be referred to as a financial physician. In this sense, the advisor-client relationship assumes similar features that characterize the role of the doctor with his/her patients. Qualities such as being a good listener, hand-holding, and reassuring are part of this job whose objective is to promote wealth and well-being. *Statman (2002)* continues by introducing a very fundamental point that contributes to stress the emphasis on the fundamental role of the advisory profession inside the financial world. He refers to the *"stress and status"* dichotomy investors deal with during the financial decision process. In general, every individual desperately seeks status which represents subjective financial ambitions and aspirations. However, at the same time, there must be a certain degree of protection toward risks that might incur during clients' lives. The greater the *status*[16] the client wants to achieve, the greater is the degree of stress he/she will perceive. In order to enhance a psychological *"peace of mind"* level inside the investor's mind need to rely on an advisor. As a matter of fact, *peace of mind* and *stress relief* are concepts that highly affect the advisor-client relationship. These aspects characterize the *Money Doctor*[17] such as not only the person who can make clients' capitals grow but also it relates to a figure who is able to provide concrete help on the psychological sphere of investors. Concerning the psychological level, *Shefrin (2000)* states that having a financial advisor allows the investor to have a psychological call option, which is a sort of mental "insurance" in the event of a negative result, thus, like a call option, it protects in the event of a negative result of a decrease in the price of the underlying.

At the macroeconomic level, one fundamental role of the financial advisor consists of sustaining and helping the participation of individuals in the financial market. Indeed, as *Gennaioli et al. (2015)* asserts, the advisor has an inner ability to push clients to be more engaged in the financial market. The higher the participation to the financial market, the greater the benefits in the whole financial system. Also, concerning the microeconomic level, Money Doctors are able to bring to the table several interesting benefits that clients may not even consider during their investing choice. *Collins (2012)* underlies several *non-monetary* benefits advisors provide during their activity. The following roles come from Collins' analysis on financial advice.

---

[16] Statman (2002) refers to the term "status" as that condition in which individuals desire to find themselves. According to Statman status seeking is good for us as a society because it spurs economic growth and innovation. But status seeking is also bad for us individually because it spurs stress as it separates winners from losers.
[17] The consultant should assume the role of "financial physician". (Meir Statman, 2002).

3.2.1. Informational Role

Firstly, the informational role the advisor provides to his/her clients is a fundamental activity of this profession. Being able to inform individuals is an educational process that addressees to the specific inability of individuals to collect all possible information alone inside the financial environment. Indeed, hiring an advisor may lower the cost of searching for information. Because of professionals' skills of advisors, information provision is fast and easily available to individuals who are no more required to inform by themselves, which in most cases, it may conduct to erroneous comprehension of information.

For instance, advisors specialized in supplementary social security can educate and inform clients about the advantages on pension plans or similar financial products. Indeed, the informational role of the advisor is to provide knowledge about the current regulation, the tax investors might face according to the financial choice they make and so on. In order to be effective, the advisory service must be impartial and educate investors about all the pros and cons of the financial choice they are going choose. Therefore, the information process must help clients to be aware of all the possibilities and alternatives the market offers.

3.2.2. Defusing Biases Role

Secondly, defusing biases and emotions taming incorporate all those skills that allow the advisor to reduce clients' instinctive attitudes. It refers to the ability to correct cognitive and emotional errors during the decision process and allow clients to benefits from the financial education provided by advisors. The latter refers to the emotional sphere of investors, for example, *regret-rejoice*[18] attitude during the financial decision process, which can be adjusted through self-control.

Debiasing requires a lot of effort and is composed of a set of techniques that varies according to the bias involved, but which is essentially based on the repetition of certain procedures *(B. Alemanni et al. 2013)*. This is very complex and extremely difficult for the advisor since cognitive errors and decision-making heuristics are rooted in the brain of

[18] *Chapter 1, paragraph 3.2.*

individuals and therefore these are resistant to change. If the awareness of the error is the first step for its correction, debiasing requires more targeted and structured interventions. Learning processes are most effective when the feedback of a certain decision is immediate and clear otherwise if the feedback is opaque, then learning will be less effective *(B. Alemanni et al. 2013)*.

3.2.3. Facilitate Cognition and Overcoming Affective Issues Role

Thirdly, Money Doctors have the role to facilitate cognition and overcoming affective issues which translate into helping to understand information about decisions investors take. Moreover, overcoming affective issues might be extremely helpful for decision-makers since their affections can influence in a negative way their choice. This also reflects in the process of helping investors to have a clearer perception of what is in their best interests. This comprehends also the emotional taming aspect *(chapter 1, paragraph 1.2)* that characterize the advisor-client relationship. Indeed, the advisors' role is also to tame inner emotions which can induce clients to commit errors due to impulsive instinct.

3.2.4. Mediating Role

Lastly, the *mediating role* addresses the ability to settle down disputes, for example, households' financial decisions, through impartial advice. In this field, it is exactly the case of insurance companies which, whenever is it possible, allow for a mediation between the parties in order to settle down the disputes, most of the time, avoiding court processes. In the field of social security, the advisor might take the role of a mediator between workers and firms.

3.3. Techniques for the Debiasing Process

As previously discussed, part of the Money Doctors' profession focuses to overcoming biases by making clients' necessities aligned with their intentions. Money Doctors have the power to defuse biases concerning investors' savings and/or

investments. As *Statman (2002)* suggests, financial advisors must be considered educators who provide a service to investors that goes way beyond economic returns.

As previously introduced in *Chapter 1*, mistakes can be cognitive or emotional. While the latter is much more difficult to eradicate, the former requires that the investor starts to approach financial education and educational programs. As previously mentioned, financial literature does not hold a clear position regarding the benevolence of educational programs bring to investors. *Alemanni et al. (2013)* assert that it is essential to raise the degree of the financial culture of individuals, but it must be done with educational initiatives that take into account the behavioral aspects described above. The cognitive limits of people and errors in the management of information can in fact prevent correct and effective learning.

The process of debiasing refers to the correction of behavioral errors. This aims at both the reduction and the elimination of behavioral biases and heuristics that affect the behavior of individuals. At the base of the debiasing process, there are the identification and explanation of these errors. For instance, these techniques include concrete examples which can help him to recognize errors and avoid them. However, *De Meza et al (2008)* assert that only future experience and the continuous repetition of the situation in question will be able to ensure that the right behavior is indelibly imprinted in the mind of the individual.

There are several practical debiasing techniques that advisors can apply in order to correct clients' distortions. The first one refers to *Consider the Opposite*[19]. This technique practically involves the idea that an individual should ask him/herself whether the decision he/she is taking might be wrong. Considering the Opposite shows the reduction in Confirmation bias, Anchoring, Representation, and others.

A second technique is called *Training* which consists of being involved in a pragmatic learning process. Decision-makers could be effectively debiased through training in specific domains. For instance, *Weber et al. (2006)* showed that experts that operate in the financial market are less affected by the disposition effect. Thus, through experience and the learning-back process, individuals can correct their biases.

[19] *Lord, C. G., Lepper, M. R., & Preston, E. (1984). Considering the opposite: A corrective strategy for social judgment.*

The last pragmatic technique is *Accountability*[20] which means, in this particular context, that in making a decision the subjects must first try to reflect on how they would explain to third parties the reasons that led them to act in one way instead of another.

In conclusion, advisors' educational role provides optimal starting points in order to help investors throughout their financial decisional process. Pragmatic techniques might be considered the most effective ways to learn how to manage cognitive errors.

3.4. The role of Trust

There are several intangible benefits that investors can gain from the advisory service. Benefits such as peace of mind, the information provision, and bias corrections which are intangible but extremely helpful. Furthermore, in order for the advisor to be able to support clients, the fundamental role of trust is the pillar of the advisor-client bond. In financial terms, trust might be defined as a fiduciary relationship in which two parties, the trustor and the trustee are identified. The trustor gives the other party, the trustee, the right to hold property or assets for the benefit of a beneficiary which is usually, but not always, the trustor itself. In order to assess the powerful value of trust, several economists and psychologists carried out experiments on this topic. One of the most known is the experimental study on trust provided by J. Berg and colleagues. Their analysis shows the effects that this reciprocal feeling has within individuals' interactions. *Berg et al. (1995)* trust game is an experimental game in which two individuals are engaged in a monetary transaction with incentives in trusting one another. In particular, this experiment bases on the fact that these two participants don't know each other and thus the level of trust cannot be assessed. According to classical theories and assumptions of rational self-interest, the model would predict a *Nash equilibrium* in which there is no incentive to deviate from their initial strategy, no one will gain. Thus, no one would send anything to the other player. However, empirical results obtained by the author provide complete opposite results. Berg's experimental analysis demonstrates that thirty out of thirty-two participants engaged trusted one another enhancing the performance of economic outcomes respect to the classical comparison. This experimental game

[20] *Jamillah Bowman Williams (2018). Accountability as a Debiasing Strategy: Testing the Effect of Racial Diversity in Employment Committees.*

introduced the possible positive effects that trust is able to provide. Financial literature on financial advisory underlies the importance of a trustful relationship between the *delegate* (trustee) and *delegator* (trustor).

Gennaioli et al. (2015) describes trust as the confidence in the delegate that is based on personal relationships, familiarity, and connections to friends and colleagues, communication, and schmoozing. What characterizes trust is that it engages clients to keep the delegate-delegator relationship over the long-run. This process involves clients' opening toward the Money Doctor whose main objective is to identify all possible risks investors are facing today or in the future finding out a possible solution to overcome these problems. *Gennaioli et al. (2015)* on his *"Portfolio Delegation Model"* bases its entire foundations on the power of trust which takes into consideration several aspects that characterize it. Indeed, one of this aspect concerns the level of anxiety when clients face the possibility to switch their own delegate with another one. For this reason, the extent of trust-anxiety has such a high impact on delegators; Investors put trust in their favorite manager (according to their preferences) which makes them perceives returns on risky investments less uncertain than those delivered by another manager *(Gennaioli, 2015).*

Recalling the concepts introduced form Chapter 1, what pushes investors to be more confident with what they know is referred to as the bias of familiarity. Indeed, the high-level of uncertainty is effectively mitigated by the familiarity bias which directly comes from availability heuristics conceived by Kahneman and Tversky. Familiarity bias occurs when individuals face a decision or a situation in which they are out of their "comfort zone". *Gennaioli et al. (2015)* explain that anxiety reduction is maybe the most important trigger that pushes investors to engage with advisors. In this sense, net of fees, investors consistently will underperform the market because of delegating costs, but their degree of anxiety will reduce drastically. This represents the peace of mind costs for the portfolio management borne by the client. Consequently, by experiencing less anxiety, investors will be better-off both at a psychological level and, at the same time, they would earn higher returns than what they would get on their own *(Gennaioli et al., 2015).* This vision justifies the role of the Money Doctor as the first necessity for clients' financial problems.

Also, the Delegation Portfolio Model provides room for the positive welfare effect on the overall financial market. Indeed, as previously mentioned, Gennaioli and other economists suggest that investors tend to shy away from market opportunities. In this

sense, thanks to the consulting service the advisor provides, they will be more prone to take higher risks.

In conclusion, advisors have an ambivalent role in the financial market. In fact, they are able to boost the money management performance of the single investor and at the same time, they have the ability to incentive risk-averse clients to approach new financial instruments. As a consequence, they will participate more actively in the financial market. Indeed, rather than leaving money into a bank account, a well-structured investment plan will benefit them the most in the long run. Thus, the presence of financial advisors improves investors' welfare relative to a world in which everyone invests on his own *(Gennaioli, 2015)*.

3.4.1. Losing Trust in Money Doctor

Thanks to the portfolio delegation model provided by Gennaioli, trust results the strongest driver that pushes investors to engage in activities with financial advisors. However, there are some fundamental aspects that this model does not consider. An empirical analysis of portfolio delegation demonstrates that trust is not always so powerful. *Dorn and Weber (2017)* show that delegation systematically breaks down during specific periods. The authors specifically refer to the economic cycle which the market is currently experiencing.

Dorn and Weber 's *(2017)* analysis exploits data from an extremely large sample of clients of one of the largest German banks. They show that investors who adopt a full delegation of their portfolio in an active fund were 4% (an 80% increase relative to the unconditional exit rate of 5%) more likely to sell their position and all of their risky investments by the end of 2008, compared to those who held only a single stock. In relation to the delegation portfolio model, it follows that risk-averse clients, who were incentivized by Money Doctors to be pushed into riskier investments activity, when facing higher market volatility and uncertainty, prefer to shy away from these types of investments. This demonstrates that the trust-based relationship that Gennaioli describes, involving market participation enhancement through Money doctors' activities, finds roots in empirical pieces of evidence. *Dorn et al. (2017)* conclude that the degree to which investors have delegated their stock market investments represents an instrument useful to predict whether they will exit the stock market during a crisis, which

can be attributed to an overall lack of trust in the market. Moreover, an additional piece of evidence can be inferred by Dorn and Weber's analysis. Indeed, based on the German bank sample, it is possible to observe a loss of trust in money managers is detected principally to those who held an active portfolio before the crisis.

However, the observable attitudes in the advisory-client relationship are missing something concerning the way the advisor act toward his/her clients. Indeed, pandering or contrasting investors' ideas may trigger a clash during this relation which must be considered during the process of advising.

3.4.2. Pandering or Contrasting Investors

Ethically, the educational role of the advisor is one of the principal non-monetary benefits that allows individuals to accrue their financial knowledge and better understand how to deal with financial and insurance instruments.

From Gennaioli et al. delegation model, the rise of the clash between the educational role (contrasting) and pandering investors' biased expectations leaves room for several implications. Indeed, considering irrational investors, Money Doctors may have a high incentive to pander their clients. More precisely, according to the model, pandering pushes investors who trust the advisor to invest more, and thus, gaining higher fees. As a consequence, pandering has a leading effect under the assumption of a trust-based model. This allows clients to follow their guts by chasing higher returns. However, during the long-run, a contrarian attitude is likely to be adopted in order to preserve the integrity of the Money Doctor service. Indeed, in the case in which investors experience disappointing returns over the long-run, this will be attributed to a low managerial skill rather than a personal biased perception of the investment *(Gennaioli et al., 2015)*

At this point, the manager has two possibilities: being contrarian and demonstrate his/her knowledge to clients which allows for higher earnings from fees in the future, and pandering which boosts the current earnings for the advisor at time zero leaving clients with their bias. Consequently, it might be the case when clients ask for an investment strategy that does not fit personal characteristics. As a consequence, the advisor might have the opportunity to pander the client in accordance with what he/she wants even though it would be not the optimal strategy. This is because advisor remuneration depends on the strategy adopted.

On one hand, pandering may ruin the process of trust leading clients to a *self-attribution bias*[21] over the long run. On the other hand, contrasting provides an educational role that shows its beneficial effects only in the long run but it may harm the trustful relationship in the beginning. In the end, the ability of the advisor to push clients to shy away from investing is overall a very good result. Whether the strategy is to pander or to contrast clients, the advisors' ability to incentivize retail investors to adopt more profitable financial solutions, at the end of the day, it has overall a better result for clients than adopting investing strategies by themselves.

3.4.3. Practical Capital Allocation

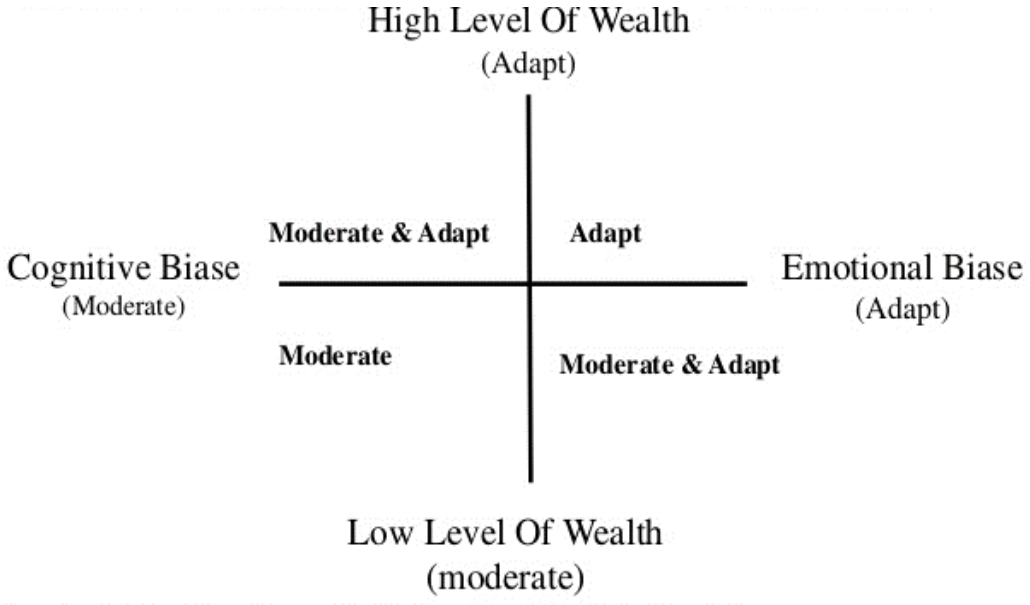
Another important contribution on pandering/contrasting or adapt/moderate concerning advisory service addresses the practical asset allocation. Through the methodology of "practical asset allocation", *Michael M. Pompian (2005)* points out a series of difficulties the practitioners encounter during the advisory process. Financial advisors are often vexed to follow clients' decision-making process when it comes to allocating their assets. Through the designing asset allocation process, advisors detect the risk tolerance of the client through a questionnaire, discuss about the client's financial goals and constraints, and recommends the output of a mean-variance optimization according to clients' valuation *(Pompian, 2005)*. This path is especially worsened when retailing clients receive the advisory service. Indeed, it is common that clients demand according to short-term market movements and to the detriment of the long-term investment plan. Thus, the two strategies advisors can adopt will have repercussions on portfolios and thus, on the relationship with clients. On one hand, serving the best interest of the client may be the recommendation of an asset allocation that suits the client's natural psychological and, on the other hand, contrasting clients' psychological tendencies in order to achieve the highest level of capital maximization *(Pompian, 2005).*

The author detected two main rules (propositions) by which advisors should act and regulated their advisory process according to the type of client they have to deal with.

[21] *The tendency to attribute successes to personal skills and failures to factors beyond their control.*

- *Proposition I;* The decision whether to moderate or adapt to a client's behavioral biases during the asset allocation process depends fundamentally on the client's level of *wealth*[22].
- *Proposition 2*; The decision whether to moderate or adapt to a client's behavioral biases during the asset allocation process depends fundamentally on the type of *behavioral bias*[23] the client exhibits.

Figure 3.1. Application of bias in Asset Practical Allocation



Propositions I and II allow for a graphical representation according the principal two features that concern clients. The graph represents on the x-axis the two side of the cognitive errors and on the y-axis the degree of wealth. In this case, according to the personal features of the single client, the advisor is able to implement the best strategy for the capital asset allocation (Pompian, 2005).

According to *Figure 3.1.,* moderate cognitive biases in less-wealthy clients (conversely adapt to emotional biases in wealthier) follows the fact that clients outliving his/her assets constitutes a far graver investment failure than his/her inability to accumulate the greatest possible wealth. On the other hand, moderate and adapt areas show how, according to the wealth degree of clients, advisors should operate. In the

[22] According to Michael M. Pompian (2005), the wealthier the client, the more the advisor should adapt to the client's behavioral biases. The less wealthy, the more the practitioner should moderate a client's biases.
[23] According to Michael M. Pompian (2005), clients exhibiting cognitive biases should be moderated, while those exhibiting emotional biases should be adapted to.

upper-left area and in the lower-right area a combination of both adapting and moderating results the best solution.

3.5. Conclusion

This chapter introduced an overview of the financial advisory framework considering the literature perspective. The importance of the role of the advisor finds its roots in several non-monetary benefits. This type of service provides stress relief to individuals who need concrete sustain during their financial decision process.

There are fundamental aspects that must be considered when evaluating the delegation of money management to an advisor. The educational role, the information provision, the defusing biases, and the emotions taming role are all very important aspects that must be incorporated during the evaluation of the advisory performance.

As provided by the delegation model, trust is the central theme of consulting services. Both clients and advisors rely on the power of trust, indeed, this intrinsic feature enables several advantages to clients who were not able to obtain alone. On the other hand, a great level of trust permits advisors to operate in a competitive context by building up fiduciary relationships and gain a positive result.

It must be considered that economic cycles can affect investors' minds and make them shy away from investing. Trust is a powerful tool but it might not be enough to contrast human heuristics and bias. Literacy on advisors suggests that there is a dichotomy between two main actions that the advising process involves. Pandering may harm the debiasing process by incentivizing clients' cognitive errors. According to *Gennaioli et al. (2015)*, pandering is the optimal approach advisors can adopt with clients because it allows for a higher degree of trust and positive mutual relationship. Instead, contrasting has the ability to enhance the educational role however this may not incentivize advisors in the short run.

SECOND PART: Behavioral Theory on Supplementary Pension Plans

CHAPTER 4: Supplementary Social Security

4.1. Introduction

Throughout the previous three chapters, the reader acquired a wide understanding of several aspects that affect both investors and advisors. On one hand, investors are extremely sensitive to cognitive biases, emotions, feelings that could affect their minds. The way they process information depends on several factors such as the degree of literacy which is a crucial aspect in the financial world. Moreover, individuals do not think about the future. Individuals may procrastinate certain decisions, for instance, savings for retirement, which is something that cannot be delayed because of timing. On the other hand, the advisor can offer not only the support to investors regarding their financial choices but also additional benefits that may concretely help clients. As discussed before, the Money Doctor has the role to guide investors; this concerns the debiasing process, taming the emotional sphere, informational provision, and so on. Thus, a huge part of the role of the advisor consists to lead individuals toward a conscious choice.

As anticipated from the title, retirement is a very important issue for anyone regardless of wealth, gender, or education. This chapter will dive into the supplementary pension plans pointing out what and how cognitive biases influences these financial decisions and their importance nowadays.

4.2. Pension Plans in Italy

Along with several reforms on pension systems implemented in recent years in many countries, there has been a change in the behavior of individuals concerning saving for retirement, especially in Italy. Unfortunately, in Italy, there is a very deep pension crisis that will have a snow-balling effect over the next years. The current public pension

system will not be able to support the burden of several economic, social, and demographic factors *(L. Monti et al., 2005*):

- The constant reduction in youth employment;
- The progressive increase of Italian seniority rate (Baby boomers pensioning);
- The difficulty of some social groups to achieve a stable income;
- Lower natality rate;
- The precariousness of the current world of work;
- The increasing National debt.

The Italian pension system crisis is projected to get worse over the years. Concerning the demographic issue, it must be considered the entry of baby boomers (those born between the fifties and the seventies) generation into the retirement age and, at the same time, the average lengthening of life. These combined together with a reduction in the birth rate will produce an increase in the number of retirees, together with a decrease in the number of people of working age *(Monti et al., 2005).*

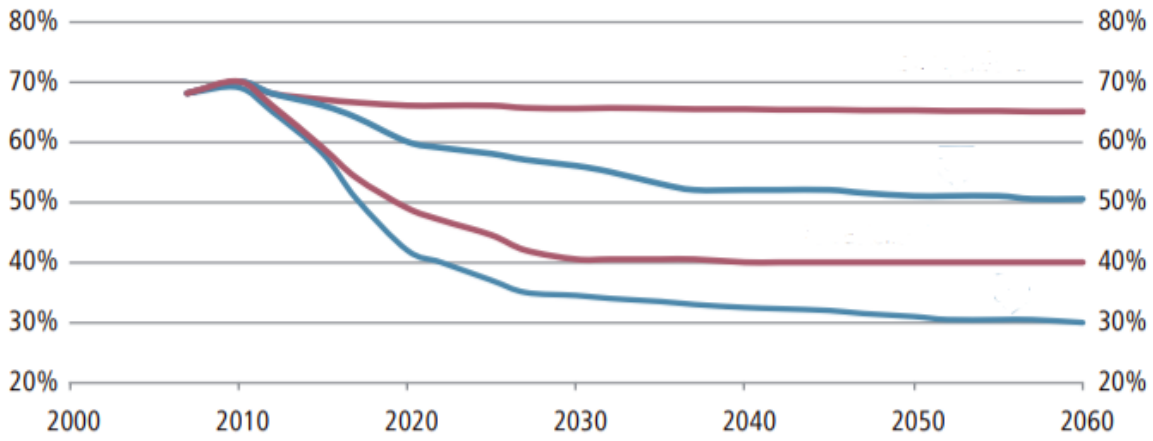
In the past the Italian public system has always been extremely generous, through the *Defined Benefit* formula, the public pension system ensured high and relatively certain monthly retirement remuneration for workers. In a defined benefit plan the employee's pension benefit entitlement is determined by a formula which takes into account years of service for the employer and, in most cases, wage or salary. Many defined benefit formulas also take into account the Social Security benefits to which an employee is entitled such as in Italy *(Bodie and Merton, 1985).* In 1996, the Italian government introduced the *Defined Contributive Plan*[24] which completely changed the whole pension system.

The final transition[25] from the famous DB (defined benefit) to the DC (defined contribution) plan in 2012 completely changed the mechanism of retirement computation. The objective of this reform aimed to improve the public pension expense and to balance the inequalities among pensions. DB system was not able to put in correlation the contributions of workers. This is because of the intergenerational pact unsustainability in Italy, meaning too many pensioners and too few workers (as previously mentioned from Bodie and Merton). DC system was introduced with the objective to cope the inefficiencies of DB system, unfortunately, DC has certain

[24] It bases the benefit on the value of contributions actually paid in. Benefit levels depend on the total contributions and investment earnings of the accumulation in the account *(Bodie and Merton, 1985).*
[25] *Fornero reform*, (28th June 2012) n. 92, is a law of the Italian Republic proposed by the Minister of Labor and Social Policies Elsa Fornero during the Monti government, to reform the labor market.

problematics too. The first one is that there is a risk due to the inflation rate. This risk would be able to devalue the accumulated capital that workers save for their pensions. Another risk is the *substitution rates* which determine the relationship between the last salary perceived and the first pension income received *(Figure 4.1.)*.

Figure 4.1. Italian forecasts of public pensioning



The graph depicts two main hypotheses: red line represents the forecasts of the pension level without any revision of the coefficients of rates of substitution (upper red line represents the employees while the lower red line represents the self-employed). The blue line represents the forecasts of pension levels with new revisions to coefficients (upper blue line refers to employees while the lower blue line refers to self-employed). (Source: Assogestioni, Guida al risparmio gestito, 2011).

DC does not guarantee high substitution rates such as the DB pension system. This is because the only things that affect the final pension is determined by workers' contributions. Thus, this may have severe risks, especially in the case whether there is a discontinuity in the working life. For this reason, integrating the public pension is a necessity people should have nowadays.

Compared to the past, people had nice pensions earnings since these depended only on last salaries perceived, while today, pensions depend only on the personal ability to pay contributions. Thus, workers will have a direct responsibility in the accumulation of savings for the elderly. Therefore, it is important to figure out how and what individuals can integrate their public pensions.

The European Union started to ensure financial sustainability concerning topics such as the social security system by guaranteeing pension benefits to citizens-workers to ensure an adequate standard of living. The European Union has focused the monetary

policy on the support and incentive of supplementary and complementary private pension systems to the public pension. These reforms consist to incentivize people to be involved in private pension schemes that will compensate for the lower value of future public pensions.

Moreover, as mentioned before, the demographic evolution has very crucial repercussions to the pension system. The *longevity risk*[26] refers to the chance that life expectancies and actual survival rates are able to exceed expectations or pricing assumptions. The risk exists due to the increasing life expectancy trends among retirees and the growing numbers of people reaching retirement age. The trends can result in payout levels higher than what a company or fund had originally accounted for. The types of plans exposed to the highest levels of longevity risk are defined benefit pension plans and annuities which guarantee lifetime benefits from policyholders. Therefore, the policymakers' intervention was necessary. In Italy, complementary pension plans are still relatively less frequent than other European states. The growth trend of members of supplementary pension schemes is positive, however, according to the latest data published by *Covip*, the number of positions reached in 2019 are 9.133 million, equal to +4.5% compared to 2018 and approximately 34% of the potential audience. Therefore, in Italy there is still a great number of people who do not hold a complementary pension plan.

4.3. Italian Regulation on Supplementary Social Security

Supplementary pension plans are a form of pensions that are added to the compulsory (public) one but does not replace it. It is based on a funded financing system. For each member, an individual account is created into which payments are made which are then invested in the financial market by specialized managers (in shares, government bonds, bonds, shares in mutual funds, etc.) and which, over time, produce variable returns based on market trends and management decisions. As can be easily deduced from the name, their function is be complement to the public pension in order to be able to reach a decent threshold for the future retirement income. Therefore, workers find themselves in the situation where they must create their own pension portfolio. The pension portfolio

[26] *Stephen Richards and Gavin Jones (2004), Financial aspects of Longevity Risk.*

will mainly consist of the public pension (compulsory) and the income from the supplementary pension (voluntary).

Until 1993, the only complementary pension plans were private pensions. These forms of supplementary pension plans were limited to only a few working sectors, such as multinational companies, banks, and insurance companies. Thus, the first pension funds spread and collected savings of certain categories of workers. These types of funds are called pre-existing pension funds. They were created before *Legislative Decree 124/1993* which is considered the first regulatory source through which pension funds were regulated.

Legislative decree 124/1993, implementation of the *delegated law 421/1992*, gives greater importance to the supplementary pension system by guaranteeing a preliminary regulation. With the entry into force of this decree, it was decided to combine the private pension system with the public one, making it complementary to it. With the introduction of this decree, the Italian social security system could be considered centered on three pillars:

1. *Compulsory Social Security*. The public pension consists exclusively of contributions paid by workers and employers and paid by public bodies (INPS, social security funds).

2. S*upplementary pension*, which supplements the public pension thanks to a funded system. Membership of this type of pension is collective, however, it is reserved for income earners. The types of funds belonging to this category are closed pension funds, pre-existing funds, and open pension funds with collective membership.

3. S*upplementary-complementary pensions*, aimed at individual savings. Membership is individual and access to this form of pension is allowed to anyone, even to individuals without income or compulsory contributions. The types of funds belonging to this category are individual pension plans (PIPs) and open pension funds (FPA).

After two years, the *Dini reform of 1995* established the COVIP (Supervisory Commission on Pension Funds) an institution that supervises all categories of pension.

In 2004, with the *Maroni reform*, it became possible to devolve the *severance pay*[27] *(art. 2120 Civil Code)* starting from 2008 in favor of supplementary pension funds, unless the employee expressly refuses. This has enormous advantages for individuals who can allocate their severance pay from the firm to the pension scheme.

Lastly, thanks to the *legislative decree 252/2005* a complete new complementary social security system was established. This decree contains the entire regulation concerning complementary pensions. Indeed, it incorporates all the norms related to the topic. Firstly, *decree 252/2005 (art.1)* established the voluntary choice and free membership of the private pension system. The subjects who can join the supplementary pension are employees (public and private), self-employed workers, freelancers, working members of the production, and labor cooperatives. The second change concerns the regulation linked to the establishment of *Open Pension Funds*. These funds are made up of both the contributions paid by registered workers and the severance pay paid by employers and the sum of these is invested in the financial markets. As part of the same reform, it was also sanctioned that "supplementary pension forms" are pre-existing funds, closed funds, open funds, and individual pension plans.

Moreover, an important point is that once an individual decides to join one of the types of supplementary pension, he or she cannot subsequently withdraw, completely renouncing the realization of the pension purposes. Because of the purpose of these financial instruments, the right to a pension benefit is acquired when the public retirement requisites are achieved and members can access the benefits established in the compulsory membership scheme, with at least five years of participation in supplementary pension schemes.

4.4. Forms of Supplementary Social Security

According to Italian law, complementary social security schemes are divided into three forms. The first two categories are represented by funds which are divided into two

[27] *Severance Pay (TFR – in Italy) is the compensation and/or benefits an employer provides to an employee after employment is over. (https://www.investopedia.com/terms/s/severancepay.asp)*

distinct sub-categories: Negotiated pension funds and Open pension funds. The third form of complementary pension scheme consists of individual pension plans.

- *Negotiated Pension Funds*

  The first type is that of Negotiable Pension Funds which is a closed-end collective fund and is established based on corporate (or national) collective bargaining between employee representatives and employers' representatives. This category of funds is aimed at specific categories of workers, who must belong to the same sector, company, or a specific territory. Usually, workers devolve only their severance pay to these funds. However, these can allow adherents to accumulate additional contributions[28] to their position. Since these types of funds are collective forms, workers can benefit (according to the contract) from additional contributions agreed with the firm. These kinds of funds have relatively low management costs with respect to another form of the complementary pension plan.

  The task of the negotiating pension fund is to collect the various subscriptions and contributions, identifying the capital investment policy, and also defining the distribution of social security benefits. The negotiating pension fund is an independent legal entity with its own legal bodies: the fund manager, the assembly, and the administrative and control bodies.

- *Open Pension Funds*

  The second type refers to the Open pension funds. This category of supplementary pension forms is established by banks, insurance companies, asset management companies, and investment firms, which allow for the achievement of an annuity that integrates the amount of the basic pension. Membership of this type of fund can be provided on an individual or collective basis. There is individual membership if the worker chooses to join the open fund directly, instead, there is a collective membership when the worker signs up in a pension fund already subject to membership by his/her company through a collective agreement. The particularity of these funds is that workers

[28] *Art. 8, comma 2 of Legislative Decree 252/2005.*

can devolve their severance pay and also additional payments to increment their level of capitalization

This type of funds is available to any subject: employees, self-employed workers, freelancers, working members of cooperatives, subjects without income, and dependent on other subjects. Their functioning takes place in the following way: financial management is followed by the promoting company, which creates an autonomous asset necessary for the future payment of the pension. The custodian bank, also, in this case, must be an external party. The fund manager is appointed by the company, in order to check that its management is carried out in compliance with COVIP rules.

- *Individual Pension Plans (PIPs)*

The third type consists of Individual Pension Plans (PIPs). It is an individual pension form created through the signing of life insurance contracts for social security purposes, authorized by *IVASS*[29]*.* This form of supplementary pension plan is voluntary for everyone. As envisaged for open-ended funds, Individual Pension Plans are created through contracts that give rise to an autonomous and separate asset, which are only necessary for the future payment of benefits to members. The amount of the pension benefit will only derive from the contributions voluntarily paid by the worker and the relative capitalization. PIPs can take two different forms:

- *life insurance contracts* (*class I – CAP art.2*), in which the revaluation of the individual position is linked to one or more separate internal management;
- *life insurance contracts* (*class III – CAP art. 2*), in which the revaluation of the individual position is linked to the value of the units of one or more internal funds held by the insurance company or to the value of the units of UCITS (collective investment schemes).

In addition, there may also be mixed forms, in which the revaluation of the individual position is linked to *class I and III* life insurance contracts

[29] *The Italian Institute for the Supervision of Insurance.*

- *Pre-Existing Funds*

  This category is not more available in the market; however, it is still regulated by current law. This type of funds had already spread before *Legislative Decree 124/1993* and provided for membership on a collective basis. These were created through corporate or inter-company agreements contracts. These pension funds represent a very heterogeneous set of collective forms of complementary pension aimed at specific sectors of workers. They are divided into two sub-categories. The autonomous pre-existing pension funds with subjectivity legal (unrecognized associations, recognized associations, foundations) and the internal pre-existing pension funds. This latter was set up within companies (banks, insurance companies, businesses) such as separate assets according to art. 2117 of the Civil Code, or only as an accounting post for the liabilities.

4.5. Advantages of Supplementary Pension Plans

Legislative Decree 252/2005 regulates every single aspect concerning supplementary pension plans (e.g., the tax regime). This regulation tries to encourage workers, especially young ones, to join the forms of private pension, in particular, by providing for significant tax breaks for members. There are significant advantages that individuals can benefit from when they subscribe to supplementary pension funds. Concerning profitability, these relate to Fiscal Benefits, Tax Benefits, and Higher Returns.

4.5.1. Fiscal Benefits

During the contribution phase, the voluntary contributions are deductible from the taxable income tax base up to an annual maximum limit of 5,164.57 euros. Therefore, depending on the level of income per year of the individual, he/she is able to deduct the amount of capital deposited in his/her supplementary pension scheme. Thus, individuals subtract from the income per year the amount of capital deposited, and then the amount of tax is computed up to the net income level (*Table 4.1.* shows the tax rate -IRPEF- applied according to the income level).

For instance, an individual who has an income per year of 35,000.00 euros decides to deposit 5,000.00 euros in his/her supplementary pension scheme. The effect of the tax deductibility has a great impact on the annual taxation level. Without any form of supplementary pension scheme, his/her taxation would have been 13,000.00 euros (35,000.00*0.38). Thanks to the deposits he/she made, the annuals taxation decreases up to 11,400.00 euro (30,000.00*0.38), therefore, obtaining a final tax reduction of 1,900.00 euros. Moreover, for workers who entered the world of work at the beginning of 2007, in the 20 years following the fifth year of membership of the pension fund, the maximum limit can be exceeded, up to an annual ceiling of 7,746.86 euros. This type of advantage is also valid for PIPs.

4.5.2. Tax Benefits

According to regulation 252/2005, supplementary pension plans are subject to lighter taxation regime. In fact, once the member accrues the necessary requisites for the public pensioning, the taxation of these financial instruments is very advantageous. The accumulated capital (whether it is converted in annuity or not) is subject to a 15% taxation rate which is reduced by 0.30% for each year of participation in supplementary pension schemes after the 15th year. The maximum reduction is 6%, therefore the minimum rate is 9%. The taxable amount is made up of the contributions deducted and the severance indemnities paid to the fund. For this reason, an individual who starts very early to accumulate severance pay plus other personal contributions in a supplementary pension scheme can obtain taxation of 9% compared to regular taxation which is the personal income tax rate (IRPEF) in the case of severance pay left in the firm. *Table 4.1.* shows the personal income tax that is applied when severance pay is given back to the worker who opted to allocate its capital accumulation into the firm where he/she worked.

Recalling the previous example, suppose that the previous investor adhered to a supplementary pension scheme for 40 years. He/she opted to allocate only his/her severance pay to the private pension scheme. At the end of the working age, suppose that the final amount of savings is 100.000,00 euros (only severance pay – no other fiscal benefits). The taxation rate would be 9%, since for each year of membership after the 15th year, the tax rate decreased by 0.30%. Therefore, the final taxation results 9.000,00 euros.

While, in the case of severance pay within the company, the IRPEF taxation would have been 38%, therefore, a final taxation of 38.000,00 euros.

Table 4.1. IRPEF and Personal Income

ANNUAL REVENUE	IRPEF TAXATION
Up to 15.000 €	23%
From 15.000 € to 28.000 €	27%
From 28.000 € to 55.000 €	38%
From 55.000 € to 75.000 €	41%
More than 75.000 €	43%

Personal income tax according to the income categories in Italy. DPR 22th December 1986 (Testo Unico del 22/12/1986 n. 917, pp. 21).

4.5.3. Higher Returns and Costs

Of course, Open Pension Funds, but also Negotiated Pension Funds and PIPs, are extremely flexible and an individual can define its best investing strategy also according to what is the time horizon to pension. Because pension plans are one-off purchases, the idea behind the investment strategy should be based on the time horizon individuals have. In finance, it is demonstrated that the stock market over the long run beats the Treasury Bills. Therefore, individuals have the possibility to exploit the potential growth of the stock market in order to get higher benefits for their future pension. Also, the possibility to switch the investment strategy allows individuals to consolidate their capital when the time horizon is closer to the end. Italian supplementary pension plan supervisor (COVIP) estimates the following data. The average of Open pension funds returns over the last ten-years period is about 3,4% while Closed pension funds returns concerning the same time horizon are about 3,3%. PIPs returns are on average about 3,0% which is due to several reasons, especially because of the high costs these financial instruments have, thus, underperforming respect to its other two siblings.

Concerning the costs of these financial instruments, financial returns generated by the pension funds are taxed annually at a rate of 20%, while for other financial instruments it is applied a rate of 26% on the generated returns. Meanwhile, the rate of taxation for the returns arising from the investment in Italian and equipped public securities, it is applied the 12,5% rate. Moreover, there are other costs that must be

considered when an investor should decide whether to opt for one supplementary pension plan or the other. Taxation on returns is already included in the annual management costs for supplementary pension scheme. Every year, Covip provides all the costs of the supplementary pension plans listed and available in the Italian territory. This list summarizes all the costs through the ISC (in English APR – annual percentage rate of charge) in which are computed the average costs of the financial instrument, including also the charge for subscription, transfers, switch operations and so on.

Overall, even considering management costs of supplementary pension products, the economic returns that individuals have are still positive and it is worth a lot in the long run.

4.6. Cash Out Operations

The *cash-out*[30] occurs when the member, who must meet certain requirements, requests the partial or total disbursement of the position before retirement. The regulation establishes that pension benefits under the defined contribution and defined benefit schemes can be paid out in the capital form, according to the current value, up to a maximum of 50% of the final accumulated amount, and the rest in an annuity form. Individuals enrolled in the supplementary pension scheme have the possibility to choose the preferred payment method. They can receive it entirely in capital, entirely in annuity, or mixed. However, please note that it is possible to receive one's supplementary pension entirely in the form of capital. This can only happen when the annuity, deriving from the conversion of at least 70 percent of the final amount, is less than 50 percent of the *social allowance*[31].

The cash-out can be also requested when:

- In the event of unemployment, layoffs, and mobility procedures for a period of no less than 12 months and no more than 48. In these cases, it is possible to request partial redemption, for an amount equal to 50% of the matured position.

[30] *Art. 11, comma 2, Legislative Decree* 252/2005
[31] *Article 3, paragraphs 6 and 7, of law no. 335 of 1995.*

- In the event of permanent disability that reduces the ability to work by at least one third, if it involves unemployment for more than 48 months. In this case, it is possible to fully redeem the amount accrued. However, he is not admitted in the five years preceding the accrual of the requirements to access supplementary pension benefits.
- In case of death of the member before accruing the right to a pension. In this case, the redemption of the entire position may be requested by the heirs.

Other cases of cash out are identified by COVIP as the loss of the requisites foreseen by the statutes and regulations of the funds. In the first three cases, a withholding tax is applied to the redemption with the rate of 15%. For each year after the fifteenth year of participation in supplementary pension schemes, there is a reduction of 0.30%, the maximum reduction limit is 6 points, the minimum rate can therefore be 9%. As for the case in which the member dies before the right to an annuity matures, the position is redeemed by the heirs. In the case of individual pension schemes, in the absence of heirs, the position is devolved to social purposes; in supplementary pension forms, it remains in the fund.

4.7. Transfer Operations

The member of a supplementary pension plan can request the transfer[32] of what has been accrued to another supplementary pension plan. The shift from one pension form to another does not occur frequently during membership, since the assessments on supplementary pension forms must be made over a long period of time. The seniority in the supplementary pension begins to run with the membership, the transfer does not involve the interruption of this. Therefore, transfer operations from one supplementary pension scheme to another do not affect the lighter tax regimes. For instance, an individual who already has accrued 25 years of membership, in the case of transfer, the taxation would still be 12% (15% minus 0.30% times 10 years).

The transfer is possible after a minimum registration period of two years in the transferring fund. The transfer can take place before its deadline in the case when the member loses the requisites for participation in the fund. For example, if the member was

[32] *Art. 14, Legislative Decree 252/2005*

enrolled in a negotiated pension fund and changes job category, the worker can transfer the position to another pension form which the member accesses in. The worker, on the other hand, can ask to enroll in another fund at any time, before the minimum period of stay. Usually, there are no charges on transfers. Transfers occur if the transferring fund (fund or Individual Pension Plan) implements changes that involve a significant worsening of economic conditions or these are simply more expensive respect to other forms of supplementary pension schemes. Finally, the transfer can also take place as a consequence of the dissolution of the transferring fund.

The following table synthetically represents all the possible cases in which a transfer may be requested.

Table 4.2. Transfer to another supplementary pension plan costs.

MOTIVATION	AMMOUNT OF CAPITAL	SUBSCRIPTION YEARS	TAXATION
SUBSCRITION TO ANOTHER SUPPLEMENTARY PENSION FUND	100%	IN EVERY MOMENT	NONE
NOT SPECIFIED	100%	AFTER 2 YEARS	NONE
AGGRAVATE CHANGES	100%	INDEPENDENTLY	NONE

The relative table represents the motivations and the relative costs that an individual sustains in the case of pension plan transfer. These are zero since they allow individuals not to be tight to one contract. Art. 14 commas 6, Legislative Decree n. 252/2005.

4.8. Advances Operations

The advances are the disbursement of a part of the amount accrued in the form of a supplementary pension, to meet the specific needs of the member, before the right to retirement is accrued. *Art. 11* of the *Legislative Decree n. 252/2005* explicit the possibility of requesting advances from the fund.

Individuals can anticipate their capital base on three motivations. There are different taxation rates applied accordingly to each motivation. Indeed, concerning health care expenses (also for relatives), because of the importance of the issue, the maximum

capital that can be anticipated is 75% of the total amount accumulated over the years. The relative taxation is lower than the IRPEF. Indeed, this ranges from 15% to 9% according to the years of subscription. It is possible to get the advance because of medical aid any time after the subscription. In the second case, the capital anticipated could be maximum 75% for home purchasing or restructuring and for the third case maximum 30% for other necessities not specified by the membership. For these last two cases, individuals can ask for the advance only after 8 years of membership. Moreover, for these two last cases, the taxation is fixed at 23% rate.

The following table summarizes all the possible cases that the member of the pension fund can get the money in advance.

Table 4.3. Anticipation from supplementary pension funds

MOTIVATION	AMMOUNT OF CAPITAL	SUBSCRIPTION YEARS	TAXATION
HEALTH CARE EXPENSES	MAX. 75%	IN EVERY MOMENT	MAX 15% - MIN. 9%
HOME PURCHASING OR RESTRUCTURATION	MAX. 75%	AT LEAST 8 YEARS	23%
OTHER NECESSITIES	MAX. 30%	AT LEAST 8 YEARS	23%

The table shows the relative motivations, costs, and also the relative taxation for any anticipation from the supplementary pension fund. Art. 11, Legislative Decree n. 252/2005.

The anticipation request can also be re-proposed for the same reason, always respecting the conditions concerning the duration of the registration and the maximum amount payable, there are no time limitations between one request and another.

Comparing the management of the severance pay within the company to its management within a private pension scheme, with respect to any request for the advance of the severance pay left within the company, the worker it is necessary to have completed at least 8 years of service with the same employer. Furthermore, private employees must request an advance on the severance pay not exceeding 70% (only for health care expenses or first home purchase/restructuration) of the treatment to which he/she would be entitled in the event of accrued payment *(law 297/82).* Therefore,

according to the law, private employees who adhere to a supplementary pension schemes benefits of greater advantages regarding advances operations of their severance pay.

4.9. Conclusion

This chapter provided knowledge about the supplementary pension system and it widely explained the advantages that individuals would have when they subscribe to a supplementary pension plan according to the current Italian regulation.

Because of the not so good scenario of the Italian public debt, public pensions are projected to dramatically decrease in the future, and thus, the same government pushes individuals to adhere to complementary saving plans in order to match the future gap in the pension system. This is because of the intergenerational pact unsustainability which consists of a combination of different demographical and sociological patterns that characterize the Italian scenario.

Starting from the current Italian situation, the chapter explains the main benefits and the process through which these financial instruments help individuals to accumulate capital for their future. Fiscal advantages and also higher returns are extremely appealing features that should attract a high number of people. However, at least in Italy, there is still quite a low number of participants in these forms of investment. In order to provide an answer this low participation rate, some better investigations must be carried out. Indeed, behavioral finance is what can help to find out reasons that push investors to be wary with respect to supplementary pension plans.

The next chapter will look at behavioral patterns that affect individuals' decisional process. As already discussed in *Chapter 1*, cognitive errors can lead investors to misunderstand and opt for financial decisions which in most of the case are non-congruent to their intentions.

CHAPTER 5: Behavioral Considerations of Supplementary Pension Plans

5.1. Introduction

The previous chapter introduced the Italian normative on supplementary pension plans. These types of pension schemes are able to provide benefits to individuals since they have enormous fiscal advantages, a high degree of flexibility, and the possibility to obtain high returns over a long-time horizon. Unfortunately, supplementary pension plans are still quite misunderstood in Italy. According to *Covip (Italian Surveillance Institute for Supplementary Pension Schemes)*, only a few more than 8 million Italian subscribed to a form of supplementary pension scheme. Some considerations might come from behavioral finance. Indeed, there must be some behavioral, but also emotional aspects that might explain the reasons for this low participation rate in Italy. As already discussed in Chapter 1, the financial decision-making process works according to cognitive and psychological mechanisms, thus, even for retirement planning, heuristics and biases affect individuals' reasoning. This chapter will investigate the biases that might affect individuals in the selection of their pensions planning and it will portrait the foundation for the empirical analysis this thesis provides.

5.2. Supplementary Pension Plans and Biases

Retirement planning in financial decision-making represents maybe the most significant investment in individuals' lives. Modigliani proposed in the 1950s the LCH - *life-cycle hypothesis (Modigliani, Franco, 1966 "The Life Cycle Hypothesis of Saving, the Demand for Wealth and the Supply of Capital)* which is an economic theory that describes the spending and saving habits of people over the course of a lifetime. People tend to smooth consumption throughout their lifetime by saving the most they are able to be productive and work, while they dis-save during the retirement period in which capitals

are required to sustain their standard of living. This reasoning matches the ideas of the classical model in which individuals are rational and completely able to manage their financial resources. Moreover, savings are positively correlated with age, with the resources available but also with the financial skills. Despite this, in many cases, individuals save in a way that contrasts with what is foreseen by the model described so far. To correctly apply the savings model to one's life cycle, it would be necessary to estimate factors that are difficult to predict with accuracy. These elements such as the life duration, health and family conditions, the evolution of their economic condition, taxation regime and others are completely outside of one's individual ability to plan. However, there are also many factors, related to behavioral finance, that negatively affect the ability of individuals to make financial decisions in view of retirement. Biases, emotions, and financial knowledge are significant factors that affect every financial choice.

As Collins suggested in Chapter 2 and 3, despite the fact that financial advisors are able to help in the debiasing process thanks to an educational approach, individuals, especially those who have a higher necessity, do not search for the sustain of a professional. Pieces of evidence show that advice is a complement feature to financial knowledge rather than a substitute. People might not be able to plan for their future wealth. They might lack of proper self-control which is a necessity in order to save for retirement. As an implication, biases have very negative consequences in the social security field. Consequently, behavioral finance plays an increasingly important role since it can provide tools that can keep track of investors' cognitive errors by mapping the way they deviate from the rational path.

In particular, several biases are directly involved in the process of retirement. This chapter focuses on the main biases related to the decision of supplementary pension plan and the way these can mistake investors.

5.3. Present Bias and Self-Control

In Chapter 1 paragraph 2.1., it was introduced the present bias which describes the way individuals decide before an intertemporal choice. The way decision-makers deal with these kinds of decisions is inconsistent with a rational point of view. *Dasgupta, Maskin (2005)* and *Halevy (2008)* studies suggest that the temporal discount is a

consequence of great uncertainty attributed by individuals to distant outcomes in time. In fact, uncertainty about future events makes individuals misperceive the importance of certain financial decisions. The low rate of participation in pension funds might be explained by many causes, including the so-called hyperbolic discount, which gives too much weight to today's consumption compared to the benefits of retirement savings that are perceived as too distant.

Behavioral economists sustain that individuals are aware of how it would be correct and advantageous to act. They recognize the benefits obtainable from joining supplementary pension funds, in some cases, perhaps, they have even planned how they could start. Despite this, they make enormous efforts to fulfill their objective and, when they make decisions, they proceed ineffectively and uncertainly. In turn, the relevance of poor self-control in the choice to save is explained in different ways in relation to the perspective from which the problem is analyzed, whether it be more economic or psychological *(Mitchell O.S., Utkus S.P., 2004)*. From an economic point of view, the *hyperbolic discounting model*[33] in which current consumption results more convenient than saving. From the psychological point of view, individuals measure the risk through their emotions by attributing it to two categories: risk of catastrophic event and risk linked to uncertainty or the unknown. Within this subdivision, the risks associated with retirement fall into both categories. However, unlike what happens for other risks that individuals may incur, those related to the uncertainty in planning their own retirement capital accumulation, individuals do not consider it as an important concern. Therefore, although workers realize the importance of supplementary pensions, they often choose not to save for the future *(Mitchell O.S., Utkus S.P., 2004).*

From present bias, two main consequences can be detected. The first one refers to procrastination. This one occurs because of decision-makers' lack of the perception of the risk. In fact, concerning retirement, the discounting effect makes individuals misperceive the importance of a good social security plan that will economically sustain them in the future. Procrastination refers to the lack of effective awareness of people about this topic. In fact, for many people, the present has much more weight during the decision-making process *(A. Bisin and K. Hyndman, 2018)*. Thus, procrastination is connected to the idea of misperception of the future risk people will encumber.

[33] *Chapter 1., Paragraph 1.3.1.*

The second one refers to inertia, which is a sort of implication that derives from procrastination. Indeed, people are reluctant to change the choices they made. This is connected to the status quo bias which refers to the situation where individuals prefer to stick with their choice instead of opting for something unknown *(Kahneman et al. 1991).* Inertia can be very dangerous because it makes individuals stick with their initial financial decision even though market conditions may change and these could dramatically affect their investments *(Alemanni et al., 2013).*

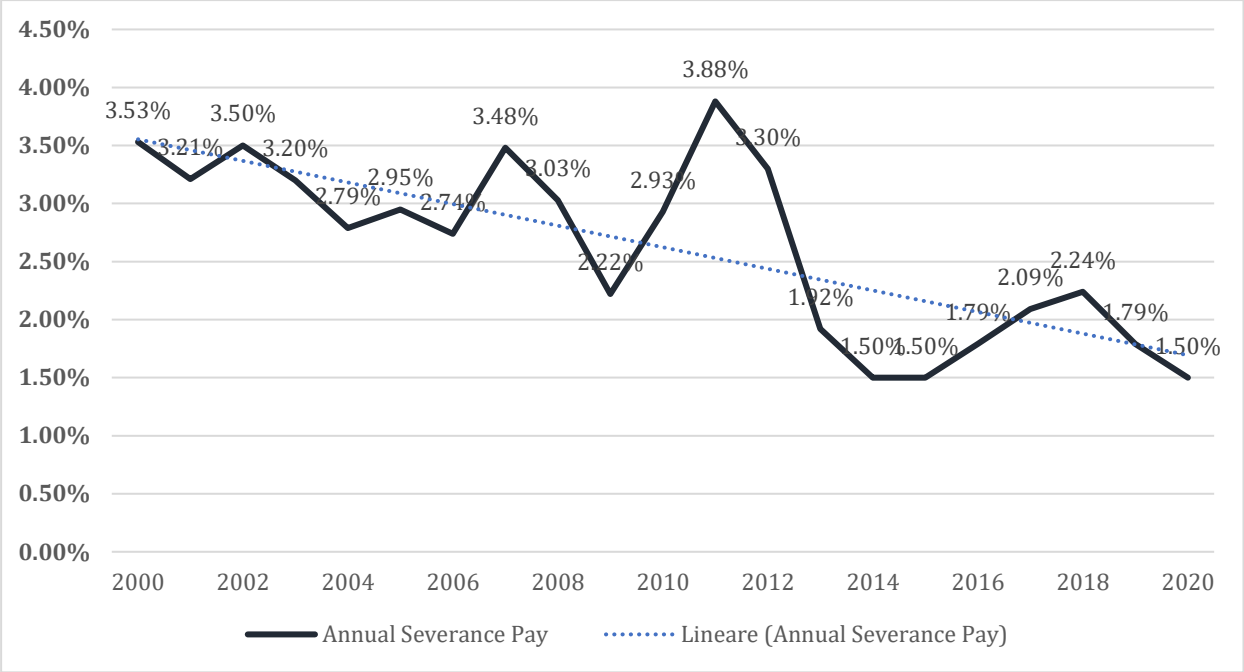
Therefore, because of the present bias, two main drivers push investors to not consider any pension funds. Whether they tend to procrastinate their decisions or whether they do not want to change their status quo, individuals forego possible economic benefits that can better-off their future savings. Moreover, concerning the aging factor, individuals are usually not aware of the longevity risk that nowadays society is facing. This is because individuals' perception of risk tolerance, most of the time, does not coincide with the real one *(Cervellati, 2012).* This implication is extremely dangerous to individuals because of the misperception of the time factor which has a huge importance regarding retirement planning.

5.4. Home Bias and Familiarity

As stated in the previous chapter, *Legislative decree 252/2005* allows for the possibility to allocate workers' severance pay to a complementary pension fund. With no voluntary expression of the worker, severance pay is accumulated within the company. The *revaluation of the severance pay*[34] *(Figure 5.1.)* takes place annually based on 1.5% fixed and a variable which is determined by the increment on the compounded basis of the inflation rate of the previous year. On the other hand, the value of the pension fund depends on the basis of the investment strategy.

[34] For more detailed information check Civil code art. 2120.

Figure 5.1. Revaluation Coefficient - ISTAT data updated January 2021



As it is possible to see from the picture, starting from the 2000, there is a decreasing tendency over the last 20 years. Especially private employees should be extremely concern of this negative trend since their severance pay revolution keeps being lower over the time.

Workers might be affected by the home bias, namely, they would prefer to stick with what they know. In this way, they shy away from other opportunities the market offers. This bias is psychologically very strong since it does not make individuals to consider other possible alternative for their money management, thus missing important opportunities in the market. Home bias affects investors who prefer to invest in securities of companies of their same nationality. This happens considering their location (national or even local companies) but also concerning emotional reasons (the sense of belonging) or deriving from the illusion of knowledge and which, for example, can lead to investing in the company for which you work. This is connected to the concept of familiarity in which the familiar is favored over new places, people, or things.

In finance, these sorts of cognitive errors might be extremely dangerous because of the fact that investors shy away from investing in foreign countries, thus diversifying their portfolio. According to the *Corporate Financial Institute*[35], foreign equities may also offer extra risk protection against the systemic risk inherent solely in one's own country,

[35] *(https://corporatefinanceinstitute.com/resources/knowledge/trading-investing/home-bias/)*

namely, the risk that an economic and/or financial market downturn may occur that is specific and limited to your home country and unlikely to significantly affect either the economies or financial markets of other countries.

On one hand, the idiosyncratic risk of leaving personal assets in one only company is very dangerous for individuals, on the other hand, according to the home bias, they feel more protected because they know the company. The diversification of the portfolio is the most important aspect that the advisor must transmit to clients, and it is a good path to help remove the home bias.

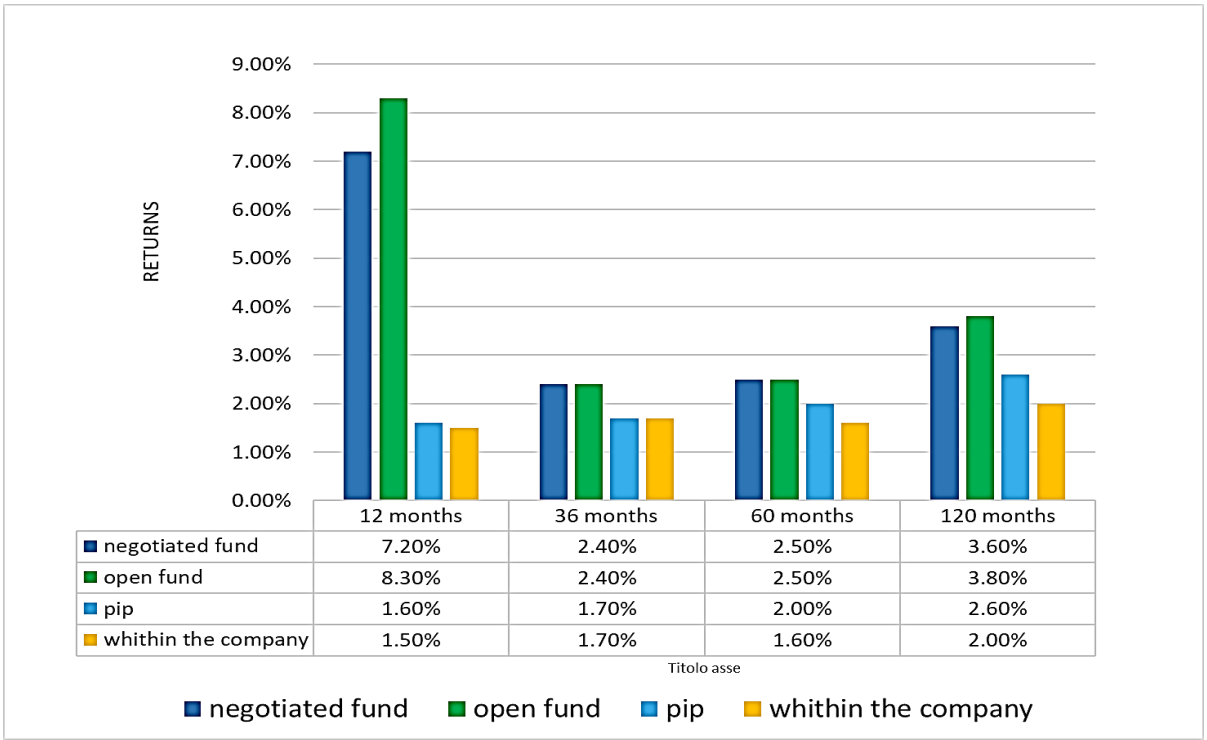
Pictet asset manager (2017) asserts that pension funds win on the severance pay in the company. In fact, the 80% of workers ten years ago, with the entry into force of law 252/2005, when faced with the choice of what to do with their "liquidation", said no to supplementary pensions. But, on balance, it was the wrong choice. Looking at returns, the majority took the less efficient route. As behavioral finance teaches, workers, without a forced choice or almost, in front of the formula of silence or dissent, often make the decisions that are less convenient for their pockets.

Figure 5.2. presents *data from COVIP*[36] in which it is possible to compare the management of severance pay within the company versus the returns of supplementary pension funds net of costs. The returns for supplementary pension plan overall beat the management of severance pay within the company. However, individuals' tendency to keep their capital accumulation within the company is still very high in Italy.

Being home biased would translate in maintaining the capital accumulation within the company and thus losing the opportunity to gather higher returns than what they would earn if investing in the market.

[36] *(https://www.covip.it/sites/default/files/notizie/agg_stat_set20.pdf)*

Figure 5.2. Supplementary pension plans versus company capitalization of severance pay.



On the x-axis (time) 12 months (2018-2019), 36 months (2016-2019), 60 months (2014-2019), 120 months (2009-2019). The y-axis represents the returns in percentage. The returns are net of management costs and substitute tax for all pension forms. The average returns for open pension funds and negotiated pension funds are higher in the short-run because of the exceptional positive trend of stock-based investment strategy in 2018-2019. Over the long-run, both the two categories of funds beat the severance pay left within the company. (PIPs investment strategy – gestione separata).

5.5. Myopic Loss Aversion and Mental Accounting

Another very predominant aspect is that individuals are extremely sensitive to losses. Concerning long-run investments, such as supplementary pension plans, *Myopic Aversion*[37] leads individuals to invest too little in stocks even when the time horizon is very long. Indeed, because individuals are so averse to losses they would prefer to adopt "safer" investment strategies. This leads individuals, especially young ones, to get too low yields to meet their retirement goals. On the one hand, this is due to the aversion to short-term losses, which is precisely myopic because it does not consider the very long investment horizon.

[37] *Chapter 1, paragraph 1.4.*

Furthermore, one more reason is related to *Mental Accounting (Chapter 1, paragraph 1.3.3.4.)* which refers to the brain's tendency to categorize money into separate sectors or partitions. This bias was also discussed in *Chapter 1 paragraph 1.6.* in which investors' portfolio construction is affected to the segregation effect, therefore, each asset is considered separately rather than in their collectivity. What concerns the most the mental accounting process is that each mental account corresponds to a certain tolerance to risk which is not necessarily related to the time horizon.

E.M. Cervellati (2018) in his article *"this is how the brain deceives about retirement"* discusses a very crucial mental error that individuals usually do. Suppose a 30-year-old person must decide the investment strategy of his/her supplementary pension fund. The public pension this person will have in the future would eventually be very low compared to his/her salary. Because the word pension evokes in individuals' brains the idea of certain (as the public pension), they associate the accumulation process with low-risk tolerance. Individuals tend to think this way since they want to make sure they will have the money when retirement comes. Consequently, this leads people to invest in low-risk instruments such as bonds. This erroneous reasoning leads us to confuse the goal (safety) with the means to achieve it. In order to have the "certainty" of setting aside a sufficient amount to supplement the public pension, it is necessary, having a long-time horizon, to invest a significant portion in shares that offer high returns over the long run. Obviously, this is all about the time horizon, individuals close to retirement can have high benefits too with supplementary pension funds. This is due to the taxation benefits. In their case, they should keep their capitals in a safer investment strategy in order to avoid the high risk of the short-run stock market.

Therefore, mental accounting and myopic loss aversion are extremely harmful to investors. Moreover, when retirement planning is involved, higher importance goes to the time horizon rather than individuals' risk tolerance.

5.6. Overconfidence

The term overconfidence occurs when a person's subjective confidence in his or her judgments is reliably greater than the objective accuracy of those judgments. This bias can be attributed to phenomena such as:

- The miscalibration, which refers to the determination of too narrow confidence intervals, thus underestimating the variability of a phenomenon;
- The *better than average effect (Kim et al., 2017),* or the assumption of being better than the average;
- The *illusion of control (Langer, E. J., 1975)* is resolved in the belief of being able to dominate phenomena that in reality are not controllable, such as the trend of the financial markets. The illusion of control therefore implies that the role of personal ability is perceived as central even in the circumstances in which case is predominant.

Overconfidence is very often reinforced by *self-attribution bias.* This one refers to the tendency of people to consider successes as arising from their own abilities and, in the opposite way, individuals attribute failures to external causes. Another bias that is related to overconfidence is the *hindsight bias* or the error of "hindsight". *Barberis* and *Thaler (2003)* define this bias as a retrospective judgment that leads individuals to erroneously believe that the result of an event was already obvious and predictable when they made the decision, while in truth it was justifiable and understandable only in retrospect.

Confirmation bias, or confirmation error, occurs after deciding and it is expressed in the propensity of individuals to consider as true and relevant only the information that confirms the goodness of the choice made, neglecting all the others.

Therefore, overconfidence has important repercussions on individuals' financial decisions. For instance, when individuals are asked where to invest their money into a fund. Overconfidence affects their decision making them exaggerated confidence about the choice made without even take into consideration other available options. In particular, individuals' tendency to be overconfident mirrors a stubborn attitude which makes people suspicious about other available possibilities the market offers.

5.7. Herd Behavior

Herd behavior is the behavior of individuals in a group acting collectively. This is typical behavior that affects individuals in a collective way. Herding is a form of convergent social behavior that can be broadly defined as the alignment of the thoughts or behaviors of individuals in a group (herd) through local interaction and without

centralized coordination. They are largely influenced by emotion and instinct, rather than by their own independent analysis. This guide provides examples of how investors may succumb to herd bias.

Raafat et al. (2009) suggested that in the group environment individuals are exposed to ever-shifting emotional messages and are influenced by the social situation and other agents. The convergence upon a single mood or emotion can elicit herd behavior in which the agents are connected and process stimuli in a similar manner.

Herd behavior may arise in every situation, not necessarily tight to financial concerns only. When decision must be made, individuals might follow the "herd" which can be represented by family, friends, and also working colleagues. This mechanism pushes investors to be biased upon the choice they are going to make, and they would tend to follow others by converging toward the same result. As a consequence, the choice of where to allocate retirement savings might be affected by the choices already made by individuals that are close to the decision-maker. This suggest that people follow what others already did.

5.8. Conclusion

There are many cognitive errors that individuals make during the management of their savings for an adequate capital accumulation. In conclusion, the behavioral aspect that characterizes individuals' financial decisions are multiple. Managing savings and pursue an adequate pension plan might not be so automatic for individuals. Even though people have all the information about the benefits this financial instrument brings, the fact that individuals' minds are biased make decision-makers delay their choice, or even opt for a sub-optimal one.

There are numerous biases that might affect individuals' cognition during this process, and these can heavily affect the final result. In particular way, hyperbolic discounting and biases connected to this behavioral pattern specifically reflect the inability of individuals to pursue savings plan for retirement. Also, home bias has several implications too. Indeed, in Italy people tend to leave their severance pay within the company where they work respect to invest it in a specific fund which is appositely conceived to enhance capital growth for retirement accumulation. Myopic loss aversion and mental account are other two important biases that have implication in the field of

supplementary pension plans. Because of the mental association between safety and pensions, individuals would tend to invest their capitals in a non-optimal, especially when the there is a long-time horizon. The last two important biases are overconfidence and herd behavior. These two can be interpreted as a sort of opposite since on one hand being overconfident denotes an over esteemed self confidence that would eventually leads to cognitive errors; on the other hand, herd behavior denotes an inability to make a decision leading individual to be affected by others' choices.

In the next part an investigation on the basis of real survey data will explore individuals' propensity to save, the way people manage their pension plan and in which measure their biases affect their perception regarding financial decisions.

THIRD PART: Empirical Analysis on Supplementary Pension Plan

CHAPTER 6: Empirical Analysis

6.1. Introduction

So far, this thesis discussed through a theoretical analysis the main behavioral and cognitive preference errors and heuristics adopted by individuals during the decisional process. Along with the behavioral sphere, this work discussed also about financial knowledge and how it can affect individuals. Therefore, the study of choice touches different spheres of individuals and it has repercussions on how people deal with money management and savings for their future. Furthermore, part of this work focused on the advisor who has the role to sustain and debiasing investors during their financial decisional process. The first part worked as a building block for the principal topic: the choice on supplementary pension plans. In fact, especially in Italy, saving for retirement has become something extremely important over the years. This is because of the deep crisis of public retirement pension system and the demographical trend the Italian country is experiencing. Moreover, this financial decision is not exempt from the influence of heuristics and bias. The second part of this work introduced what supplementary pension plans are and why this financial decision is a necessity to people. Unfortunately, individuals might not perceive the risks they will probably face since cognitive and emotional deviations might undervalue the importance of maximizing savings for the future. In fact, the main objective of supplementary pension plans is to cope the continuously reduced future public pensions next generations of retirees will receive.

This last chapter will have the objective to reconcile behavioral theory to supplementary pension plan choice. In doing so, the empirical analysis will explore real data acquired from a survey which was appositely constructed for the purpose of this investigation. The survey will touch several topics that previous chapters discussed and it will analyze a sample of Italian individuals. The main scope is to find out how participants deal with savings for their retirement and whether they took in consideration to choose a form of supplementary retirement plan. Furthermore, the survey will also aim

to point out what are the main drivers that might be able to dictate this kind of financial choice. Therefore, through the survey it will be possible to prove the consistency of behavioral patterns that can affect this important financial decision. The chapter will explore any possible correlation that could explain the decisional path of participants on pension saving management and the choice of supplementary pension plans. This will allow to confirm theoretical works of several scholars and to provide facts that will hopefully explain the non-rational deviations of the human decisional process.

6.2. Survey descriptive analysis

The survey was submitted to 236 individuals living and working within the Italian country. The number of the respondents who finished the questionary was 175 (100% complete). Therefore, the analysis that will be conducted by this survey will be based on 175 observations (sample numerosity).

Concerning the time taken to complete the questionnaire, on average, the participants took about 14 minutes to complete the survey. This estimate does not consider the outliers of the sample which probably occurred because of participants who exited and entered back after they already started the session.

The survey was created and distributed through *Qualtrics*[38] application which allowed for a high degree of customization of the questions of the survey. Moreover, the participants of the survey could respond completely anonymously in compliance with *law UE 2016/679*. The data were collected starting from the 15th to the 31st of January. Furthermore, the survey excludes pensioners and individuals under 18 years of age.

Concerning the distribution of this survey, it was principally shared through social media such as Facebook and LinkedIn, but also through anonymous link to acquaintances and by word of mouth.

The composition of the questionnaire consists of four main sections which will work together in order to provide a complete analysis of the acquired data.

[38] *https://www.qualtrics.com/it/*

- **First section**, *personal data*[39]*:*

In this section participants were asked to provide some personal data such as gender, age (gathered in macro groups), education degree, residence (divided by north/center/south of Italy), type of job, and their annual salary (gathered in macro groups).

- **Second section**, financial literacy and risk propension:

In this second section participants were asked to respond to the "Big Five" test provided by *Lusardi and Mitchell (2006)* so it is possible to have a point of reference concerning the degree of financial literacy. After that, the survey asks to the respondents few questions about their propensity to risk which can allow to map a clear picture of individuals and categorize them into groups;

- **Third section,** heuristics and bias:

In this section participants were asked to respond to some questions related to heuristics and bias. In particular, the first two questions aim to detect the presence of the present bias, thus the way the hyperbolic discounting affect individuals' minds. The third and the fourth aim to test knowledge of the concept of expected value and the risk aversion. The last three questions concern mental accounting bias.

- **Fourth section,** Supplementary pension systems and retirement savings:

Firstly, according to the previous answers, the survey will ask some questions about retirement and supplementary pension plans. Participants were asked about their awareness on retirement timing and also about what saving for retirement represents for them. After that, this last section explores (according to their type of job) in which way they are saving for retirement and whether they have already adopted supplementary pension plans.

In order to obtain a better investigation of the data acquired from this survey, the sections will cooperate together with the objective to have a better description of the analyzed sample.

[39] *According to law UE 2016/679.*

6.2.1. The objective of the survey

The purpose of the survey is to reconcile behavioral theory on decision making process to retirement saving choice and in particular to the choice of a supplementary pension plan (SPP). Indeed, as suggested during this paper, like every other financial choice, SPP concerns numerous aspects. Some of these aspects concern intrinsic factors such as gender or income. Other aspects refer to behavioral factors such as cognitive biases but also financial literacy and propension to risk. In particular, the following analysis will search for confirmations of what this thesis presented by looking at concrete data.

According to *Dasgupta, Maskin (2005)* and *Halevy (2008)* studies suggest that the temporal discount is a consequence of great uncertainty attributed by individuals to distant outcomes in time. In fact, uncertainty about future events makes individuals misperceive the importance of certain financial decisions. Moreover, heuristic and bias inevitably have the power to affect individuals' decisions. From Chapter 1 and 5, there are some important biases such as home bias, mental accounting, overconfidence, and herd bias that can have the ability to distort financial decisions. *Therefore, is it possible to find out a correlation that connect biases to the aversion in subscribing to a supplementary pension plan?*

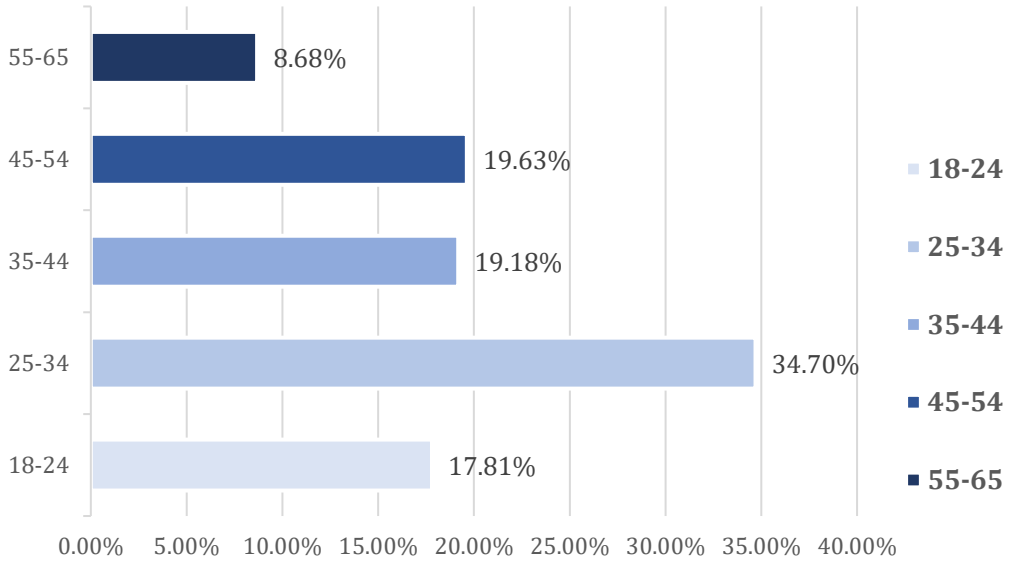
Chapter 2 showed that financial knowledge and the understanding of financial issues are qualities required in order to deal with the pressure uncertain prospects convey. There are costs for illiteracy and these costs have strong repercussions to non-educated households. *Therefore, is there a possible correlation between the choice of non-subscribing or not considering supplementary pension plans with the level of financial education?*

During Chapter 1 of this thesis, it was introduced the concept of risk aversion which is a preference for a sure outcome over a gamble with higher or equal expected value. Risk aversion might be probably the worst enemy for SPP. Risk averse individuals would rather invest their money in something that will not face any kind of loss rather than an instrument that follows the financial market trends, despite the fact that overall, because of the long run effect and the low taxation rate, the expected value would be higher. *Is there the possibility that non SPP members are affected by risk aversion?*

6.2.2. Demographic information

The sample of respondents who finished the survey is composed by 175 individuals, of which 70.86% (n=124) are males and 29.14% (n=51) are females. Concerning the age composition, it is possible to see from *Graph 6.1.* that the majority of the respondents are between 25 and 34 years of age. This is a very relevant to this research since it will be interesting to find out the way young workers deal with retirement savings and whether they know supplementary pension plans. Overall, the sample is quite homogeneous concerning the age factor. There are good percentages also concerning the category of middle-aged workers that ranges from 35 to 54 years of age. The lowest percentage of respondents are those close to the pensioning which is the category between 55 and 65 years of age.

Graph 6.1. Age of participants

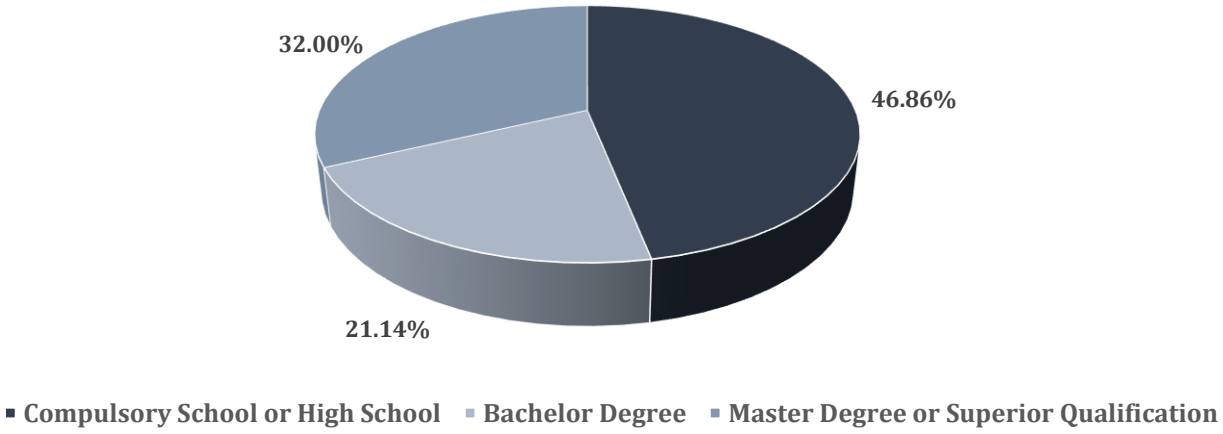


The mean age of the group of participants is 2.71 which means that participants' average age is between 25 and 44.

Concerning the geographic area, the 90% of the respondents come from the north of Italy and the rest comes from the center or the south. Unfortunately, for this reason, it will be not possible to have a clear differentiation between Italian macro regions.

Regarding the education level of the participants, the possible answers that categorize them were three: the compulsory school or high school diploma, bachelor degree, master or other superior degree.

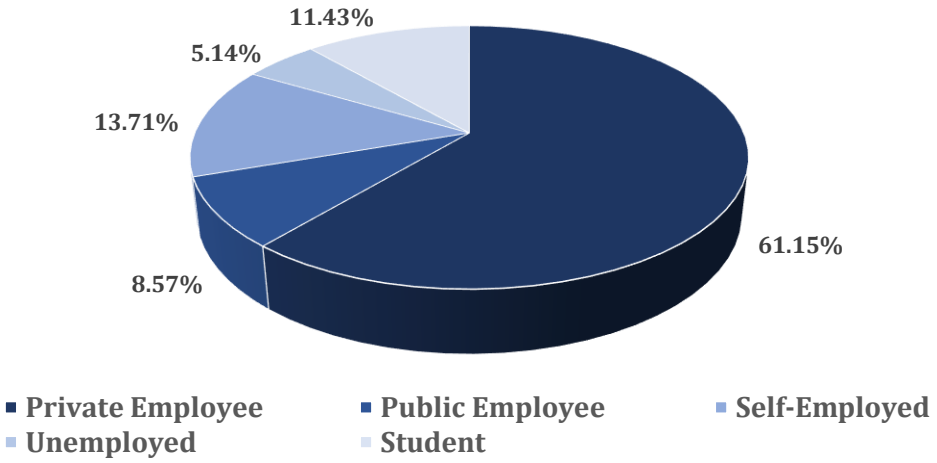
Graph 6.2. Level of Education of participants



Overall, there is a high number of participants who hold a qualification which comes from the lowest level of education or from high school. However, from the *Graph 6.2*., the sum of participants who hold a bachelor, master or superior degree results very close to the number of individuals who do not hold these qualifications. This categorization might assume that it is possible to distinguish two similar groups of individuals. The first group which has presumably a lower level of education and the second group which would have a higher level of education. This data might be explained by the age factor. In fact, a great part of the participants who are between 18 and 34 years of age have at least a Bachelor degree. In particular, 68.18% (60 out of 88) of young participants had a higher level of education. On the other hand, only the 35.63% (31 out of 87) of participants from 35 to 65 years of age hold at least a Bachelor degree.

Next, the questionnaire asks participants about their working career to find out how many participants work as private employee, public employee or self-employed but it distinguishes also students or unemployed individuals.

Graph 6.3. Working condition of the participants

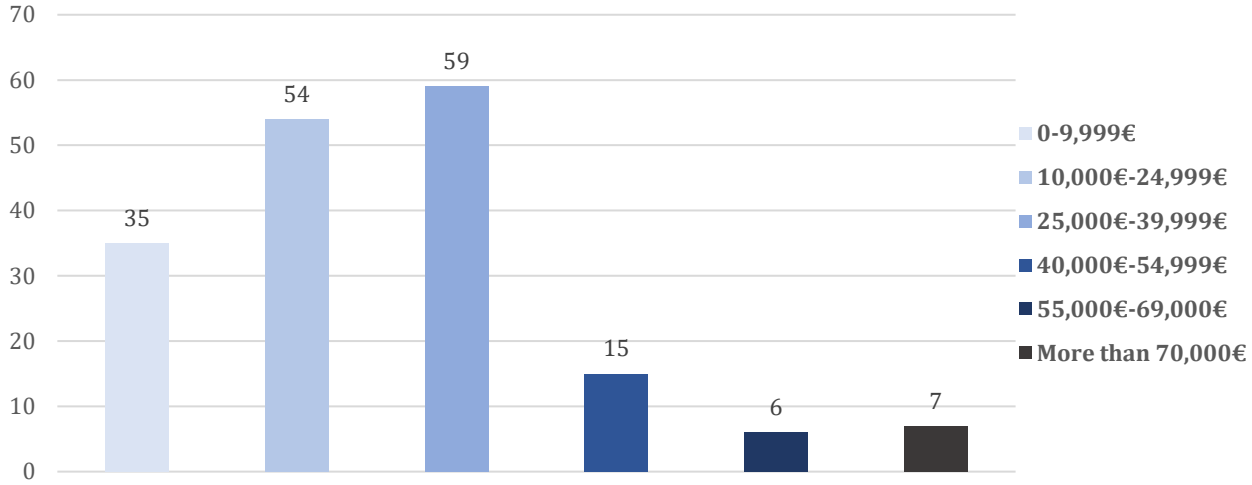


As it is possible to see from *Graph 6.3.,* the greatest percentage of the participants are private employee. This means that, within the sample analyzed, a high number of individuals might have already chosen whether to allocate their severance pay into a supplementary pension plan.

Another important category is the one of self-employed workers. This category of workers is the one which must take advantage of the benefits from complementary pension plans. Indeed, in the *OECD* report *"Pension at Glance"* (2019) analyzing 15 countries (Italy included) asserts that, on average, the retired self-employed workers receive 22% lower allowances than employees. Unfortunately, in Italy there is one of the largest gaps with a difference that exceeds 30%. This is not because they pay less contributions, on the contrary, self-employed workers usually pay more. Therefore, supplementary pension plans are continuously important for this category of workers.

Last question of this first introductory part concerns the average salary of participants. This data will provide important pieces of information which can relate to the way individuals deal with retirement savings planning.

Graph 6.4. Annual average income of participants



The graphical representation of the annual average income of participants has a mean of 2.57, Std Deviation of 1.22 and a Variance of 1.49.

Graph 6.4. represents the annual average income of respondents. The average income per year of the respondents fluctuates between 10,000€ and 39,999€, while the mode is represented by the third category of the classification which ranges from 25,000€ to 39,999€. This classification will be very interesting because there will be also a comparison between supplementary pension plan adherents and their income level. This will have the objective to identify patterns that correlates their salary to supplementary pension choice.

6.2.3. Financial literacy

Firstly, in order to assess the level of financial education, it was asked to respondents a self-valuative question in order to categorize individuals. The question asked *"In your opinion, what is your level of financial education?".* Respondents provided a valuation that ranges from 1 (low level) to 5 (high level). After, the questionnaire proposes to participants a well-known set of questions which have been extensively tested over the years. This is the "Big Five" questions on financial education level provided by *Lusardi & Mitchell (2009).* They proposed this set of financial literacy questions to the 2004 Health and Retirement Study (HRS) which have served as the foundational

questions in several surveys designed to measure financial literacy in the United States and other countries.

The following questions comes from the *Lusardi & Mitchell (2009)* survey:

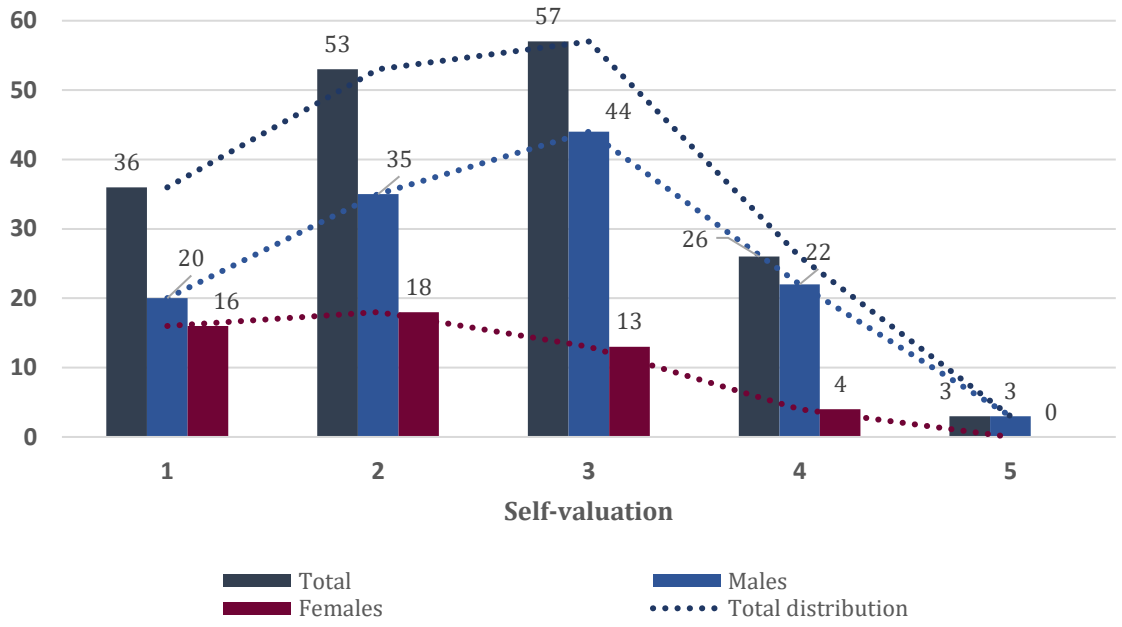
1. *"Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?"*
2. *"Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, with the money in this account, would you be able to buy…"*
3. *If interest rates rise, what will typically happen to bond prices?*
4. *A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less.*
5. *Buying a single company's stock usually provides a safer return than a stock mutual fund.*

In this way, thanks to the self-valuative question and the subsequent five questions test, it is possible to analyze two important things; First, what is the actual degree of financial literacy of respondents and second, whether they show tendencies of overconfidence among individuals.

Graph 6.5. shows the distribution of the self-valuative level of financial education gathered in main groups. These groups represent the selected choice which ranges from 1 to 5 indicating the grade each individual assign to himself/herself. The total groups show a self-valuative low-medium level. From the *Graph 6.5*. it is possible to see that males tend to value their financial education slightly better than females who generally tend to self-valuate with a lower grade.

While, *Table 6.1.* represents each different levels of financial education compared with the self-valuative grade that each category assessed. For each question it is possible to see the absolute frequency of correct and incorrect responses and in the last low it is represented the total for each question.

Graph 6.5. Financial Education Level – self-valuation



This graph represents the self-valuative question in which respondents assess by themselves their personal level of financial education. On the x-axis there is the self-valuative levels 1 – low level; 2 – medium-low level; 3 – medium level; 4 – medium-high level; 5 – high level. On the y-axis the number of participants. The mean of the answers of respondents is 2.47 which might indicate that individuals' self-valuative level of financial knowledge tend to be on a medium level. For each level of self-attribution of financial literacy, it is computed the percentage of individuals out of the total sum of participants.

Table 6.1. The five questions test according to self-valuative levels

	Question 1		Question 2		Question 3		Question 4		Question 5	
	correct	incorrect	correct	incorrect	correct	incorrect	correct	incorrect	correct	incorrect
self valuation 1/5	32	4	30	6	9	27	24	12	30	6
self valuation 2/5	43	10	43	10	9	44	39	14	50	3
self valuation 3/5	53	4	53	4	22	35	48	9	51	6
self valuation 4/5	26	0	21	5	14	12	22	4	23	3
self valuation 5/5	3	0	3	0	2	1	2	1	3	0
total	157	18	150	25	56	119	135	40	157	18

The table represents the answers provided by participants represented in absolute frequency. For each question coming from the Mitchell and Lusardi study it is divided for the level of self-valuative level each participant assessed for his/her financial literacy.

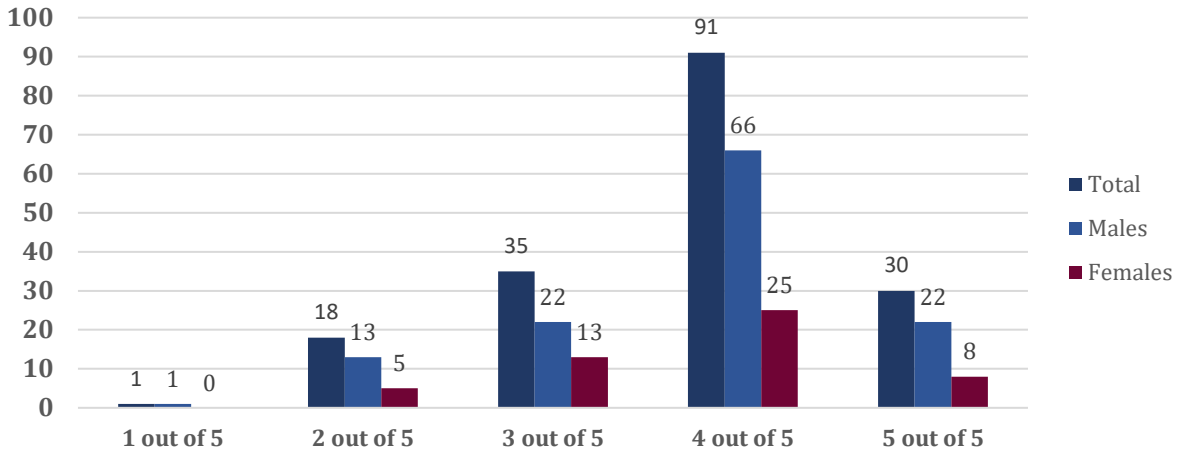
Even though it is not possible to represent this piece of information from the table, the analysis of the data shows that every participant who self-valued their financial knowledge 1 out of 5 made at least one correct answer. Moreover, the average, in percentage, of correct answers of respondents with lowest self-valuative level is 69.44%. This data might indicate that this category of individuals may underestimate their financial level, and thus, making them falling into the middle level group. Concerning the answers coming from the low-medium group (2 out of 5 self-valuation), as in the previous case, also in this group every individual made at least 2 questions correct. As for the previous category, also for this category it is computed the average, in percentage, of correct answers of respondents. This is surprisingly close to the low-level since the average is 69.43%. Similarly from the previous case, it might be inferred that these participants tend to underestimate their financial knowledge. Next group is the one with the middle-level of self-valuation which corresponds to 3 questions out of 5. For this group there are 2 individuals who did not make at least 3 correct answers. The average of correct responses is 79.65%. The majority of this group made even more than the threshold required. Indeed, 44 individuals out of 57 made at least 4 questions correct. Next group is the one with 4 out of 5 level concerning the self-valuation. Even though the numbers are quite lower respect to the other groups, in terms of percentages, individuals who self-valued as high/medium level reflect their knowledge through the five questions test. Even though only 4 people out of 26 did not make at least 4 questions correct, the average, in terms of percentage, of correct answers is 85,54% which reflect the category in which these people belong. Finally, concerning the high-level category (5 out of 5 in the self-valuation), there are only 3 individuals who valued their financial knowledge with the maximum grade. 2 out of 3 individuals were able to respond to all the questions correctly, thus, one individual did not make it.

From *Table 6.1.,* by looking at the totality of the answers participants gave, the results are quite outstanding. Overall, only question number 3 had the lowest level of correct answers.

The analysis might reflect what *Annamaria Lusardi and Olivia S. Mitchell (2011)* assert about financial literacy in Italy. They state that large geographic differences in financial literacy can be detected in Italy where there is a higher level of financial education in the Northern and Central regions than the Southern regions. In fact, about the 90% of the respondents - whose are extremely heterogeneous - of this questionnaire

come from the North of Italy. This might be a valid explanation for the positive result participants provided. *Graph 6.6.* shows the scores individuals assessed from the five-question test; it is possible to compute that the 69.14% of the respondents made at least 4 question correct out of 5.

Graph 6.6. Financial Education Level – The five-test valuation



This graph represents the actual level of financial education represented by the Big Five (Lusardi and Mitchell, 2011). On the y-axis the number of participants and on the x-axis the number of correct questions. The average is 3.74 questions correct out of 5.

Through this analysis it is possible to compare genders. Indeed, concerning the five-question test valuation, males (124) made, on average, 3.76 correct answers out of 5. A similar result comes from females (51) who made, on average, 3.70 correct answers out of 5. However, the self-valuation question points out a slightly different tendency. Indeed, males, on average, self-valued their financial knowledge as 2.62 out of 5, while females self-valued their knowledge, on average, as 2 out of 5. This means that, given the similar percentage of actual financial knowledge (five-question test), females show a tendency to underestimate their knowledge respect to males.

6.2.4. Financial risk tolerance

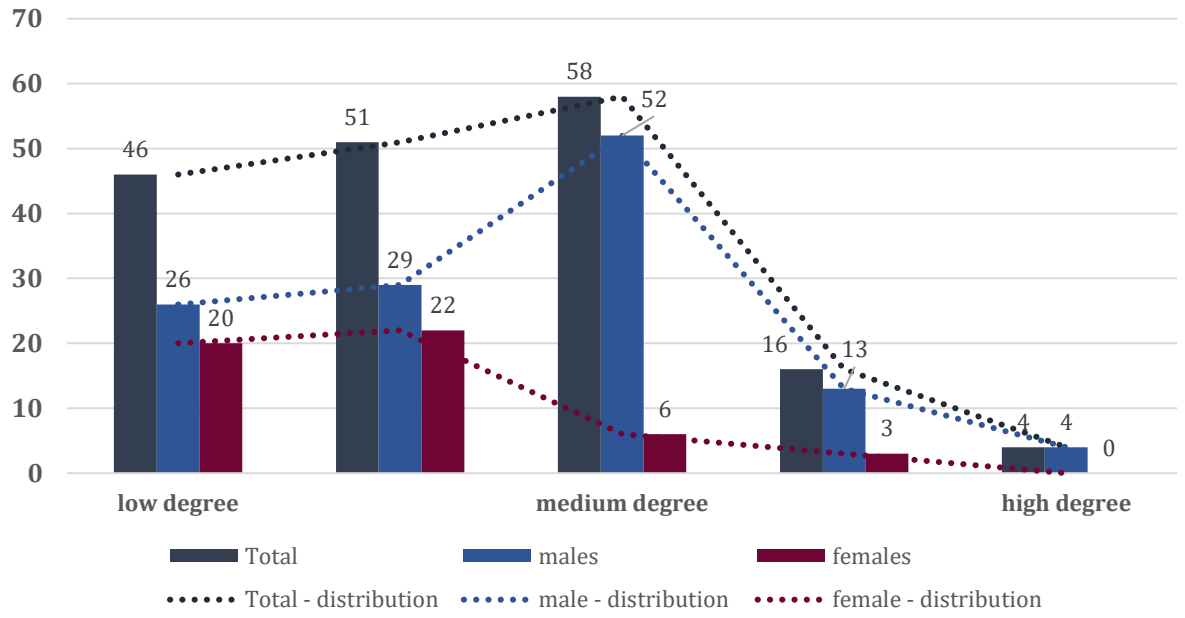
The analysis continues through the investigation of the financial propensity to risk of individuals. This part of the questionnaire was conceived to detect what is the degree

of propensity to risk within the financial environment and, by doing so, participants answered the following three questions:

1. *To what extent do you define yourself as a risk taker in the investment world?* – where they had to indicate the degree of risk on the scale from 1 to 5 (lowest 1-degree; highest 5-degree);
2. *"I would never invest in stocks because I consider that investment too risky."* – where they had to indicate on a scale from 1 to 5 how much they do agree with this sentence, (1-strongly disagree; 5-totally agree);
3. *"I am ready to take the risk of losing money in order to have the chance to earn it."* – where they had to indicate on a scale from 1 to 5 how much they do agree with this sentence. (1-strongly disagree; 5-totally agree).

From *Graph 6.7.,* it is possible to see that individuals tend cluster near to the medium level of risk aversion. Indeed, the histogram of the risk propensity points out that there is a high number of individuals who identify themselves with a low-medium risk attitude, while only few participants of the survey assert that they are medium/high-risk or high-risk prone individuals. Interestingly, the 13.71% (17 out of 124) of individuals who show medium-high or high propensity to risk (choice 4 or 5) are male while only the 5.88% (3 out of 51) are females, indicating that males tend to be more risk lover than females. Consequently, there is a high number of females that show a tendency of low-risk attitude (choice 1 or 2).

Graph 6.7. Financial risk propensity of respondents – 1st question "To what extent do you define yourself as a risk taker in the investment world?"



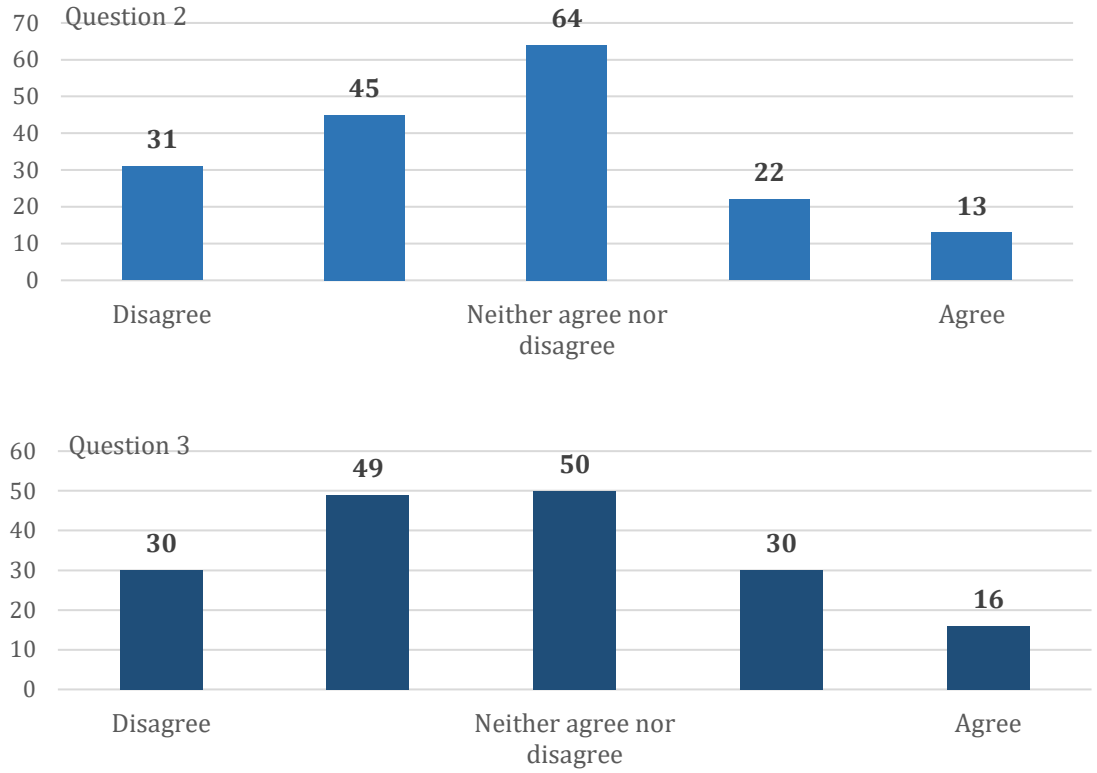
This graph represents the risk propensity of respondents divided into five macro groups. On the y-axis the number of participants and on the x-axis the relative choice concerning the degree of risk propensity each individual identifies. The average is 2.32.

As *Lusardi and Mitchell (2014)* affirm, concrete differences between genders can be detected also concerning risk aversion. Therefore, as for the literacy level, also for risk aversion (*Graph 6.7.*), the data mirrors what financial literacy asserts on the gender gap.

Subsequently, *Graph 6.8.* shows the two other questions which have the objective to confirm the previous question about financial risk tolerance and to detect whether the participants were coherent with their risk aversion.

The second and third questions confirm the tendency of participants to cluster within the mean of the distribution. Thanks to these two questions, it is possible to detect also respondents who were not coherent with their answers. Indeed, it turns out that 4 out of 175 participants define themselves as low risk profile (1-2 choice), however they agreed in investing in the stock market (question 2) and agreed in being ready to take risk (question 3). Fortunately, this number is very small and does not affect the sample with inconsistency.

Graph 6.8. Financial risk propensity of respondents



Second question - "I would never invest in stocks because I consider that investment too risky" and Third question - "I am ready to take the risk of losing money in order to have a chance to earn it". These graphs represent on the y-axis the number of participants and on the x-axis the relative choice concerning whether they agree or disagree. In both cases, the mode is the third choice which is the one that reflects the overall average degree of risk of participants.

6.2.5. Heuristics and bias

In this third part of the survey the attention shift to the behavioral bias analysis. In particular, the principal objective of this analysis is to find out whether the participants are affected by principal bias and the degree of influence this bias have on this sample.

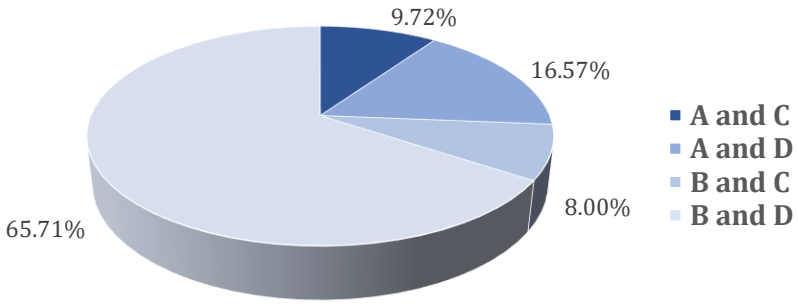
Because of the importance of the intertemporal decision in this study, the first bias that must be detected is the hyperbolic discounting. The survey proposed a two initial questions about what it is called the present bias. By doing so, it will be possible to detect whether participants of the sample make differentiations between prizes over different time periods.

6.2.5.1 Present Bias

1. *Imagine having the option to choose one prize. The A prize consists of 50 euros today while the B prize consists of receiving 100 euros in exactly one year from now. What do you choose?" - (Possible answer: A or B);*
2. *"Now imagine that you have the option to choose another prize. The C prize consists of exactly 50 euros in 5 years while the D prize consists of 100 euros in exactly 6 years. What do you choose?" - (Possible answer: C or D).*

This first set of questions sums up the concept of present bias by making a first step in order to detect inconsistency in the choices of the sample. As it was described before, the present bias defines the trend of overvaluing immediate rewards, while putting less worth in long-term consequences. The following graphs represent the way the sample of participants answered these questioned:

Graph 6.9. Present Bias – sequence selected by participants question number 1 and 2



Q.1	Answer A	46	***Q.2***	Answer C	31
	Answer B	129		Answer D	144

In addition to Graph 6.9., it is reported the table which represents the absolute frequencies concerning question 1 and question 2 for the present bias.

From *Graph 6.9.,* it is possible to see that the majority of respondents followed a consistent choice during their selection. Indeed, A-C and B-D represents the consistent path that makes individuals seem not to be affected by present bias. Alternatively, A-D and B-C can be attributed to the present bias since there is an inconsistency in

participants' choice. Indeed, individuals who selected A-C (9.72%) means that they prefer 50 euros now and 50 euros in 5 years, thus, they are consistent with temporal proximity. Also, individuals who selected B-D (65.71%) are consistent with their decision too. Indeed, they wait for the highest prizes in both cases. On the contrary, A-D and B-C which together sum up to 24.57% are inconsistent with their choice, therefore, they show pieces of evidence of present bias. This is reflected also from the table showing the absolute frequencies of the choices. The overall results shows that participants are conscious about discounting the prizes presented from the question in a consistent way, therefore, avoiding the effect of hyperbolic discounting.

6.2.5.2. Risk aversion

3. *"Consider two investments: if you choose investment A, you could earn € 500 but only in 50% of cases. If you choose investment B you will surely earn € 250. So, the expected value of the two investments is 250. Which investment do you choose?" – (Possible answer: A, B or it is indifferent);*
4. *"Consider two other investments: if you choose investment C, you could suffer a loss of € 500 in 50% of cases. If you choose investment D you will certainly lose € 250. Therefore, the expected value of the two investments is -250. Which investment do you choose?" – (Possible answer: C, D or it is indifferent).*

What was emphasized by the main behavioral theory, the Prospect Theory, is that the behavior of individuals changes according to whether they are in the domain of losses or the domain of gains. In particular, participants would be risk averse in the gain domain and inclined in the loss domain. This first question was therefore formulated with the aim of testing the actual presence of this behavioral bias in the way individuals act. This question was also used to test knowledge of the concept of expected value. In fact, the error arises when subjects choose investment A rather than B and C rather than D. If they knew the concept of expected value, they should in fact have no preference between the two investments.

Table 6.2. Risk aversion – question number 3 and 4

Q.3	**Answer A**	38	***Q.4***	**Answer C**	105
	Answer B	122		**Answer D**	44
	Indifferent	15		**Indifferent**	26

The table represents the absolute frequencies for question number 3 and 4 concerning the degree of different risk tolerance according to the reference domain.

Table 6.3. Sequence of answer selected by participants – question number 3 and 4

A and C	23	**B and C**	78	**Indifferent and B**	4	105
A and D	11	**B and D**	32	**Indifferent and D**	1	44
A and Indifferent	4	**B and Indifferent**	12	**Both Indifferent**	10	26
TOT	38		122		15	**175**

The table represents the combined results from question 3 and 4. As it is possible to see only 10 the participants opted to be completely indifferent in the decision. These participants show great level of rationality. Indeed, the combination of question 3 and 4 detects two biases: the different risk tolerance according to the reference domain and the lack of knowledge of the concept of expected value.

6.2.5.3. Mental accounting

5. *"Imagine that after a year of work you want to take a vacation. You have 2000€ deposited in a current account into which you pay your savings every year to have a certain amount aside. You also have another 2,000€ that you have fortunately won by playing the lottery that have been paid into another bank account. The interest rates of the two accounts are the same. The holiday costs exactly 2,000€. What money do you decide to use to finance the upcoming vacation?" – (Possible answer: Use your savings, Use the lottery win, Indifferent).*

The bias in question is detected when individuals choose which account to withdraw money from. In fact, given the fungibility of this asset, they should be indifferent in using the capital deposited in one or the other account. Therefore, in this case, they divide wealth into two watertight compartments: "Savings" and "Lottery winnings" and

treat the same as if there were different assets inside. The account where they mentally entered the money leads the subjects to discriminate on the use of the capital itself.

Table 6.4. Mental accounting related to wealth, income and consumption – question number 5

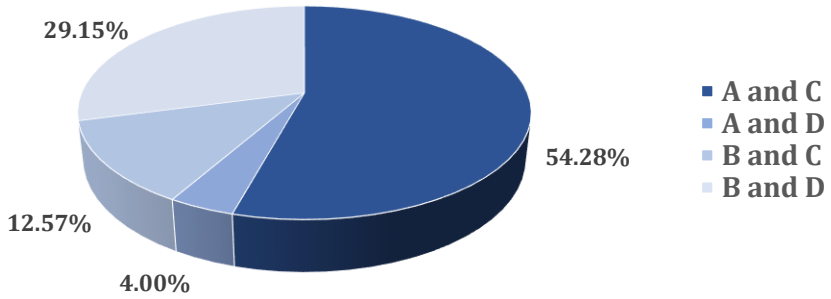
	Answer	Percentage	Count
Q.5	**Use your savings**	3.87%	7
	Use the lottery win	51.38%	89
	Indifferent	44.75%	79

The table reports the data from question number 5 of mental account. It is possible to see both the percentages and the absolute frequency of the answers of participants.

Clearly, from *Table 6.4.* there is a high number of respondents who chose to use the money coming from the lottery win and only 3.87% of people would use the money they saved. Only 44.75% asserted that they are indifferent between the two, thus, showing rationality.

6. *"Imagine you are inside a shop and you are buying a calculator and a shirt. The shirt costs 125€ while the calculator costs 15€. The shopkeeper tells you that in another shop, of the same chain, about ten minutes away, they sell the same calculator at a price of 10€. What do you decide to do?" – (Possible answers: A, Purchase the shirt and the calculator at the store you are in or B, buy the shirt in the store you are in and go to buy the calculator in the other store);*
7. *"Now imagine having to buy two more goods, a T-shirt that costs 15€ and a pair of shoes that cost 125€. The shopkeeper tells you that in another shop, of the same chain, about ten minutes away, they sell the same pair of shoes at a price of 120€. What do you decide to do?" – (Possible answers: C, Purchase the t-shirt and pair of shoes at the store you are in or D, buy the t-shirt in the store you are in and go to buy shoes in the other store);*

Graph 6.10. Mental accounting – sequence selected by participants question number 6 and 7



A and C	95	54.28%	**B and C**	22	12,57%
A and D	7	4%	**B and D**	51	29,15%

The graph represents the sequence selected from participants regarding question number 6 and 7 about mental accounting. Mental accounting bias is detected when individuals choose B-C and A-D combination of questions. Overall, only the 16.57% of individuals are affected by this bias.

In this context, the bias is detected when the subject decides to behave differently in the two situations. In fact, the individual could decide to undertake the journey to the other store only in the first case, where he would have a saving equal to 1/3 on the total price of the good (about 33%), in the second case, however, it could reason by comparing the effort made to reach the other store on the basis of the saving of a paltry 4% on the total price of the good, thus deciding to buy both goods in the shop in which it is already located. The error underlying this reasoning is that the savings guaranteed by the discount should be assessed considering the entire amount that is about to be spent and not the savings relating to the individual asset. In both cases, the savings would always be 5€ out of 140€ and the subject should reason by comparing this data with the effort he should make to reach the other shop. Thinking in this way, the savings would be equal in both cases and approximately 3%. This bias applied concretely leads individuals, for example, to consider the fluctuation of a share owned by them independently and in isolation from the fluctuations affecting the portfolio as a whole. This practice often leads to the construction of suboptimal portfolios. Portfolios should instead be built following a logic of simultaneous and global optimization and not based on the performance of individual stocks within the same.

6.2.6. Choice of Supplementary Pension Plans

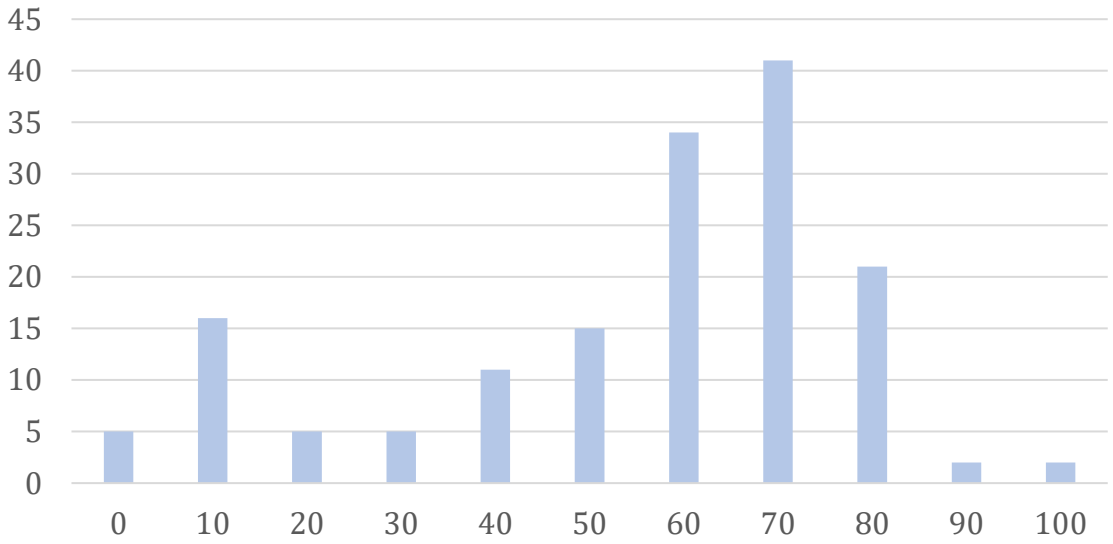
This last part of the questionnaire seeks to identify how participants are managing their retirement savings. Starting from the perception they have with pension and ending with the degree of trust, this section of the survey explores participants' pensioning financial decision. The first two questions of the survey were built in order to make a general understanding about whether participants have an idea about what their future pension would be and what saving for retirement make them feel. This will provide an important understanding about the way individuals think or even approach to savings for retirement, thus, it will help to give a better knowledge about the sample.

1. *"How much will your INPS[40] pension amount to compared to your current working income?" (in percentage)*

Graph 6.11. represents the distribution of question 1 of the last section of the survey. The distribution has a mean of 54.59% and the mode is 70%. This question was answered by 157 individuals. Indeed, this was proposed to those participants who currently work or who are looking for an occupation (unemployed). Therefore, students did not participate. This was intentional since the aim was to test whether workers are aware about the risk of low pensions in the future. In addition, students are not able to give this parameter since they do not have an income. This parameter gives important information, indeed, 57 people out of 157, 36.31% of the total sample, think that they will earn a pension that will be even less than 50% of their current income, the most pessimistic ones. The rest of the participants fluctuates around 60% and 80%.

[40] *Public authority that manages pensions and oversees the Italian pension system*

Graph 6.11. Frequency ranked in percentage according to question 1 of the last part

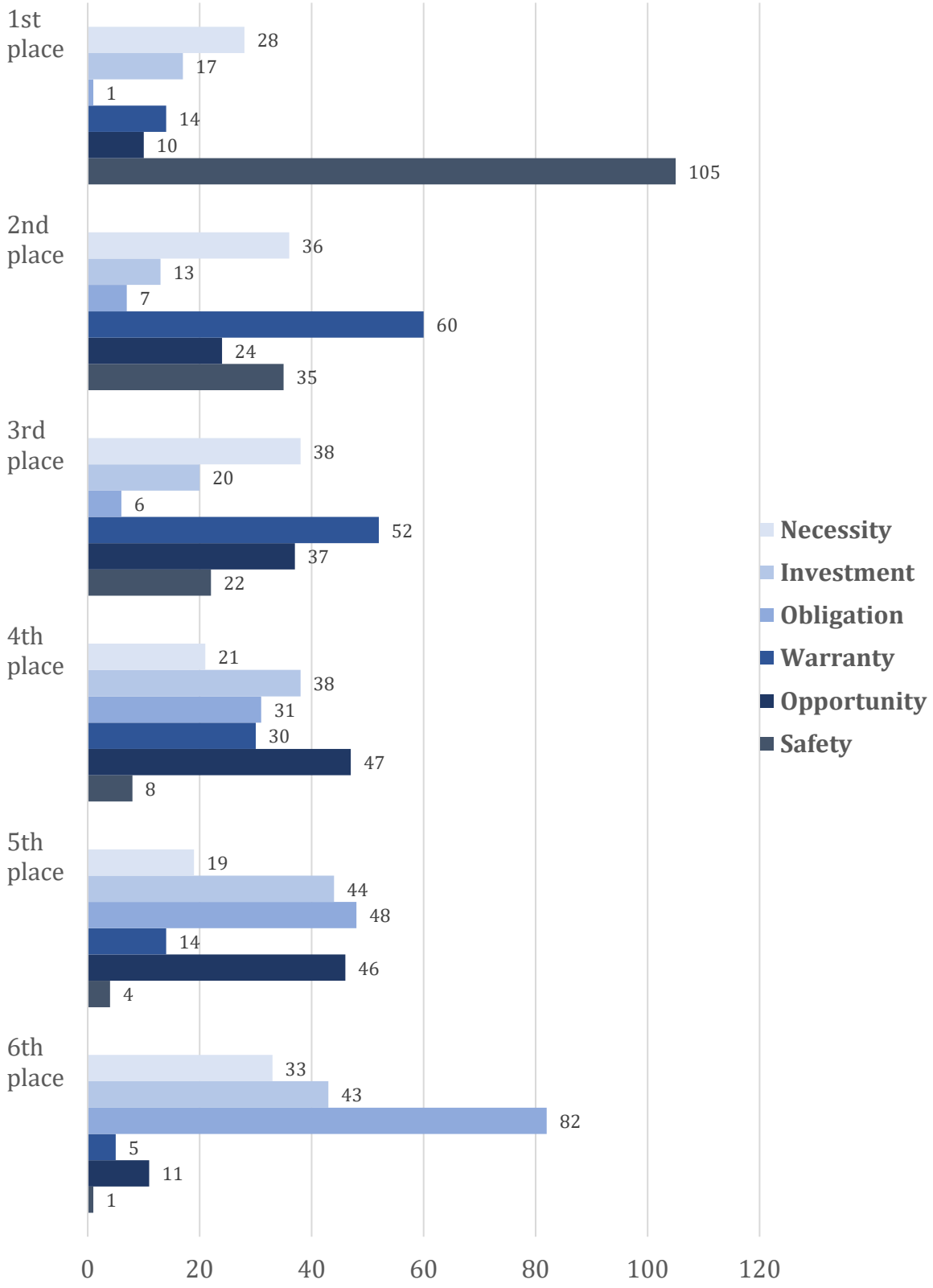


Respect to Figure 4.1. Italian forecasts of public pensioning, the answers given by participants overall mirror the current situation of public pensioning, however, forecasts are much more pessimistic than what participants think.

Next, the survey asked the participants to provide an indication about what saving for retirement means for them. In fact, question 2 provides several adjective that participants would put in order according to their preferences.

2. *"Put in order the following terms according to what retirement savings represent to you". The term savings means all those sums paid and / or set aside for the purpose of accumulating wealth that will be used for the future.*

Graph 6.12. Representation of ranked preferences according to question 2



In the graph are represented the preferences ranked from the first to the sixth place. On the y-axis there is the ranking and, for each column, there is the number of participants who ranked that adjective. The total number of participants who ranked the preferences are 175, therefore, all the respondents of the sample.

This question asks participants to select six different terms which they have to put in order. These are: safety, opportunity, guarantee, obligation, investment, need. The following *Graph 6.12.* represents 6 charts showing the ranking places for each term. The objective to this question is to identify how individuals classify savings for retirements in their mind. For instance, human mind uses mental account to associate with retirement very low risk tolerance: "I want to make sure I have the money when I'm old!". Consequently, it leads to invest in perceived low-risk instruments such as bonds to satisfy that desire. This erroneous reasoning leads us to confuse the goal (safety) with the means to achieve it. In order to have the certainty of setting aside a sufficient amount to supplement the public pension, it is necessary, having a long-time horizon, to invest a significant portion in shares that offer high returns in the long term, with a limited risk of loss. By investing in bonds, however, the only certainty is that the yield obtained will not be sufficient and, at this time, with a prospect of a rise in interest rates, it could lose *(Cervellati, 2018).* As E. M. Cervellati suggests, individuals tend to associate safety, which is the goal, with the mean through which this goal must be pursued. Secondly, participants preference is warranty which is strictly related to the idea of myopic loss aversion. Warranty results as psychological relief for individuals who might prefer to see continuous low and positive trends or even flat trends because they are not able to burden losses in short-run terms. Only in third position, necessity which is probably the most important characteristic among all the terms considering the Italian projections for public pensions in the future. Fourth and Fifth respectively opportunity and investment which is far away from the idea that participants have regarding retirement savings. Lastly, obligation which received the highest number of votes for the 6th place, indicating that great part of participants does not feel pressure to accumulate savings for their pensions.

3. *"Are you familiar with supplementary pension systems?"- supplementary pension refers to Open Pension Funds and Individual Pension Plans (deriving from contracts with banks and / or insurance companies) and Category Pension Funds (deriving as a result of an employment contract: FONCHIM for workers in the chemical industry, etc).*

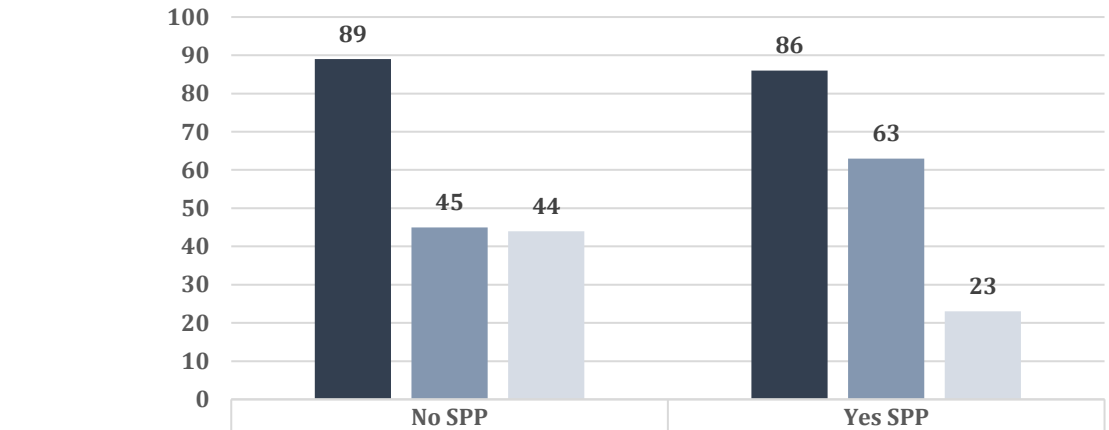
This general question works as a test in order to have an overview about the percentages of individuals who know what supplementary pension systems are. From the

data, about a third of the participants declared that they do not have a knowledge about what supplementary pension plans are. There is a good number of participants (122 out of 175) who know or at least have an idea of supplementary pension plans. This question introduces the focus of this survey which tries to discover the way participants deal with retirement pension planning.

Next, the questionnaire articulates according to the category of worker the participant falls in. Indeed, in the case where the participant is a private employee, he/she would be asked to indicate whether he/she has a supplementary pension plan, which type and whether they allocate their severance pay or not. Moreover, the survey asks about the type of investment they did (balanced, equity and so on) and also asked participants to indicate motivations that would explain their choice to allocate their severance pay within the company where they work.

Similarly, the survey asked to other categories of workers (public employee, self-employee, unemployed and students) questions related to this central topic. The following graphs represents schematically all the data and information gathered from the questions listed before. Figure 6.13. Divides in category the two main groups of participants and indicates how many hold a SPP and how many does not. Graph 6.13. shows which type of SPP participants hold.

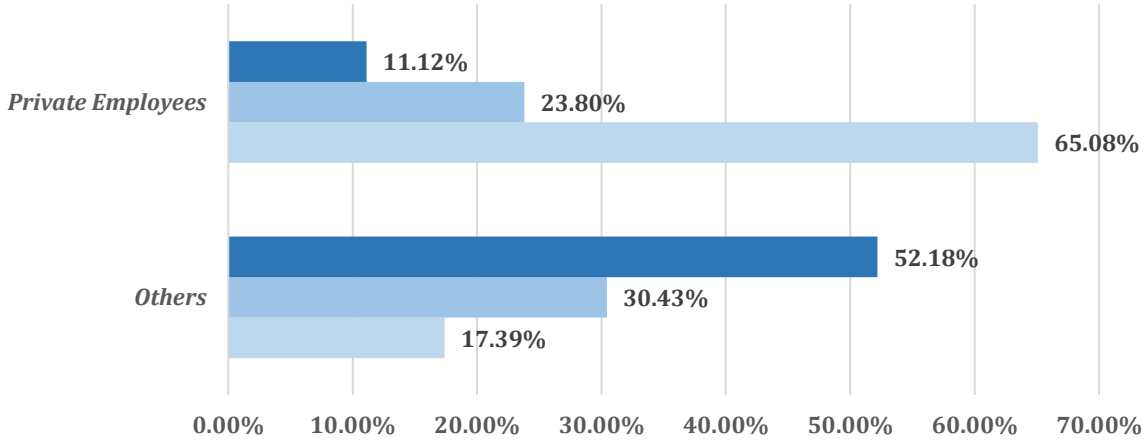
Graph 6.13. Membership of participants to SPP



	No SPP	Yes SPP
Total	89	86
Private employee	45	63
Others	44	23

The category "Other" gathers all the non-private employee which comprehends students, public employee, self-employee and unemployed.

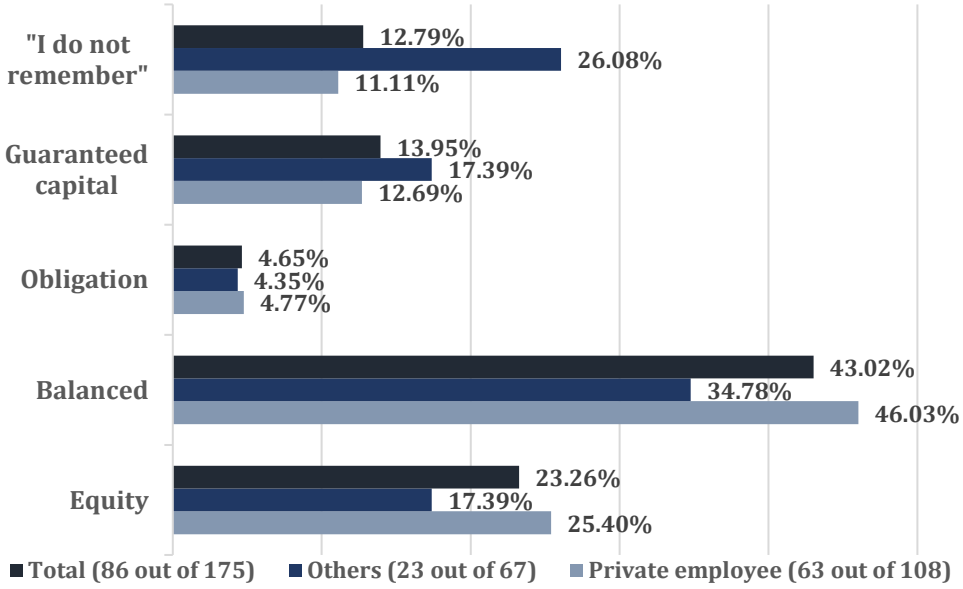
Graph 6.14. Participants type of SPP they hold



	Others	Private Employees
PIP	52.18%	11.12%
Open fund	30.43%	23.80%
Negotiated fund	17.39%	65.08%

As it is possible to see from the graph, as expected, greatest part of the private employees holds a negotiated pension fund while the rest mostly hold a PIP which on average are little bit more costly respect to the private and open funds.

Graph 6.15. SPP class of assets of participants



As it is possible to see from the graph, there is a relevant percentage of individuals who do not remember in which class they invested their savings. There is also a nice portion of participants who hold equity as the main class of assets within their SPP. The most chosen asset class consist of balanced SPP which include both equities and obligations.

About a half of participants of the sample have a SPP (in percentage 49.14%) while the other half do not hold it (50.86%). Concerning private employees, 63 out of 108 already have a SPP while, 36 do not. Moreover, 9 individuals stated that do not remember whether they have a SPP or not. Since there are 9 individuals do not remember to have supplementary pension plan, for the sake of simplicity, they won't be considered for further observations. Meanwhile, for the "Other" group, the total number of individuals who do hold an SPP is 23 out of 67 people. More than a half of the participants have a PIP, while the rest hold one of the other two forms.

From *Graph 6.14.* it is possible to see that great part of private employee hold a negotiated SPP.

The survey also reports in which class of assets participants who hold a SPP invested. *Graph 6.15.* reports the type of investments participants hold. By crossing the data with the age factor, 20 individuals out of 34 (from 18 to 34 years of age) invested in a balanced or equity asset class which, in a rational way, it is the most indicated type of investment since the long period before retiring. This is a very good data since it indicates that young participants project to invest their savings for a long period with higher returns that the market can offer.

An additional data can be added in this descriptive analysis by differentiating the population who hold a SPP according to the gender. *Table 6.8*. reveals the percentages of females and males that hold a SPP. It is clear that the biggest portion of the population who hold a SPP is the male one. Therefore, this might actually indicate some patterns that distinguish males from females concerning financial choices.

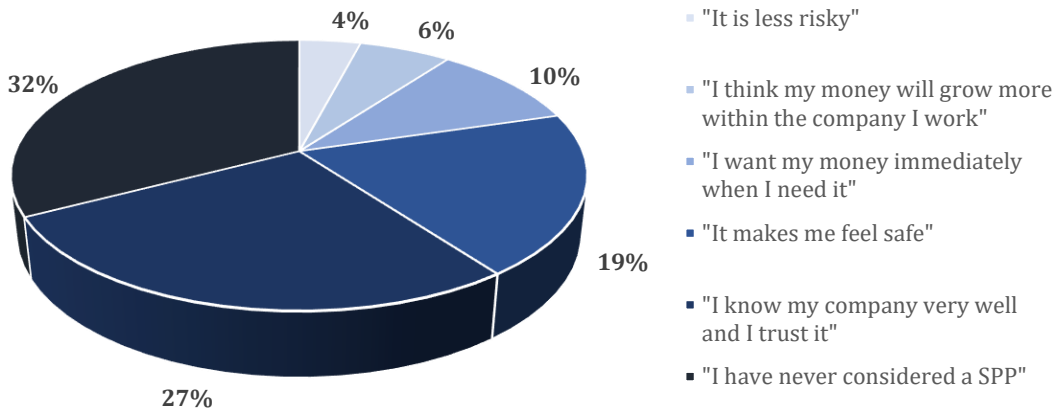
Table 6.5. Number of participants who hold a SPP by gender

Males	**Private employees**	52 – 41.93 %	***Females***	**Private employees**	11 – 21.57%
	Other	16 – 12.90%		**Other**	7 – 13.73 %

From the table it is possible to infer that in terms of percentage, 54.83% of males hold a SPP while only 35.29% of females hold a SPP.

Next, the survey asks the participants who work as employee what are the main explanations for the choice of investing their severance pay within the company where they work. As it was explained in the previous chapter, investors might be influenced by home bias during their financial choice. Concerning pensioning this is not exception. Indeed, in the case whether the severance pay is managed by the company, the employee's severance pay is subject to idiosyncratic risk of the company. *Graph 6.16.* shows the ranking answer that individuals reported.

Graph 6.16. Reasons to hold severance pay within the company for private employees



This question considers multiple answers from participants. These participants are 45, however, because of the multiple choice, individuals selected more than 1 answer. Therefore, this graph shows a ranking of what is the more selected answer that provides an explanation of the reasons why individuals did not opt for a SPP.

The most chosen option reveals that participants did not take into consideration the possibility to adopt a SPP in order to deal their savings for retirement. Moreover, it is possible to detect some bias which were discussed previously in *Chapter 5*. Indeed, ranked as the second option, the graph shows that individuals have tendencies to *"stick to what they know"*. Therefore, they would eventually prefer to invest their money in their company rather than in the financial market. It can be perceived that there is a great sense of safeness and trustiness in the choice they made because of ranked options in the second and third place. The fourth ranking choice finds its validation when individuals think about this amount of money as something immediate available. Because of this availability, they will bare high level of taxation upon their amount of retirement savings

in the case of anticipations. Fifth and sixth raking place allows to detect an empirical incorrectness because of *home bias*[41].

Moreover, the survey gave also the possibility to category of non-private employees (Others) to specify the reasons why they do not hold a SPP. Indeed, to the question: *"which of the following reasons better explains why you did not hold a SSP?",* great part of the answers (about 61% - 27 out of 44) relate to the procrastination and inertia – "I will think about it later". Therefore, procrastination heavily affects the decision for s SPP. Other answered the question with "I do not care right now" (about 13% - 6 out of 44), "I do not trust in financial intermediaries" (about 9% - 4 out of 44). The rest of participants typed a personal justification which mostly indicate that they do not activate a SPP because of low or absence of income.

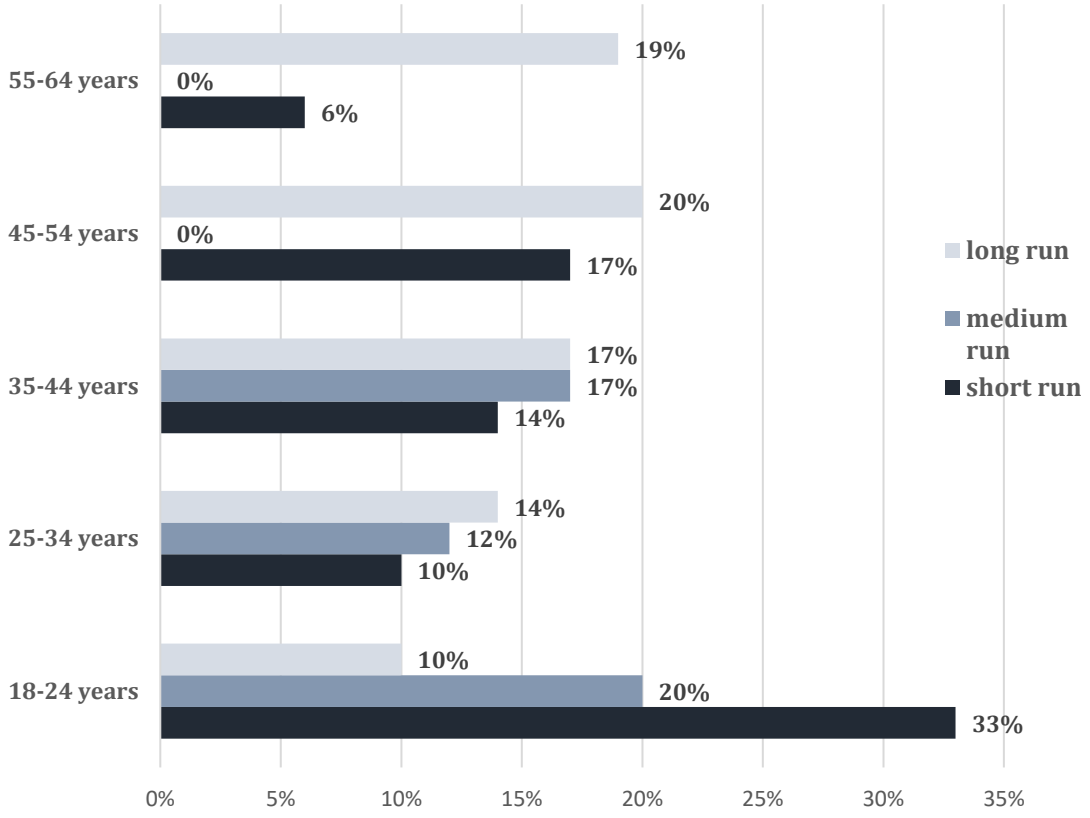
Furthermore, the survey asks to participants whether they hold or do not other form of savings. In order to investigate whether individuals hold other sorts of savings the questionnaire asks whether they hold other savings plans and, in case of positive answer, it allows individuals to specify how many (maximum three savings plans) and their time horizon. The results are the following: 99 out of 175 declare that they do not hold any other saving plan. The rest (76 participants) showed that they hold the following savings plan:

- 28 participants hold only one savings plan;
- 16 participants hold two savings plans;
- 32 participants hold three savings plans.

For each savings plan, participants indicated its specific time horizon that plan was meant for. The short run time horizon (less than 5 years), medium run time horizon (5-15 years), long run time horizon (more than 15 years). The total number of savings plans is 155 and these are respectively composed by 52 short run saving plans, 50 medium run saving plans, and 53 long run saving plans. An interesting result comes out when savings data are crossed with those of the age factor.

[41] *Chapter 5, paragraph 5.4, pp.104-106*

Graph 6.17. Other savings plans according to the age factor



This graph represents the percentages of respondents who hold other savings plans categorized by age and typology of savings plans. Overall, the graph matches the theory of Modigliani proposed in the 1950s the life-cycle hypothesis (LCH) in which the closer individuals get to the pensioning the lower is the level of accumulation of capital. The percentages pictured in the graph belong to each category of age of participants. Therefore, for each age group the remaining (in %) do not hold any other saving plan.

Graph 6.17 represents the savings plans according to the age factor. 14 out of 89 individuals who do not hold an SPP do have at least one long-term saving plan and while 20 out of 86 do have both an SPP and at least one long-run saving plan. Even though it is not known the purpose of these long-run savings, this data shows that individuals who currently do not hold SPP do manage their money through other forms of savings. From the previous graph it is possible to see how, according to the age factor, young individuals tend to accumulate (save) more rather than older individuals who tend to get closer to their phase of decumulation with pensioning.

In the end, in order to detect the way participants are mostly affected during the financial decisions process, the survey proposed to each individual the opportunity to

indicate who affects them most. In the following table it is possible to see to the data concerning participants' trust degree to each category.

Table 6.6. Who affects your financial decisions the most?

Subject	Mean	Std Deviation	Variance	Count
Relatives	**2.60**	**1.49**	**2.21**	**175**
Friends	**1.65**	**1.00**	**0.99**	**175**
Colleagues	**1.62**	**0.95**	**0.90**	**175**
Advisors or financial intermediary	**2.53**	**1.46**	**2.14**	**175**

For each category, the maximum level of trust they can get is 5 out of 5. Therefore, it is possible to deduce that only relatives and expertise had the highest level of rating. Friends and colleagues received the lowest ratings (both 108 out of 175 voted as 1 out of 5).

On averages, many participants show the tendency to address their financial decisions toward relatives and advisors or financial intermediaries. These two figures represent to whom individuals put their trust during their financial choices. An interesting data comes from the percentage of individuals who own a SPP according to their degree of trust in these figures. The 51.6% (16 out of 31) of participants who strongly rely only on expertise (at least 4 out of 5) do hold an SPP, while only the 39.4% (13 out of 33) who strongly rely only on relatives (at least 4 out of 5) hold a SPP.

6.3. Empirical Observations

Concluding the analysis of the survey, this following paragraph provides an inferential analysis of the survey based on the information gathered from participants. In particular, the objective is to study whether there are correlations between variables and the way these affect the choice of individuals in considering supplementary pension plans. This paragraph will present some tests which have been run with *RStudio*[42] by using the variable obtained from the data.

[42] *RStudio is an integrated development environment (IDE) for R, a programming language for statistical computing and graphics.*

In order to obtain a dataset through which it will possible to operate and get results, the data were elaborated in order to provide variables able to give significant result to the purpose of this work. Starting with the demographic variables, they were constructed thanks to the information collected in the first part of the questionnaire. In particular, the Gender variable can assume only two values and was constructed by assigning a value of 1 to men and a value of 0 to women. Similarly, in the case individuals own a SPP the variable will take value 1, while, in the case of no SPP the variable takes value 0. Regarding the Income variable, it was created a scale used goes from 1 (0-9,999€ income per year) to 6 (more than 70.000€ income per year). Similarly, the Age variable ranges from 1 to 5 which represents the several clustering presented in the previous paragraph.

Next, two important variables were created: bias variable and financial knowledge variable. The bias variable was built by taking into consideration several bias that the survey proposed both as parts of the questions. Moreover, several biases were also extrapolated from the interaction of more questions. The scale for the bias variable ranges from 0 to 6 in which 0 represents the lowest level of bias presence and 6 represents the highest degree of bias that a participant can show. These comprehend present bias, overconfidence, framing effect, lack of knowledge of expected value, mental account (one for income and consumption and one for the comprehensive accounts). Therefore, the bias variable is represented by a natural number ranging from 0 to 6 for each individual. This is the results of the sum of the biases that individuals showed from the survey.

The financial knowledge variable takes into consideration two main data: the self-valuation of financial knowledge and the actual financial knowledge level achieved from the five-questions test. In order to obtain this variable, it was computed the average between the two data. This variable provides in part the self-valuation of participants level of their own financial knowledge and, on the other hand, it incorporates the current knowledge of participants according to the five-questions test. The financial knowledge variable ranges from 1 to 5 increasing by 0.5 (1 represents the lowest level while 5 represents the highest level of financial knowledge).

Lastly, this analysis will also consider the aversion to risk of investors. This variable derives directly from the survey, no modification occurred. This variable ranges from 1 to 5 and it increases by 1 in which 1 represents the lowest level while 5 represents the highest level of risk aversion.

6.3.1. Gender and supplementary pension plans

Throughout the previous paragraph it was noticed that there are actual patterns that might affect the two gender groups. From the previous graphs, there were indeed several differences concerning the gender factor. Even though females are fewer respect to males, women show tendencies of less risk aversion and a lower self-valuation related to financial knowledge respect to males (3 out of 5 – medium). In order to investigate in the gender differences, it was chosen the t-test which has the objective to compare the two subgroups to determine if the means of two sets of data are significantly different from each other. It was used the non-parametric Wilcoxon rank sum test or its equivalent, the Mann-Whitney test, which is an appropriate method for examining the median difference in observations for two population that are independent. *Table 6.7.* represents the outcomes of the statistics from the RStudio.

Table 6.7. Detecting differences between genders

	Mean	**P-value**
Financial Knowledge	mean x (male) = 3.1854, mean y (female) = 2.9216	0.03343
Bias level	mean x (male) = 2.9354, mean y (female) = 2.8235	0.6011
Propension to risk	mean x (male) = 2.9354, mean y (female) = 1.8431	5.049e-05

The following table represents the results coming from the test run on R studio. In the first column the variable which is discriminated according to the gender, on the second column the output of the statistics and on the last column the p-value

The p-value for this first test is 0.03343 confirming that differences are detected in these two groups concerning financial knowledge. Indeed, p-value lower than 0.05 means that the null-hypothesis must be rejected and it must be assumed that there is actually a difference related to financial knowledge degree between the two groups. The second test was run in order to detect whether differences regarding the use of bias. In this case, the test provided a p-value which is 0.6011, therefore it can be concluded that it is not possible to reject the null-hypothesis and that there is not statistical difference in the use

of bias during a financial decision. Therefore, as previously identified in the descriptive analysis of the survey, there are differences between males and females concerning financial knowledge; however, difference cannot be detected in the implementation of bias. The last one focuses on gender and participants' propension to risk. As identified in the descriptive analysis, pieces of evidence show that females are more risk averse than males. Results from the third test show that the p-value is lower than 0.05, therefore, it should be rejected the null proving that also concerning propension to risk, males and females act differently. Differences between women and men are statistically significant, in fact as *Lusardi et al. 2009* report, different analyses on financial literacy and money management proved that the discrepancy between women and men holds across the different analyses.

Concerning supplementary pension plans, from the data gathered through the survey, membership percentages of SPP results as 35.29% (18 out of 51) for the female population, while the 54.83% (68 out of 124) for the male population. This confirms that genders behave differently when financial decisions are involved. In this case, the SPP decision seems to be biased whether the decision maker is male or female. Even though further researches must be carried out on this topic, it is evident that this difference mainly traces back to the financial knowledge and the propension to risk.

6.3.2. Income and supplementary pension plans

By looking at the available variables, part of the analysis regards differences between income for those who have an SPP and those who do not. Therefore, similar to the previous test, the investigation brought interesting results regarding the income level of participants.

The SPP holders, on average, have a mean of income which is 2.92, while participants who do not hold a SPP have an average income mean of 2.25 (From *Graph 6.4.* it is possible to see the income levels). At first sight it is already possible to assert that from the population, SPP holders, on average, have an income level which is very close to the third one (25,000 – 39,999 euros). Instead, participants who do not hold a SPP have an income level that falls in the second level (10,000 – 24,999 euros). Differences are detected also by the Wilcoxon rank sum test in which the p-value results 0.00018, lower than the confidence level of 0.05. As a result, participants holding a SPP seem to have on

average greater level of income. Although it is not possible to infer any conclusion, the results are quite impressive since this might suggest there could be several common factors that connect income level with supplementary pension funds. Indeed, this result must be considered according to other variables such as the financial knowledge level and risk aversion, but also other variables which are unfortunately not available such as type of job of participants and so on.

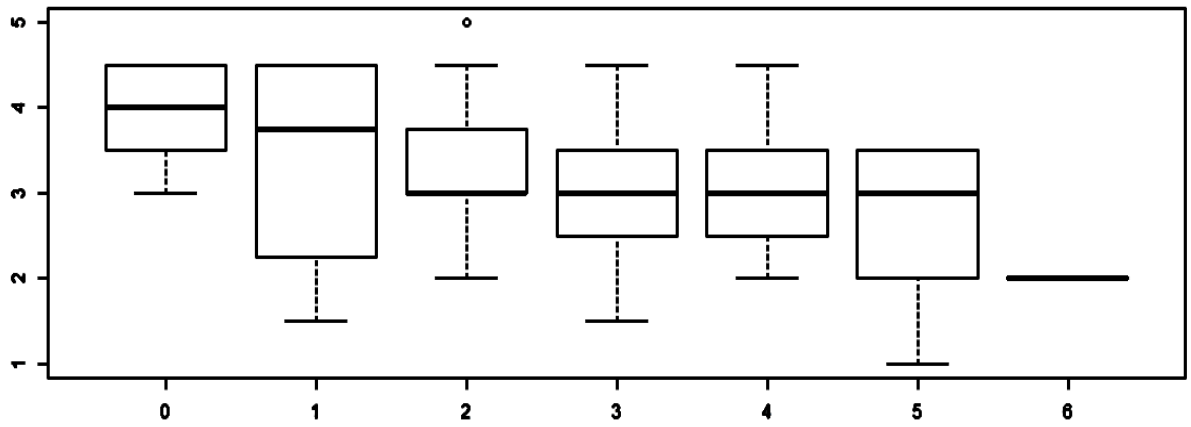
6.3.3. Financial knowledge and its relation with biases and propension to risk

Throughout this work it is possible to assert that financial literacy suggests that there is a negative relationship between financial knowledge and the influence of bias. For instance, *Hilgert et al. (2003)* suggest that the success level in the practices such as cash flow management, credit management, saving and investment is higher when the financial literacy level is higher. *Lusardi and Mitchell (2007)*, in their analyses on financial knowledge, find that financial literacy is the primary determinant of retirement planning. According to several analysis, low levels of financial literacy were found to be correlated with the lack of portfolio diversification *(Kimball & Shumway, 2010)* and also concerning bias such as the home bias *(Kimball & Shumway, 2010).* These analyses contributed to the literature by looking into the relationship between the financial literacy and behavioral biases. Therefore, by observing the population and through these previous tests, it is possible to depict the way bias and financial education interact each with each other by confirming what financial literacy asserts.

Through the RStudio tools it is possible to easily obtain a *box plot*[43] that plots for each level of bias the distribution of participants' degree financial literacy. Overall, the plot will track also the relationship that links financial knowledge and bias.

[43] *It is a method for graphically depicting groups of numerical data through their quartiles. Box plots are non-parametric: they display variation in samples of a statistical population without making any assumptions of the underlying statistical distribution. Outliers may be plotted as individual points.*

Figure 6.18. Box plot: bias and financial knowledge

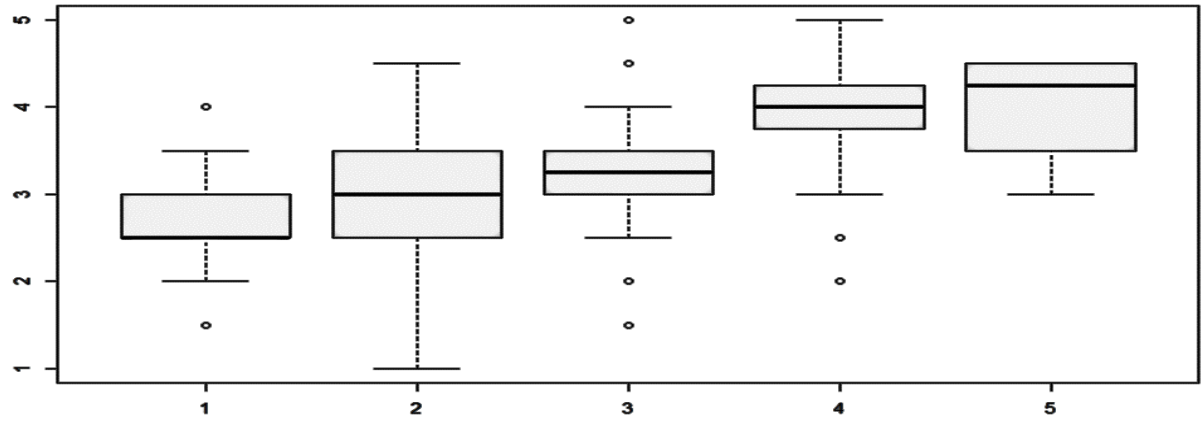


The figure represents the relationship between bias variable (x-axis) and financial knowledge variable (y-axis) of all the participants. Graphically the patterns are quite intuitive. Indeed, also by computing the correlation between the two variables, the result is -0.27 (negative correlation: greater the number of bias lower the degree of financial knowledge).

Figure 6.18. shows the inversely proportional tendency between financial knowledge and numbers of bias detected. Greater is the number of bias, lower tends to be the degree of financial knowledge of individuals, therefore, confirming what financial literacy suggests. Through the data it was possible to demonstrate that behavioral biases, which affect investor behavior, also are negatively related to the level of financial knowledge. People can suffer from behavioral biases and behave irrationally and as a result, as financial literacy suggest, this can lead to make bad investment choices. On the one hand financial literacy leads to better financial decisions; on the other hand, behavioral biases cause irrational financial behavior.

Next, another interesting pattern was also detected from the relationship between financial knowledge and propension to risk. Indeed, as it is possible to observe, *Figure 6.19.* shows the positive relationship between these two variables. Intuitively, this tendency is confirmed from the fact that a greater level of knowledge of the financial world makes individuals more aware of their financial decisions.

Figure 6.19. Box plot: financial knowledge and propension to risk



The figure represents the relationship between financial knowledge variable (y-axis) and propension to risk variable (x-axis) of all the participants. Graphically it is possible to immediately identify a positive trend. Indeed, also by computing the correlation between the two variables, the result is 0.47 (positive correlation: greater the knowledge of financial world, greater is the degree of propension to risk).

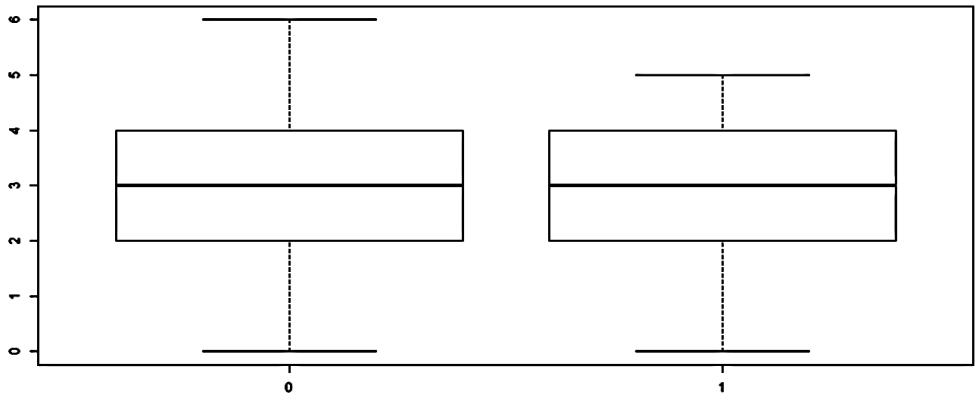
6.3.4. Repercussion on the choice of supplementary pension plan

To verify whether the financial knowledge variable and the bias variable have repercussions on the choice of supplementary pension plan, the analysis continues by gathering individuals who hold a SPP and those who do not in order to compare whether there are statistical differences between these subgroups. Contingency table method would perfectly represent these types of data. A graphical representation of the contingency table is the box plot which it is able to depict the two groups (YES-SPP and NO-SPP) and the way the two variables (financial knowledge degree and bias degree) are distributed. Through this graph it is possible to detect whether there are differences in the distribution of the data and the whether the tails of the distributions can suggest something more about this analysis.

Firstly, the analysis will start with the bias variable and how it differentiates between the two subgroups. Unfortunately, it was not possible to detect a statistical difference in the two gender groups and their application of bias. In *Figure 6.20.* it is possible to see the box plot of the bias variable distribution according to participants who hold a SPP (1) and those who do not (0). Running the Mann-Whitney test on the two subgroups, it is possible to find out that the p-value is 0.09459 which is above the 0.05 level. This implies that, concerning the bias variable, there is no statistical difference between individuals who hold an SPP and those who do not it. Therefore, it is possible to

conclude that there is no statistically different between individuals who hold a SPP and those who do not hold it. This means that individuals' bias for those who do hold a supplementary pension plan affect in the same way to participants who do not hold a supplementary pension plan.

Figure 6.20. Does the Bias variable affect the choice of SPP?



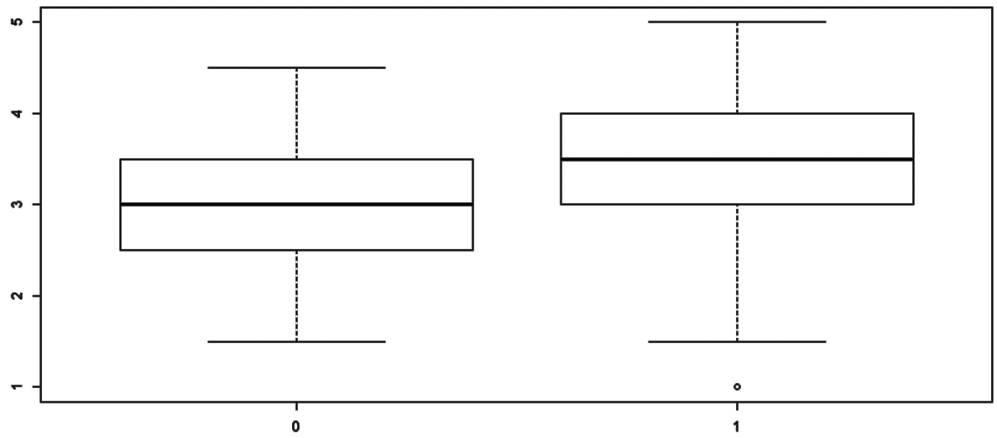
The box plot represents the two different distribution of bias degree (y-axis) according to 1 – individuals who hold a SPP and 0 – individuals who do not hold a SPP represented on the x-axis. The means are: for No SPP (2.98876) and for Yes SPP (2.81395). There is a little difference in the right tail distribution, however, these overall are really similar.

Next, the second test consist in identify the difference in the distribution according to the financial knowledge variable. *Figure 6.21.* represents the box plot of the financial knowledge variable distribution according to participants who hold a SPP (1) and those who do not (0). In this case, running the Mann-Whitney test on the subgroups, the p-value results 0.00692 which is lower than 0.05 level. Therefore, considering the financial knowledge variable, from the population it is possible to detect that there is a statistical difference between the two subgroups. This suggests that the distribution of the SPP (1) group according to financial knowledge has different patterns respect to the SPP (0) group.

In fact, in order to get a closer look to this analysis, from *Figure 6.22. A and B,* it is possible to see the graphical representation of the two distributions of the financial knowledge for the two subgroups. *Figure 6.22.A* represents the distribution of the subgroup for those who do not hold a SPP concerning the financial knowledge variable. Computing the skewness of this distribution, which is 0.13676, as the plot suggests, it results that there is a slightly positive skewness which indicates that the size of the right-

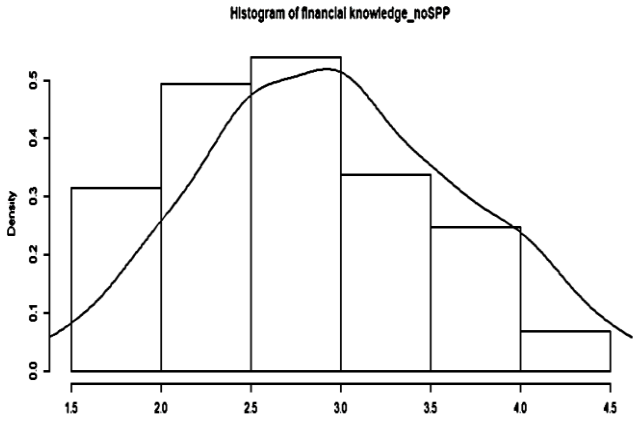
handed tail is a little bit larger than the left-handed tail. However, since the skewness ranges between –½ and ½, the distribution is approximately close to a symmetric one. On the other hand, *Figure 6.22.B* represents the distribution of the subgroup for those who do hold a SPP concerning the financial knowledge variable. In this case, the skewness computed is -0.2621388 which means that the size of the left-handed tail is a little bit larger than the right-handed tail. Also, in this case, the distribution is approximately close to a symmetric distribution, however, the skewness is more accentuated.

Figure 6.21. Does financial knowledge determine the choice of SPP?



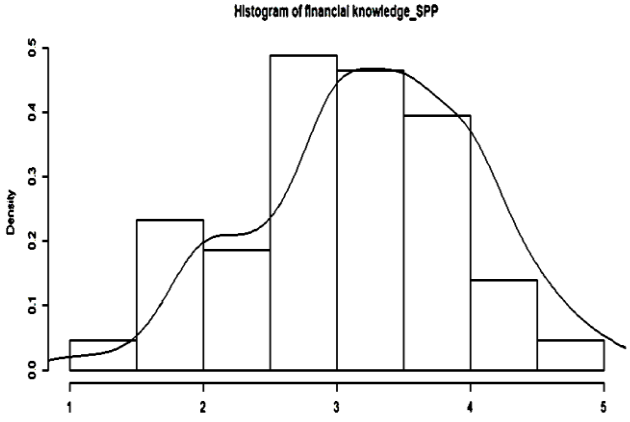
The box plot represents the two different distribution of financial knowledge (y-axis) according to 1 – individuals who hold a SPP and 0 – individuals who do not hold a SPP represented on the x-axis. The means are: for No SPP (2.9606) and for Yes SPP (3.2616).

Figure 6.22. A_ histogram No SPP (0) of Figure 6.22.



The graph depicts on the y-axis the density of the distribution, while on the x-axis the degree of financial knowledge.

Figure 6.22. B_ histogram Yes SPP (1) of Figure 6.22.



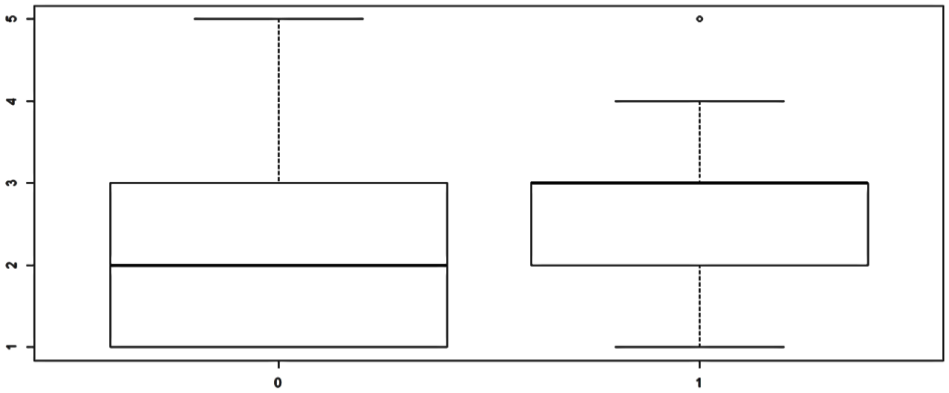
The graph depicts on the y-axis the density of the distribution, while on the x-axis the degree of financial knowledge.

As it possible to see from these two last figures, the data would suggest that individuals who hold a SPP happens to have a slightly better degree of financial knowledge respect to those who do not. Indeed, the right tail of *Figure 6.22.B* show that there are higher density levels between 3 and 4 grades of financial knowledge, while, in *Figure 6.22.A*, there are higher density levels between 2 and 4 grades.

Therefore, it can be concluded that financial knowledge might be an effective determinant concerning the financial decision to be engaged with supplementary pension plans. Comparing with the bias variable, unfortunately, the test did not provide any statistical result that would suggest that there are statistical differences between participants who holds a SPP and those who do not. However, statistical differences have been detected when financial knowledge variable was involved, thus, following what financial literacy suggests.

Lastly, the analysis concludes by identifying the differences between individuals' holding an SPP and those who do not accordingly to their propension to risk. Similarly to the previous cases, the following graph represents the difference in the distribution of the two subgroups through a box plot representation. As it is possible to see form *Figure 6.23.*, the two distributions are quite different and therefore further test are required.

Figure 6.23 Risk aversion and the choice of SPP



From the graph it is possible to see participants distribution according to their aversion to risk. On the x-axis are presented 0 and 1 which are respectively No SPP individuals and Yes SPP individuals; on the y-axis the degree of risk aversion; Mean for (1) is 2.546512, while the mean (0) is 2.101124.

According to the Mann-Whitney test, there is statistically significant difference between the two subgroups. The Mann-Whitney test presents a p-value of 0.00731 which

is below the 0.05. It is not possible to firmly establish that this evidence is due by chance or there are concrete explanations about this difference. Financial literacy might suggest that this would be caused by case of familiarity bias which can heavily influence the degree of propension to risk of individuals when facing a decision. In fact, individuals who happen to have higher level of risk aversion might shy away from uncertainty prospects and, therefore, shying away from opportunities the market offers. Even though it is not possible to firmly confirm this tendency, it can be concluded that risk aversion is related to SPP financial choice.

6.4. Consideration of the empirical work

In conclusion, from this empirical work, great part of the evidence presented in the chapter are mostly in accordance with what the main literature asserts about behavioral finance. Starting with the presentation of the survey, the way it was constructed, and the descriptive analysis of the data, the main objective of this last part was to verify whether behavioral finance insights are part of the financial choice than concerns supplementary pension plans.

In the first place, throughout the descriptive analysis of the data, it was possible to detect some differences concerning the gender. These were consistent regarding the level financial knowledge but also concerning the propension to risk. Indeed, it was detected in both cases statistical differences between the two subgroups. These statistical differences might be a cue for further investigation regarding this topic. Moreover, according to the SPP membership percentages, only the 35.29% (18 out of 51) of the female population hold a supplementary pension plan, while the 54.83% (68 out of 124) of the male population hold a supplementary pension plan. This confirms that genders behave differently when financial decisions are involved.

Also concerning the income level of participants differences were detected. Indeed, it seems that participants who hold a SPP, on average, have higher income respect to those who do not hold a SPP.

Unfortunately, it was not possible to detect some differences in the implementation of bias, therefore, from this analysis, the bias level was not a discriminating variable that was able to confirm genders' inequalities. In fact, this had repercussions also when the discrimination focused on participants who hold a SPP and

those who do not. Although, it was possible to find out that the level of financial knowledge and the degree of bias affection are negatively correlated, the bias variable did not result any statistical difference between the two subgroups.

Conversely, the financial knowledge variable and the risk aversion variable presented interesting point which are worthy of consideration. In fact, starting with the financial knowledge, through the graphical representation of the box plot and the Mann-Whitney test, it was possible to find out that there is a difference between the means of the distributions. In particular, this difference was underlined by the analysis of the tails of the distribution thanks to the histogram representation. The graphical representation of the tails and the skewness analysis detected that the two distributions present opposite tendencies. In the same way, also for the propension to risk variable it was possible to detect a similar pattern. Even though it was not possible to provide a deeper analysis on the tails, the Mann-Whitney test confirms that there is a difference in the means.

In conclusion, thanks to the data analysis provided from the survey, it is possible to assert that there are actually patterns that differentiate SPP holders from SPP not holders. Also, through data it was possible to show that there is a positive influence that relates financial knowledge and supplementary pension plan choice. However, this positive relationship was not possible to detect concerning the behavioral bias affection which seems to be constant independently whether individuals hold a SPP or do not. Lastly, it is not possible to completely affirm that also propension to risk is related to SPP choice, however, evidence suggest that participants who hold a SPP show slightly higher risk attitude compared to those who do not. This would reconcile to the idea that individuals who are more risk averse tend to shy away from what they do not know.

CONCLUSION

This thesis discussed supplementary pension plans and the way individuals are affected by several aspects that only the field of behavioral finance can explain. Making decisions in the absence of certainty is complicated, especially when dealing with financial choices that are related to the future. The difficulty derives both from the possible lack of skills in the field, but also from the influence of psychological and emotional factors. The field of behavioral finance integrates and enriches classical economic theory by highlighting the so-called behavioral biases, namely, cognitive and emotional errors individuals do when facing an uncertainty prospect.

In particular, through fundamental insights coming from the seminal work of Kahneman and Tversky, great part of contemporary financial economy focuses on biases and heuristics which are recognized as the main drivers that affect the investing decision of individuals. Myopic loss aversion, poor diversification, segregation in separate mental accounts, disposition effect, are all incorrect behaviors that derive as much from psychological and sociological factors as from the gaps in knowledge on financial matters that characterize most individuals.

Along with the behavioral finance field, it was explained that also the degree of financial literacy is a predominant component in the investment choice. As it was provided by scholars such as Lusardi and Mitchell, financial knowledge is very heterogeneous. In fact, differences can be detected depending on the geographic area, but also across different characteristics such as gender or age. In particular, from the empirical analysis previously provided, it was demonstrated that genders show two different statistical results of financial literacy level. As a consequence, also the degree of financial literacy affects the way individuals deal with financial decision and thus, savings for retirement.

The importance of financial knowledge is sustained by two important actors in the market. On one hand, governments and international organization such as OECD which oversee the effectiveness of educational programmes across the economy and monitor its effect on the population. On the other hand, financial advisors who help investors to

overcome to lack of financial knowledge and the distortion of rationality due to bias and emotions. The benefic role of financial advisors relies on the ability to overcome the non-rational behavior of investors. In particular, when financial decision involves temporary prospects in which individuals struggle with planning their money management. By focusing in maintaining the trust with clients, as Gennaioli prescribes from his model, one of the most important tasks of money doctors is to help clients to plan clients' management of their assets by taming the cognitive and emotional errors. For instance, advisors help through the debiasing process (techniques that can reduce the effect of bias), furthermore, according to the type of client, they are able to push or moderate them in order to obtain the best result that suits the characteristics of the client. Therefore, there are strong pieces of evidence that sustain the necessity of individuals to be guided in their financial choices and, in particular, the one concerning retirement.

Because of the current situation in which the pension system has changed so dramatically, individuals should be aware and act more carefully when financial decision must be taken. In particular in Italy, the necessity to improve the way individuals follow the "*life-cycle hypothesis*", namely, the way they smooth their consumption over the time, is a fundamental requirement nowadays. In fact, pensioning is an important goal for workers and the choice concerning the management of retirement savings is a concrete example of how behavioral finance can be useful to individuals. Today, several risks characterize the pensioning forecasts of Italians, these are the longevity risk, pensioning rates of substitutions and collapse of the generational pact. In order to overcome these issues, the Italian government, along with European regulations, instituted the *252/2005 regulation* on pensioning system. This new regulatory environment is slowly pushing Italian workers to adhere to supplementary pension plans systems such as Open-ended Funds, Negotiated Funds or Individual Pension Plans. These form of supplementary pension plans are devoted to sustain and maintain the standard of living of individuals over the years. However, still a high number of workers do not hold a supplementary pension plan in Italy, especially self-employed workers whose are the most penalized by the public pension system.

A valid answer to this low participation rate level was found in the field of behavioral finance. Indeed, the influence of behavioral bias concerning savings for pensioning are numerous. In particular, present bias, home bias, familiarity, overconfidence, mental accounting and myopic loss aversion are able to push away

investors from responsible financial decisions making them missing opportunities the financial market offers.

From the empirical analysis of data emerged that the population analyzed shows a medium level of participation of supplementary pension plans which is more or less in accordance to the Italian membership rate. Furthermore, it was demonstrated that financial knowledge and bias affection are negatively related and conversely, financial knowledge is positively related to the propension to risk, therefore, confirming what financial literature asserts. Unfortunately, despite the fact that it was not possible to find out any statistical difference in bias affection between individuals who hold a SPP and those who do not, interesting results show that financial literacy and propension to risk of individuals are two variable that detect a statistical difference between these two subgroups. Therefore, this analysis demonstrates that some differences exist between the group of SPP owners and the group of not owners. This result would suggest, especially for the financial literacy variable but also for risk aversion, that SPP owner would show higher degree of financial knowledge and less risk aversion respect to those who do not. This would probably reconcile with the fact that a better financial knowledge and a not excessive risk aversion would lead investors to open up to this new important instrument for the management of future savings for retirement.

Overall, the role of the advisor is fundamental for the supplementary pension plans. Today, those who lead a quality financial planning and consulting profession need a global view of the client. Good financial planning must begin with protecting investors' savings first. Indeed, a choice as important as that of adding a contribution to the continuous reduced public pension is a necessity for everyone, not only in terms of returns but also in terms of fiscal and tax level. The advisor who leads clients to make this choice should also provide them with targeted advice based on the years of contributions that have yet to be paid and the amount they will want to integrate in the future in order to maintain their standards of living. This process creates a mutual benefit. On one hand, the client improves his savings management and receives financial knowledge and education through the advisory service. On the other hand, the consultant receives compensations and establishes a relationship based on trust in which this figure can expand his/her management skills on the rest of clients' capitals aiming for extra returns.

In conclusion, the overall paper stresses out the importance of being aware of the fact that individuals' way of thinking detaches from the concept of rationality, and thus,

this might eventually make people fail. The study of behavioral approach, not only in finance but also in daily lives, would make individuals more aware of the way they should behave in front of situation of uncertainty in order to make people more conscious about choices that can guarantee an adequate standard of living.

BIBLIOGRAPHY

Alemanni B. (2008). "*Finanza comportamentale: presupposti teorici e approcci in letteratura*". Impresa progetto, rivista online del DITEA, No.1

Alemanni B., Cervellati E. M., Rocca S., Rocco G., (2013) Allegato alla pubblicazione Mefop Newsletter n. 52, *La previdenza comportamentale.*

Barberis, N., Thaler, R. (2002). Chapter 18 in Handbook of the Economics of Finance, 2003, vol. 1, Part 2, *A survive of behavioral finance, 1053-1128.*

Bisin A., Hyndman K. B., (2019), Games and Economic Behavior, *Present-bias, procrastination and deadlines in a field experiment*

Benartzi, S., Thaler, R.H. (1999), Management Science, Vol.45, No.3, *Risk Aversion or Myopia? Choices in repeated gambles and retirement investments*, 364-381.

Campbell J. Y. (2006), Journal of Finance VOL. LXI, NO. 4, Household Finance, 1553-1604.

Cervellati E. M. (2015), Ateneo Editoriale No. 82, newsletter per l'investitore istituzionale, 6-10.

Cervellati E. M. (2012), *Finanza comportamentale e investimenti. Oltre l'approccio tradizionale per comprendere gli investitori*, Milano, McGraw-Hill, I-156

Collins J. Michael (2012) Financial Services Review, Financial advice: A substitute for financial literacy? 307-322.

Covip (2018), *RELAZIONE PER L'ANNO 2018 – COVIP www.covip.it Relazione-annuale-2018-20190612*

Cruciani C. (2017), Investor Decision-Making and the Role of the Financial Advisor, A behavioral finance approach, Palgrave MacMillan (ISBN 978-3-319-68234-1).

Damayanti S. M., Murtaqi I. and Pradana H. A. (2018), The Business and Management Review, Volume 9 No.3, The importance of financial literacy in a global economic era, 435-441.

Damasio H., Bechara A. and Damasio A. R. (2000), Oxford University Press, Emotion, Decision Making and the Orbitofrontal Cortex.

Dasgupta P. and Maskin E. (2005), American Economic Review Vol. 95, No. 4, September 2005, *Uncertainty and Hyperbolic Discounting,* 1290-1299.

De Maza D., Reyniers D. J. and Irlenbusch B (2008), Londo School of Economics, Financial Services Authority, Financial Capability: A behavioral Economics Perspective.

Dorn D. and Weber M. (2017), Journal of Economic Literature, *Losing Trust in Money Doctor.*

Fornero E., Monticone C. (2011), Financial literacy and pension plan participation in Italy, 547-564.

Gennaioli N., Shleifer A. and Vishny R. (2015), Journal of Finance, Money Doctors, 91-114.

Gigerenzer G., Selten R. (2001) The MIT press, *The Adaptive Toolbox*.

Graham B. (1949), The Intelligent Investor (riedizione del 1949), Collins, 2005, pp. 269.

Haslem John A. (2010), The Journal of Investing, *The New Reality of Financial Advisors and Investors.*

Hepburn C. and Duncan S. (2010), Behavioural Economics, *Hyperbolic Discounting and Environmental Policy*, pp 89–206.

Hirshleifer D. and Shumway T. (2003), Journal of Finance, Good Day Sunshine: Stock Returns and the Weather.

Huston S. J. (2010) Journal of Consumer Affairs 44, Measuring Financial Literacy, 296-313.

Kahneman D. and Tversky A. (1979), Econometrica vol 47, Prospect Theory: An Analysis of Decision Under Risk, 263-291.

Kahneman D., Tversky A. (1973) Cognitive Psychology, Availability: A Heuristic for judging frequency and probability, 207-232.

Kahneman D. and Tversky A. (1983), Psychological Review, 90(4), *Extensional versus intuitive reasoning: The conjunction fallacy in probability judgment,* 293–315.

Kahneman D. and Tversky A. (1992), Journal of risk and uncertainty, Vol.5, *Advances in Prospect Theory: Cumulative Representation of Uncertainty*, 297-323.7

Kim Young-Hoon, Kwon Heewon and Chiu Chi-Yue (2017), Department of Psychology, Yonsei University, Seoul, South Korea, Department of Psychology, The Chinese University of Hong Kong, *The Better-Than-Average Effect Is Observed Because "Average" Is Often Construed as Below-Median Ability.*

Kimball M. S., Shumway T. (2010), University of Michigan, *Investor Sophistication and the Home Bias, Diversification, and Employer Stock Puzzles, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1572866.*

Laibson D. (2003), *Encyclopedia of Cognitive Science 2003, Intertemporal decision making*, 32(2), 311–328 https://doi.org/10.1037/0022-3514.32.2.311.

Langer, E. J. (1975). The illusion of control. Journal of Personality and Social Psychology.

Lee J. M. and Sherman D. H. (2015), The Journal of financial Counseling and Planning Volume 26, *Savings Goals and Saving Behavior from a Perspective of Maslow's Hierarchy of Needs*, 129-147.

Linciano N. (2010), Consob, Quaderni di Finanza n°66, Errori cognitivi e instabilità delle preferenze nelle scelte di investimento dei risparmiatori retail.

Lowenstein, G., & Lerner, J.S. (2003), Handbook of Affective Science, The role of affect in decision making, 619-642

Lusardi A., Michell O. S. (2014), Journal of Economic Literature, *The economic importance of Financial Literacy: Theory and Evidence*, 5-44

Lusardi A., Mitchell O. S., and Curto V. (2009), *Financial Literacy among the Young: Evidence and Implications for Consumer Policy*.

Lusardi A., Bumcrot C. B. (2011), RAND Labor and Population, *The Geography of Financial Literacy*.

Lusardi A. and Tufano P. (2009), *Debt Literacy, Financial Experiences, and Overindebtedness.*

Lusardi A., Keller P. A., Keller A. M. (2008) *New Ways to Make People Save: A Social Marketing Approach.*

Lusardi A., de Bassa Scheresberg C. (2015), Global Financial Literacy Excellence Center Working Paper No. 2013-1, *Financial Literacy and High-Cost Borrowing in the United States.*

Lusardi A., Mitchell S. Olivia, Curto V. (2009) Nber Working Paper Series, Financial Literacy Among the young: Evidence and Implications for Consumer Policy.

Lusardi A., Michaud P.C., Mitchell O. S. (2013), National bureau of economic research, Optimal Financial Knowledge and Wealth Inequality.

Lusardi A., Bumcrot C. B. and Lin J. (2011), *The Geography of Financial Literacy.*

Markowitz, H.M. (March 1952), The Journal of Finance, Vol. 7, No. 1, Portfolio Selection, pp. 77-91.

Mitchell, O. S., Utkus, S. (2004). in Mitchell O. S., S. Utkus eds. "Pension design and structure. New lessons from behavioural finance", Oxford University Press, *Lessons from behavioural finance for retirement plan design.*

Monti L., Azzarà Z. and Berti F. (2015), *Divario generazionale, il senso della dismisura*.

Modigliani F, Miller H. M., (1961), Journal of Business, *Dividend Policy, Growth, and the Valuation of Shares,* 411-411

OECD (2017), *Policy Framework for Investor Education.*

Pictet (2017), Dopo 10 anni i fondi pensione si rivelano più convenienti del TFR in azienda, https://www.am.pictet/it/blog/articoli/mercati-e-investimenti/dopo-10-anni-i-fondi-pensione-si-rivelano-piu-convenienti-del-tfr-in-azienda.

Pompian M. and Longo J. (2005), Journal of Financial Planning (march 2005), *Incorporating Behavioral Finance into Your Practice,* 58-63.

Raafat R. M., Chater N. and Frith C. (2009), Trends in Cognitive Sciences, *Herding in Humans,* 420-428.

Samuelson P. A (1937), The Review of Economic Studies, Volume 4, Issue 2, *A Note on Measurement of Utility*, 155–161.

Simon H. A., (1956), *Rational choice and the structure of the environment*, Psychological Review, vol. 63, March, compiled in, and quoted from, de, Simon (1957: 261-273).

Skala D. (2008), Published in: Bank I Kredyt, Vol. April, No. 4, Overconfidence in Psychology and Finance - An Interdisciplinary Literature Review, 33-50.

Statman M. and Shefrin H. (2000), The Journal of Financial and Quantitative Analysis, Jun., 2000, Vol. 35, No. 2 (Jun., 2000), 127-151.

Statman M. and Shefrin H. (1985), The Journal of Finance, *the disposition to sell winners too early and ride losers too long: Theory and Evidence*.

Statman M. (2002), AIMR's Investment Counseling for Private Clients IV, no. 4, *Financial Physicians*.

Statman M. (2019), *Behavioral Finance* - The Second Generation, CFA Institute, 8-10.

Richards S. and Jones G. (2004), Financial aspects of Longevity Risk, 4-19.

Thaler R. H. (1999), Journal of Behavioral Decision Making, *Mental accounting matters*.

Thaler, R. H. (1985), Marketing Science, Vol. 4, No. 3, *Mental Accounting and Consumer Choice*, 199-214.

Vanek J. and Botlik J. (2013), Procedia - Social and Behavioral Sciences, *can education help to reduce information asymmetry?* 591-597.

Vranas P. B. M. (2000), Cognition 76, *Gigerenzer's normative critique of Kahneman and Tversky*, pp 178-193.